“Analysis of Vaginal Candidiasis Prevalence among Bangladeshi Women in Relation to Menstrual Hygiene and Other Risk Factors: A cross-sectional study”

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A thesis submitted to the Department of Mathematics and Natural Sciences in partial fulfillment of the requirements for the degree of Bachelor of Science in Biotechnology

Mathematics and Natural sciences
Brac University
September, 2022

Declaration

It is hereby declared that

1. The thesis submitted is my/our own original work while completing 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

The thesis titled **"Analysis of Vaginal Candidiasis Prevalence among Bangladeshi Women in Relation to Menstrual Hygiene and Other Risk Factors: A cross-sectional study",** submitted by

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of Spring, 2016 has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Bachelor of science in Biotechnology on 30th September, 2022.

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Ethics Statement:

I hereby state that, this thesis, titled, **"Analysis of Vaginal Candidiasis Prevalence among Bangladeshi Women in Relation to Menstrual Hygiene and Other Risk Factors: A cross-sectional study"** is based entirely on my original research and writing and nothing in it has been published before or authored by anyone else is included, and it has not been submitted for credit toward any other degree program at any other university or higher education institution.

This research was conducted under the direction of Dr. Mohammad Rafiqul Islam, Associate Professor in the Department of Mathematics and Natural Sciences at Brac University, Dhaka and was conducted at AK Memorial Hospital situated in Maona, Gazipur, and Lubana General Hospital and Uttara Cardiac Center situated in Uttara, Dhaka.

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Abstract

Vaginal candidiasis, which is an infection of the female reproductive system, continues to be a leading risk factor of morbidity, which negatively impact the physical and mental health of women worldwide. As the second most common kind of vaginal infection, this illness affects many women. *Candida albicans*, the fungus that causes vaginal candidiasis (VC), continues to be a major health issue for reproductive-age women. Despite widespread awareness, vaginal candidiasis is still seen as a minor health issue in many impoverished nations like Bangladesh. This study aimed to examine and evaluate the prevalence of vaginal candidiasis and its association with menstrual hygiene and other risk factors among reproductive-aged women. This cross-sectional study was carried out at AK memorial hospital, Maona, Gazipur and Lubana General Hospital & Uttara Cardiac Center. The total number of participants were 244, among them 91 tested positive for Vaginal Candidiasis. Among the participants, prevalence of Vaginal Candidiasis was mostly seen on women aged between 15 to 34 (66%) and also in 70.3% patients who are married. According to the educational background and social status, prevalence of this disease is mostly seen on women of lower middle class and with higher secondary education. Another major part of the study is to know about the relation between menstrual hygiene and vaginal candidiasis. About 33% of the women use cloth and another 33% use both sanitary napkin and cloth as an absorbent. 68% women change the absorbent only about 1-2 times per day. Because of these practices poor menstrual hygiene is detected as the most causative factor of Vaginal Candidiasis among these women from this study (about 35%). This study also investigates the various symptoms and problems experienced by people with vaginal candidiasis. In developing country like ours, in most of cases this disease is treated after only doing pelvic examination. Though, Vaginal Candidiasis is a type of mild infection for most the cases still it needs to be given importance as it can cause troublesome and serious complications such as recurrent infection, candidemia etc.

Keywords: Vaginal Candidiasis, Menstrual hygiene, Menstrual absorbent, Absorbent change rate, Pelvic examination, Recurrent infection.

Dedication

This work is dedicated to my parents, my brother Sujon, my sister Zahra and my best friend Gregory

Bristy Gloria Gomes

September, 2022

Acknowledgement

The first thing I want to say is that I am grateful to the most high God for granting me the opportunity to do this research.

I would like to convey my profound appreciation to Professor A F M Yusuf Haider, PhD. Chairperson, Department of Mathematics and Natural Sciences for granting me permission to pursue my studies in this department.

I'd like to express my thanks to my supervisor, Dr. Mohammad Rafiqul Islam, Associate Professor, Department of Mathematics and Natural Sciences, for all of his time, effort, understanding, encouragement, inspiration, insight, and expertise over the duration of my work.

Then, I would like to express my deepest gratitude to Dr. Iftekhar Bin Naser, Associate Professor, Department of Mathematics and Natural Sciences and Dr. Munima Haque, Associate Professor & Coordinator of Biotechnology Program, Department of Mathematics and Natural Sciences, for their devoted, insightful, and motivational guidance throughout the process.

For the privilege of doing my research at their prestigious institution, I would like to thank Md Tajul Islam, Managing Director of A.K. Memorial hospital, and Md. Shah Zahidul Islam, Managing Director of Lubana General Hospital and Uttara Cardiac Center in Uttara, Dhaka.

I want to thank my parents from the bottom of my heart for always believing in me, always encouraging me to follow my dreams, and always being there for me, even when things were bleakest.

Bristy Gloria Gomes

September, 2022

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List of Acronyms

SRY: Sex-determining Region of the Y chromosome

WHO: World Health Organization

STI: Sexually Transmitted Infection

VC: Vaginal Candidiasis

STD: Sexually Transmitted Disease

VVC: Vulvovaginal Candidiasis

BV: Bacterial Vaginosis

HIV: Human Immunodeficiency Virus

MHM: Menstrual Hygiene Management

MHH: Menstrual Health and Hygiene

WASH: Water, Sanitation and Hygiene

RVVC: Recurrent Vulvovaginal Candidiasis

SRHR: Sexual and Reproductive Health and Rights

DM: Diabetes Mellitus

Chapter 1: Introduction

Introduction

One of the characteristics that sets living things apart from inanimate things is their capacity for reproduction. Reproduction is a process where parent organism give birth to offspring's that are genetically or biologically similar to themselves. Reproduction is the most important feature of earth by which the existence of species continues. Two types of reproduction can be seen. They are, asexual reproduction and sexual Reproduction. As being part of animal kingdom human reproduce sexually. In sexual reproduction 2 parents are required. This is a process where a new unique life forms are made by the combination of hereditary data from two people of various genders. The hereditary data or genetic information is stored on chromosomes which is situated inside the nucleus of particular sex cells called gametes. The male gamete is called sperm whereas the female gamete is called egg or ovum. In the process of sexual reproduction these two gametes fused together a process named as fertilization to create a zygote which then produce embryo. In fallopian tubes fertilization takes place. Fallopian tube connects the ovaries to the uterus.

The female reproductive system is a sensitive and intricate part of the female body. Infections, injuries, and other issues (including some chronic ones) can be avoided if one takes the right precautions. Reproductive health is a subset of sexual and reproductive rights which focuses on an individual's overall well-being as it relates to reproduction at every age.

The World Health Organization (WHO) defines reproductive health as a "condition of full physical, mental, and social well-being in all aspects relevant to the reproductive system and its activities and processes, which goes beyond the simple absence of sickness or infirmity". It is crucial to take good care of female reproductive organs in order to prevent a number of painful and uncomfortable reproductive illnesses and the spread of STDs. Keep one's reproductive system in good shape is guarantee to a healthy sexual life. Likewise, it's important for the growth

of healthy kids. Women's reproductive health problems are directly responsible for the bulk of the world's 1.3 million female deaths per year.

Infections of the reproductive system are being recognized as a major worldwide health issue that affects not only individuals but also their loved ones and community. Negative effects such as infertility, ectopic pregnancy, persistent pelvic discomfort, miscarriage, and a higher risk of HIV transmission are all possible results. Since many female reproductive tract infections are asymptomatic or have vague symptoms, women bear a significant share of the burden of untreated RTIs. Despite the fact that RTIs afflict women in both developing and developed nations, the infections and their consequences are an especially pressing public health concern in places with limited access to healthcare. A 2003 CDC study found that the prevalence of reproductive tract disorders among women in underdeveloped nations was 10-15% greater than in developed ones. The proportion of female morbidity attributable to reproductive tract infections is 22 percent worldwide, with the highest frequency in South Asia and Sub-Saharan Africa (where 150 million of the total 340 million cases are concentrated) (Msuya et al., 2002).

Among all type of RTI's Bacterial Vaginosis and Vaginal Candidiasis is most common type of infections that women face most during their lifetime between these Vaginal Candidiasis is the second most common type of infection. It is caused by overgrowth of *Candida*. *Candida* is a common yeast that harmlessly colonizes human skin and internal environments such the mouth, throat, stomach, and vagina. Symptoms of a yeast infection include changes to vaginal discharge and discomfort in the vulva (the outer regions of the vagina). Vaginal Candidiasis infection can affect women and girls of any age. But it is less common in women before puberty and after menopause. In most cases, a yeast infection will affect three out of every four females. Nearly half of all females suffer from several infections. Among many causes, poor menstrual hygiene and use of over the counter antibiotic can be said as the main reason that cause the disease. In most developing country, menstrual hygiene still remains as a taboo for

which women do not know about it and face many complications. From various study, it has been seen that socio-demographic factors such as age, marital status, educational background, social status etc. have association with Vaginal candidiasis. The aim of this study is to determine the prevalence of Vaginal Candidiasis among women of reproductive age and to see the risk factors, symptoms, and consequences and association of it with various socio-demographic factors.

Chapter 2: Female Reproductive System

Female Reproductive System

2.1 Introduction

There are 11 different organ systems present in human body and reproductive system is one of them which plays a vital role in human life. Reproductive system of human includes the tissues, glands, organs which help the organism to produce and support live offspring. Reproductive system of female is situated deeply inside the pelvic cavity which is situated in the lower part of abdominal cavity. The female reproductive system is very interesting yet complex subject. For the purpose of proliferation, it has the ability to work with the other body systems intimately. The female reproductive system is consisting of internal and external sex organs which work together for the purpose of sexual reproduction. There are many functions carried out by the female reproductive system, such as:

- Produces ovum or egg during reproductive cycle
- To receive male gametes spermatozoa (sperm)
- Provides a suitable environment for the fertilization process and helps in the early embryo development which further supports pregnancy period
- Facilitates parturition or childbirth and laboring process
- For maintaining the reproductive cycle, it produces sex hormones such as progesterone and estrogen.
- Provides lactation for the baby

2.2 Development of the female reproductive system:

Reproductive systems begin to form in the embryo shortly after conception. Constantly, the maturation of the urinary system is involved. During the first eight weeks of an embryo's development within the uterus, there are no outward indications of its gender. During this stage, the chromosomes of an embryo's cells must be analyzed in order to determine its gender. This stage is known as indifferent stage. The development of the fetal gonads and external genitalia

begins in this stage. The same cluster of cells in male and female embryos has the capacity to develop into either male or female gonads; these tissues are termed as bipotential.

Females are regarded as the "fundamental" sex, as all fertilized eggs would naturally develop into females absent any chemical stimulation. The Y chromosome in men contains the gene responsible for initiating the series of events (known as the SRY gene) that lead to the development of a male sex organ. Due to the absence of a Y chromosome in females, the SRY gene is absent in females. The absence of a functioning SRY gene results in a feminine phenotype. Without SRY, the epithelium of the gonads produces cortical cords then primitive ovary. The presence of the SRY gene attracts other genes that initiate testis development. Leydig cells emit testosterone when they detect the testis nearby, prompting some bipotential tissues to develop into male reproductive structures. Because of a lack of testosterone, bipotential cells fail to develop into the male testes but rather the female clitoris.

During embryonic development, male and female fetuses are identical, both have three basic protuberances that serve as external genitalia and duct systems that connect the undifferentiated gonads to the outside world. Each developing embryo has four ducts, the fate of which has a major impact on how men and women develop biologically. During embryonic development, one of two rudimentary duct systems gives rise to the internal reproductive organs such as the uterus, uterine tubes, and part of the vagina in females and the epididymis, ductus deferens, and seminal vesicles in males.

The female duct also known as the paramesonephric or Müllerian duct, will form and the Wolffian duct will deteriorate in the absence of testosterone and anti-Mullerian hormone. Which indicates the developing embryo will be a female. There are three distinct sections to these ducts known as Cranial, Horizontal and Caudal. The Fallopian tubes develop from the Cranial and Horizontal part. The cervix, the upper one-third of the vagina and the uterus, all devel-

ops from the caudal part. Sinovaginal bulbs which derived from the pelvic part of the urogenital sinus made up the vagina's lower two-thirds.

The development of the female external genitalia is controlled by oestrogens in the fetus. To become the clitoris, the genital tubercle merely grows somewhat longer. Both the labia minora and labia majora develop separately from the urethral folds and genital swellings and they do not unite. Therefore, the urogenital groove is left unclosed, serving as a vestibule into which the urethra and vagina opening.

Sexually functional adult organs are present in the correct anatomical locations but are not yet active at birth. Up until the onset of puberty, all reproductive organs develop normally and increase at a consistent rate. Increased sex gland activity and the gradual maturation of secondary sexual features are hallmarks of the onset of puberty. Women experience an expansion of their external genitalia and the onset of menstruation at puberty, marking the beginning of the uterus' periodic activity. Mammary glands enlarge and fat is deposited, giving the body the typical female shape. The pubic and axillary (armpit) hair follicles grow more rapidly and thicker.

2.3 Anatomy of the Female Reproductive System in Brief

The female reproductive system can be broadly classified into three subsystems based on their primary functions. They are primary sex organs, secondary sex organs and secondary sex characteristics. The gonads, reproductive ducts, and external genitalia make up the female reproductive system. The gonad is the major gland that creates reproductive cells (gametes), this is also known as primary sex organ. Female gonads are called ovaries. Reproductive ducts consist of the oviducts, uterus, and vagina. Reproductive ducts, external genitalia and mammary glands are the part of secondary sex organs. Secondary sex features in females include the pattern of body hair and a wide pelvis, as well as the distribution of fat between the breasts, belly, mons pubis, and hips.

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.

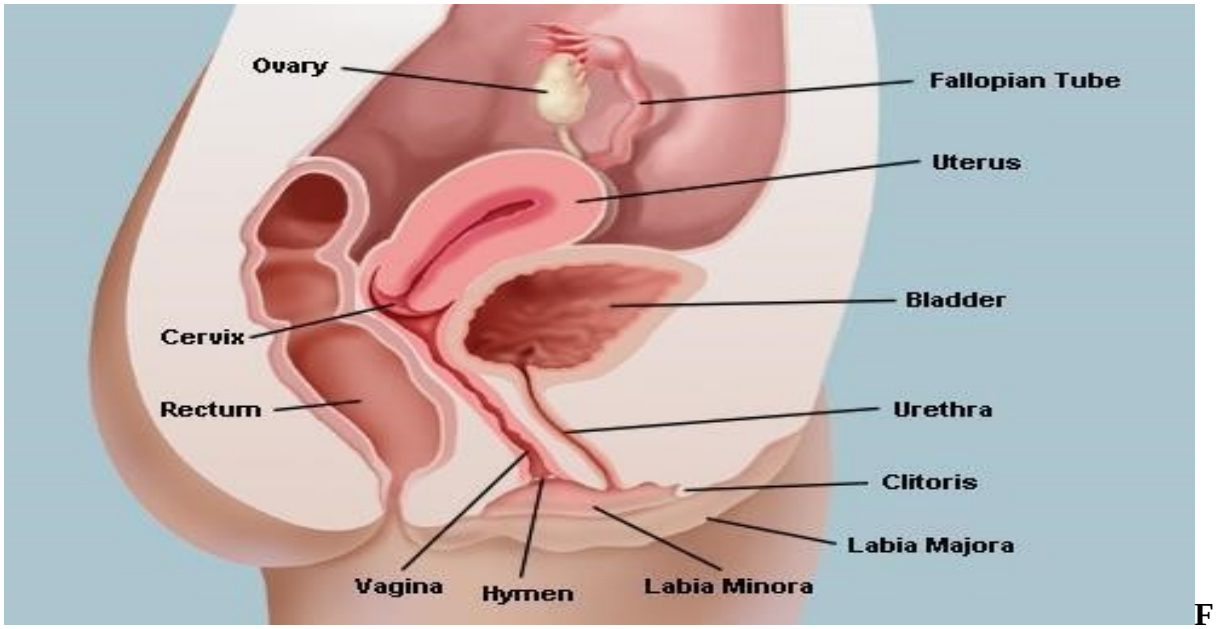

Fig 1: Female reproductive system

2.3.1 Internal Genitals

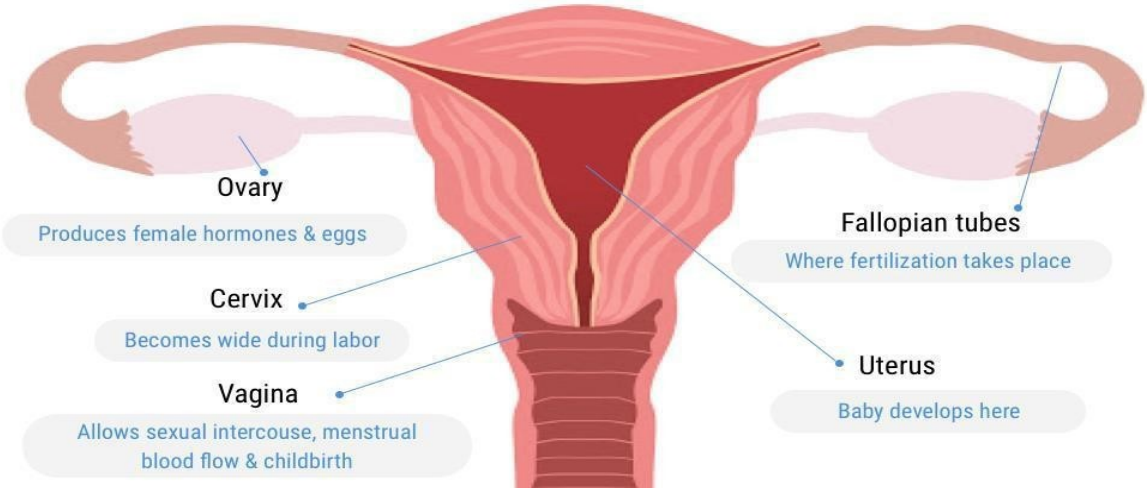

Fig 2: Female internal genital

Ovary: Ovaries are a pair of oval shaped female gonads or glands situated on either side of the uterus within the pelvic cavity. Each ovary is 4 cm long, 2 cm wide and 1 cm thick in size and weights around 2 to 5 grams. Ovaries are the primary sex organ which produces the ovum. The endocrine system is connected to the reproductive system through the ovaries.

Each ovary consists of parts known as surface, tunica albuginea, cortex and medulla. The surface area is made of simple cuboidal epithelium which is also known as germinal epithelium. The tunica albuginea, which is a layer of connective tissue, serves as the foundation for the germinal epithelium. Cortex has stroma present inside it which is made up of connective tissue and it has ovarian follicles which contains oocytes. Loose connective tissue makes the medulla where many blood vessels are seen which penetrates through the hilum of ovary.

Function: Two major roles of the ovary are the creation and release of the ovum, as well as the secretion of estrogen and progesterone hormones.

Uterus: The uterus, also known as womb has a thick lining and muscular walls and is shaped like an upside-down pear. It is hollow and located near the pelvic cavity's floor, which allows a blastocyte, or fertilized egg, to implant and develop. Some of the strongest muscles in the female body are found in the uterus. The uterus is approximately three inches long, two inches wide, and one inch deep. The size of uterus increases during and after childbirth and decreases after menopause. The uterus can be divided into 3 parts; fundus, body and cervix.

The wall of uterus, consist of 3 layers known as endometrium, myometrium and serosa. The myometrium is the middle layer made up of smooth muscle fibers, connective tissue and many elastic fibers. This layer expands in size during pregnancy to hold the fetus, initiates labor and delivery. The innermost layer endometrium shed during each menstrual cycle and further regenerates. The body of uterus is covered by the serosa.

Function: Uterus receives the fertilized egg, transport sperm and holds the developing fetus.

Vagina: The vagina is a flexible, fibromuscular duct, located between the urinary bladder and the rectum connects the uterus and cervix with the vulva vestibule. The size of vagina ranges from 7-10 cm in length and about 2.5-3 cm in width. A longitudinal column is made up of the outer walls of vagina is called the fornix.

Three layers made up the vagina, they are inner mucous membrane which contain transverse folds known as rugae, a middle layer made up of smooth muscle and an outer layer known as adventitia. The mucous membrane has several longitudinal folds and is tightly attached to the muscular layer underneath it and lined with squamous epithelial stratification. An exterior layer of longitudinal fibers and a much thinner inner layer of circular fibers make up the muscle coat which contain a lot of elastic fibers. Adventitia is composed of fibrous tissue that contains a lot of elastic fibers and surrounds the muscle wall.

A standard population of microorganism's lives in the vagina and helps to defend it against infection by harmful bacteria, yeast, and other organisms that can enter the vagina. *Lactobacillus acidophilus* known as the beneficial bacteria is present in the vagina which secrets lactic acid to keep the pH of the vagina acidic (lower than 4.5), in which most pathogenic microorganisms cannot survive. Lactic acid combined with other vaginal secretions, makes vagina a self-cleaning organ.

Function: During coitus (sexual intercourse) vagina acts as a receptor of male genital and semen. Also, it provides a pathway for the baby during childbirth and menstrual blood to exit the body. Furthermore, it can hold different types of birth control.

Fallopian Tubes: The fallopian tubes are also known as uterine tubes or oviducts, are pair of muscular tubes which connects the ovaries to the uterus. Each of the fallopian tube is about 10

cm long and about 0.7 cm in diameter. These tubes are located in lower part of pelvis and shaped like an extended J.

The uterine tubes are consisting of four parts named as intramural parts, isthmus, ampulla and infundibulum.

- Intramural Parts: The intramural is the medial most and most constrictive portion of the fallopian tube found inside the uterine wall. Its length is 1 cm and width is 0.7 mm. Through the uterine wall, the short interstitial portion links to the inside of the uterus.
- Isthmus: A small region that makes up around one-third of the tube's length is called the isthmus. It is between 1 and 5 mm wide and 3 cm long. It joins the uterine cavity and the ampulla.
- Ampulla: Ampulla refers to the widest part of the uterine tubes. It is 5 cm in length and 1 cm in width at its widest point. Its wall is thin, its luminal surface is folded, and fertilization typically occurs inside its lumen.
- Infundibulum: The last segment of the uterine tube is called the infundibulum which is a funnel-like form. The distal end of the infundibulum is linked to finger-like mucosal extensions called fimbriae. Fimbriae are finger-shaped, ciliated projections that pick up the ovum from the ovarian surface. Fimbriae is the term for the fringes, which are often counted as a separate fifth section. These fimbriae extend along the medial surface of the ovaries and are 1 mm broad. The ovarian fimbria is the longest fimbria and it is attached to the top of each ovary.

Functions: Fallopian tubes facilitates the ova's journey from the ovary to the uterus. The ampulla of fallopian tube is the typical location of fertilization and for fertilization to occur, spermatozoa make their way via the fallopian tube to the ovum. The ova and spermatozoa receive nourishment from tube secretions.

Cervix: The cervix is the lower section of the uterus that separates the uterus's body from the vagina. They make a nearly 90-degree bend where they meet. The cervix cavity (cervical canal) is thin and connects to the uterine cavity at one end and the vaginal canal at the other. The word cervix came from a Latin word which means neck, thus cervix is often called neck of the uterus or cervix uteri. The cervix has a conical or cylindrical form and is around 3-5 cm long on average. The cervix can be divided into 2 parts,

- Ectocervix: Stratified squamous non-keratinized epithelium tissue surrounds this area. The ectocervix is the cervix part that protrudes into the vaginal canal. The orifice of ectocervix is known as the external os, it is the point where the ectocervix and endocervical canal meet.

- Endocervical Canal: The endocervical canal (or endocervix) is the inner section of the cervix which is covered by mucus-secreting simple columnar epithelium. At a constriction known as the internal os, the endocervical canal terminates and the uterine cavity starts.

Function: The cervix allows sperm to enter and menstrual blood to escape the uterus. During childbirth it also allows the baby to pass through by expanding the cervical canal. Protects sperm from acidic environment of vagina and maintains upper female reproductive tract sterility.

2.3.2 External Genitals

Vulva: The external genital organs of the female reproductive system are also called vulva or pudendum which can be seen in the perineal area and located in genital orifice (opening of the vagina). The word Vulva came from a Latin word which means covering. Components of vulva are mons pubis, labia majora, labia minora, clitoris, urethra, hymen, perineum, vestibule, vestibular glands, vestibular bulbs. The external genitalia or vulva is covered with keratinized

stratified squamous epithelium. The development of the vulva take place mainly during the fetal and pubertal periods.

Functions: By using labia majora (large lips) and labia minora (small lips) as double door, the vulva protects the opening of uterus or womb which further protects the internal reproductive tract from infection. It also helps in urination or micturition process by opening the urethra. Vulva contains a nerve supply which function as a sensory tissue which can react in different sensory stimuli such as touch, pain, pressure and temperature which furthermore enhances sexual intercourse between male and female which later initiates the process of fertilization, pregnancy, labour and delivery of a child. By flushing out the vulvovaginal fluid the pudendum helps to maintain a normal vaginal health.

Mons Pubis: Mons Pubis, also known as Mons Veneris came from Latin word "Mound of Venus" (Roman Goddess of love). It is a soft pile of subcutaneous adipose connective tissue situated over the pubic bone. Hair development in a triangular pattern after puberty period can be seen on Mons Pubis.

Functions: Functions of Mons Pubis or Mons Veneris are to protect the vulva and pubic bone from injuring during sexual activity and also it secrets pheromones which boost up the sexual attraction.

Labia Majora: Labia means lips and majora means larger which indicates the labia majora as the larger or outer lips which are two thick fleshy folds of skin made of connective tissue, adipose tissue, smooth muscle, sebaceous and sweat glands. The labia majora covers the vulva starting from mons pubis then it merges with the perineum. The size of labia majora can vary in size and distribution. Also, the colour of the outside skin can vary as it is generally based on the skin colour of an individual. Inside of the skin pink to light brown colour can be seen.

Function: The main function of labia majora is to protect the other parts of vulva and the vaginal opening.

Labia Minora: The labia minora or nymphaea is also known as the smaller or minor or inner lips of vulva. Labia minora are skin of two smaller folds which is situated in labia majora. The folds are made up of mucous membrane, connective tissue and sebaceous glands, starting at the clitoris and then expands downward. Size of labia minora can be very small, which can be up to 2 inches. The colour of labia minora varies from person to person. Because of the blood vessels present within the labia minora, an increased level of blood flow is seen on it during sexual arousal and which makes the nymphae expand and sensitive to touch and pressure.

Function: Function of labia minora is to cover the opening of both urethra and vagina.

Clitoris: The Clitoris often referred as miniature penis but without presence of urethra. The clitoris is a pea sized pile present at the top of labia minora, made of erectile corpora cavernosa tissue and contains many nerves. Presence of nerves make it highly sensitive and erect at the time of sexual arousal. Size of clitoris varies between women, average size usually is 2 cm long and diameter is 0.5 cm. A fold of skin alike the foreskin of penis named as prepuce covers the clitoris.

Function: Function of clitoris is to respond during sexual stimulation and having pleasure during it.

Urethra: Urethra is a part of urinary system but the opening or orifice or meatus of the urethra is present on the vulva hence it makes urethra a part of the vulva. Urethra is a tube which acts as a passage to transfer urine from bladder to urethral meatus for excretion of urine. Membranous connective tissue makes up the urethra and transitional epithelium with stratified squamous epithelium made the lining of urethral orifice. The urethra is situated above the vaginal opening. Size of female urethra ranges from 3.5 to 5 cm and the size of urethral opening is about 2.5 cm.

Function: Main function of urethra is to discharge urine.

Hymen: Hymen is a thin layer made of mucous membrane which detach the urethral sinus from the lumen of vagina. Hymen is present at the opening of vagina which covers the vaginal

orifice partially. Hymen come in a range of types and sizes, allowing menstrual blood to flow freely. The half-moon shaped hymen is the most prevalent kind of hymen seen on young females. There is popular myth present that an intact hymen is a guarantor of female virginity. But hymen can be ruptured because of sport activities, injury and use of tampons.

Function: Hymen allows menstrual blood to leave the vagina, also keeps the vagina safe from germs and foreign objects.

Perineum: Perineum is also known as lower rabbus in United Kingdom. Perineum is the space situated between the vulva and the anus. Perineum is a diamond shaped area present between the symphysis (pubic arch) and the coccyx (tail bone). The perineum is composed of connective tissue, skin, muscle and fat. The perineum can be divided into 2 parts, the anterior urogenital triangle and the posterior anal triangle. The area of perineum makes up the pelvic floor and contains the vulva and 3 openings (urethral orifice, vaginal orifice and anus). The perineum acts as a link between the reproductive, urinary, and digestive systems, supporting their muscles and activities.

Function: Perineum has multiple function, such as

- Gives attachment to the muscle present on pelvic floor
- Micturition
- Defecation
- Sexual intercourse
- Childbirth

Vestibule: The vestibule is a triangular area present between the labia minora that contains the orifice of vagina and urethra. Vestibule is present inside of the labia minora and contains six openings (urethral orifice, vaginal orifice, opening of 2 greater vestibular glands and 2 lesser

vestibular glands). Between the vestibule and labia minora a boundary present named as Hart's lines. The transition from the vulva vestibule to the labia minora is marked by Hart's lines.

Function: Contains the openings of urethra, vagina, greater and lesser vestibular glands.

Vestibular Glands: Glands that opens into the vulva vestibule are known as vestibular glands. There are two types of vestibular glands. They are, greater vestibular glands and lesser vestibular Glands.

- Greater Vestibular Glands: Greater Vestibular Glands are also known as Bartholin's Glands are two glands analogous to the bulbourethral glands present in males. These glands are as small as a size of pea located at both side of vaginal orifice and opens into the vaginal vestibule.

Function: These glands secrets a waxy, pheromone-containing substance which keep the vaginal orifice and vulva moist and lubricated during sexual arousal. This mucus like substance also helps to maintain the vaginal pH acidic (pH 4.5 or lower).

- Lesser Vestibular Glands: Also called the Skene's Glands is analogous as the prostate glands present in males as both of the glands originated from same structure presented in the embryo. Skene's gland are two glands which are positioned at both side of the urethra.

Function: The glands secrets mucus like substance which,

- Lubricates the urethral opening
- Keeps it safe from urinary tract infection
- Is a source of female ejaculation

Vestibular Bulbs: Vestibular bulbs are two piles made of corpus spongiosum tissue which is a type of erectile tissue. The vestibular bulbs start from lower part of the clitoris and then ex-

tended towards the urethra and vagina. The vagina and urethra separate the bulbs and further it covers them. Vestibular bulbs are said to be similar as the bulb present in penis of male.

Function: Unlike clitoris, during sexual stimulation the vestibular bulbs encourage a pleasant sensation.

Chapter 3: Menstrual Hygiene

Menstrual Hygiene

Menstruation or period is a sign of good health and a natural occurrence for women of child-bearing age. Approximately 52 percent of the world's female population, which accounts for 26 percent of the total population, is of reproductive age. As reported by UNICEF, monthly menstruation affects 1.8 billion individuals worldwide. Worldwide, more than 300 million women experience menstruation every day. Nonetheless, it is still taboo and rarely discussed in the majority of the world. Thus, many social and cultural norms and expectations further complicate the already challenging task of maintaining good menstrual hygiene. An estimated 500 million do not have regular access to period products or sanitary facilities, as reported by the World Bank.

The health and independence of women and girls around the world depend critically on their access to menstrual hygiene services. According to the Terminology Action Group of the Global Menstrual Collective organization, “Menstrual health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in relation to the menstrual cycle.” (Hennegan et al., 2021)

The term "menstrual hygiene management" (MHM) is used to describe the process of providing girls and women with the knowledge, resources, and privacy they need to care for their personal hygiene and health needs during menstruation (Davis et al., 2018).

Menstrual hygiene entails a number of practices, such as changing sanitary napkin in every 4-6 hours, washing oneself thoroughly, avoid douching, disposing of used napkins in an appropri-

ate manner, and using just one method of sanitation at a time. Girls and women need safe and easily accessible water, sanitation, and hygiene (WASH) facilities, as well as inexpensive and suitable menstrual hygiene items, knowledge of best practices, and a welcoming atmosphere in which to manage menstruation in private and without shame. But significant barrier that women and girls face is inadequate WASH (water, sanitation, and hygiene) facilities, especially in public settings like schools, workplaces, or health clinics (World Bank Group, 2018). This can create big hurdle for women and girls when it comes to the proper disposal of old menstrual products and the practice of proper hand washing. Their freedom of movement and action gets limited because of it. Furthermore, it creates negative effects on both academic performance and social engagement. Moreover, it endangers their safety, which raises their already elevated levels of worry.

It is important for women to practice good menstrual hygiene as it can trigger infections in the reproductive system or the urinary tract which might further lead to eventual infertility or problems during childbirth. Infections like yeast infections and hepatitis B can be transferred when women don't wash their hands after changing their menstrual products. Fungal infections, infection of the reproductive system, infection of the urinary system, and even infertility can result from using dirty pads. Also, it is possible to get a vaginal fungal infection from using the same tampon or sanitary pad repeatedly without changing it. Urinary tract infections are sometimes caused by transferring bacteria from the rectal area to the vagina, which can be spread by washing or wiping backwards after urinating or pooping. Also, during menstruation, the likelihood of contracting an STD such as herpes, HIV, or Hepatitis B increases. Menstrual infections, characterized by symptoms such as white discharge, itching/burning, swollen ovaries, and frequent urination, were reported by almost 14% of women from India (Mahon & Fernandes, 2010). Women who have a greater understanding of menstruation hygiene and safe practices are less susceptible to RTI and its repercussions (Dasgupta & Sarkar, 2008).

Despite the prevalence of menstruation in Bangladesh, only 6% of schools offer MHM instruction. 2018 national hygiene survey results showed that just 36% of teenagers and 30% of adult women were aware about menstruation prior to their first appearance or menarche. Furthermore, more than a third of the girls surveyed in Bangladesh said that they had to miss school because of menstrual problems. A survey of teenage females in rural Bangladesh found that 69% either used an unclean cloth or went without any protection at all throughout their menstrual cycles. In a research conducted by IRC and BRAC it has been said that, it is difficult to upgrade menstrual hygiene facilities in Bangladeshi schools because only about 24% meet basic wash facility criteria. The 2014 Bangladesh National Baseline Survey found that the country has an average of one toilet for every 187 students, with nearly two-thirds of those bathrooms without adequate water and soap amenities.

Chapter 4: Reproductive Tract Infection

Reproductive Tract Infection

4.1 Introduction

Reproductive tract infection (RTI) is described as an infection of the reproductive or genital tract that reduces the healthy life expectancy of sexually active women of reproductive age in developing countries (Puthuchira Ravi & Athimulam Kulasekaran, 2014). According to WHO, infections of the reproductive system can arise from microorganisms that are already resident in the reproductive system, or from those that are brought in from the outside through sexual contact or medical treatments.

4.2 Types of RTI

There are three distinct categories of infections that can affect the reproductive system. They are, Endogenous Infections, Iatrogenic Infections and Sexually Transmitted Infections (STI's).

1. Endogenous Infections: Worldwide, endogenous infections are likely the most frequent RTIs. Endogenous infections are caused by an overgrowth of organisms that are typically found in the genital tract of healthy women. Due to an overpopulation of vaginal microorganisms, several conditions develop. For example, bacterial vaginosis and candidiasis are both examples of endogenous infections. This is a very treatable and curable condition.

- Bacterial Vaginosis: Bacterial vaginosis (BV) occurs when there is an overabundance of specific vaginal bacteria. Because of this, the vaginal bacterial equilibrium is disturbed.
- Candidiasis or Yeast Infection: Vaginal yeast infections are a type of endogenous infection caused by an overpopulation of vaginal yeast.

2. Iatrogenic Infections: Various medical procedures, including transcervical laparoscopy (such as menstruation management, induced abortion, the installation of an IUD) or childbirth can result in iatrogenic infections. These can drive endogenous organisms from the vagina or sexually transmitted organisms from the cervix into the upper genital canal, infecting the uterus, fal-

lopian tubes, and other pelvic organs. As an added risk, if infection control measures are inadequate during medical operations, foreign organisms may be introduced into the urethra and vaginal canal. Infertility, ectopic pregnancies, cervical cancer, fetal loss, premature births, low birth weight, newborn blindness, neonatal pneumonia, and mental retardation can all be traced back to these illnesses, all of which can be avoided or treated.

3. Sexually Transmitted Infections: STI's are a group of transmitted diseases contracted from an infected partner via sexual contact due to the presence of a virus, bacteria, or other microorganisms. Thirty distinct types of STIs are known to exist. Some common sexually transmitted diseases (STDs) are chlamydia, gonorrhea, trichomoniasis, syphilis, chancroid, genital herpes, genital warts and human immunodeficiency virus (HIV) infection. Some of the sexually transmitted infections are curable because of medical advancements yet many others cannot be cured.

4.3 Worldwide Situation

Common diagnostic criteria for reproductive tract infections include the location of the infection, vulvovaginitis and vaginitis refer to infection of the external genital area and lower reproductive tract in women; cervicitis refers to inflammation of the cervix; and pelvic inflammatory disease refers to infection of the upper reproductive tract (PID). (van de Wijgert, J., & Elias, C., 2003)

Both sexes are equally susceptible to reproductive tract infections (RTIs). Sexually transmitted infections are far more common in men than other types of illnesses, including those that occur naturally or are caused by medical treatment.

Reproductive tract infections have been a growing public health concern in many developing nations over the past 40 years (Wasserheit, J. N., & Holmes, K. K.,1992). Reproductive tract infections (RTIs), excluding Human Immunodeficiency Virus (HIV), are the second leading cause of morbidity and mortality among young adult women in low-income countries, after

only pregnancy and childbirth (WHO, 2001). The World Health Organization reported that annually more than 200 million sexually transmitted pathogen-related infections affect women's reproductive systems in low-income nations. The majority of the 1.3 million annual deaths of women are attributed to issues related to reproductive health (Piet-Pelon & N. J., 1996). Researchers in Bangladesh found that 76.4% of woman had experienced at least one symptom of a respiratory tract infection (Thekdi et al, 2013). According to a survey done by Feng et al. (2021), about 11.1%, 13.9%, and 13.4% of Bangladeshi women of reproductive age reported experiencing RTI symptoms in 2007, 2011, and 2014, respectively.

Identification, treatment, and control of RTIs in women might be difficult. The nature and appearance of these infections are affected by factors such as age, marriage and reproductive status, socioeconomic level, and comorbidities. In addition to causing acute morbidity, RTIs can have long-lasting consequences include chronic pelvic pain, spontaneous miscarriage, stillbirth, low birth weight, neonatal infections, and infertility.

Chapter 5: Overview of the Disease

About the Disease

5.1 Candidiasis

Definition: Candidiasis is a type of fungal disease caused by yeast belonging to the genus *Candida*. Candidiasis is also known as thrush or moniliasis. *Candida* is a common yeast that lives harmlessly on the skin and in the body (in places including the mouth, throat, stomach, and genital tract). If environmental circumstances are favorable for *Candida* development, an infection may occur because of the overgrowth.

Types: Several types of candidiasis can be seen, they are:

- Mucosal Candidiasis: Conditions caused by *Candida* that affect the skin or mucous membranes. This type includes oral candidiasis, vaginal candidiasis, gastrointestinal and respiratory candidiasis.
- Cutaneous candidiasis: Fungal infection of the skin and nail is called cutaneous candidiasis.
- Systemic candidiasis: This type of candidiasis is also known as invasive candidiasis. Invasive candidiasis, is a life-threatening condition where *Candida* can spread to other organs and systems in the body through blood. Bloodstream infection caused by Candida, often known as candidemia.

Among all candidiasis oral candidiasis and vaginal candidiasis are most common. Five species of the genus *Candida* are responsible for around 90% of all infections; these are *Candida albicans*, *Candida glabrata*, *Candida tropicalis*, *Candida parapsilosis*, and *Candida krusei* (Turner & Butler, 2014). Brief discussion about vaginal candidiasis is given on the next chapter.

5.2 Vaginal Candidiasis

5.2.1 Introduction

As the name implies, vaginal candidiasis (VC) is an infection caused by yeast or fungi in the genital area (Okonkwo & Umeanaeto, 2011). The vagina and vulvar tissues become inflamed

and itchy due to the vaginal yeast infection, which is caused by a *Candida* overgrowth. This disease is also known as vulvovaginal candidiasis or candidal vaginitis or vaginal thrush.

Vaginal Candidiasis develops when Candida organisms gradually invade the mucosal lining of the vagina and trigger an inflammatory reaction. Polymorphonuclear cells and macrophages are often the predominant inflammatory cells. Inflammatory alterations in the vaginal and vulvar epithelium are the direct result of a fungal infection, most often caused by *Candida albicans*, and are responsible for the development of vaginal candidiasis. *Candida* is considered part of a woman's natural flora, and many women have it without any noticeable symptoms. Thus, discomfort, itch, dysuria, or inflammation are necessary for a diagnosis of vaginal candidiasis in addition to the presence of *Candida* in the vagina/vulva.

Glycogen, a substrate on which *C. albicans* thrives, is produced in the vaginal lining because of oestrogen hormone. Symptoms tend to emerge in the second part of the menstruation, when progesterone levels are naturally higher. Female genital candidiasis, or vaginal candidiasis, is less prevalent in postmenopausal women of all ages because of the decline in estrogen levels.

A typical vaginal flora includes a mix of bacteria and yeast. Some strains of bacteria, termed *lactobacilli*, benefit from the presence of estrogen and flourish as a result. These microorganisms protect health by eliminating pathogens in the vaginal environment. Yeast infections are caused by the fungus Candida, which can grow out of control if the body's natural defenses are overwhelmed. This disease often develops when the vaginal pH becomes unbalanced.

5.2.2 Organism Causing the Disease

Candida is a kind of yeast that is responsible for the vast majority of all fungal infections. Overgrowth of *Candida* in vagina cause vaginal candidiasis. Large, spherical, white or cream (albicans means "whitish" in Latin) colonies with a yeasty odor develop when *Candida* is cultivated in the lab on agar plates at room temperature. The most common form of candidiasis is caused by *Candida albicans*, a species that is normally found as a commensal in the human

flora and which can be found in the skin, intestines, and urinary system. Depending on the circumstances, *C. albicans* may develop as yeast, pseudo hyphae, or genuine hyphae in vitro and in vivo, making it a human opportunist pathogen.

Scientific Classification:

Kingdom: Fungi

Phylum: Ascomycota

Subphylum: Saccharomycotina

Class: Saccharomycetes

Order: Saccharomycetales

Family: Saccharomycetaceae

Genus: *Candida*

5.2.3 Symptoms

Yeast infections in the vagina usually present with the same symptoms. The following symptoms may be present, with severity ranging from mild to moderate:

- Unusual vaginal discharge- Discharge from the vaginal area is thick, clumpy, and a pale-yellow color. Cottage cheese-like discharge has been described by some patients. Watery discharge is a possibility. Discharge has no noticeable odor.
- Occurrence of vaginal and vulvar itching and irritation
- Experiencing pain or discomfort, typically during sexual activity or urination
- Swelling in the Genital Area
- Soreness and redness in Vulva and Vagina
- Rash
- Cracks in the wall of the vagina

Yeast infection symptoms may intensify during the week preceding menstruation.

5.2.4 Risk Factors

Most women who develop a yeast infection do not have a preexisting condition that would cause it. Several variables, such as those listed below, may enhance one's likelihood of contracting an infection:

- Antibiotics: Women who regularly use antibiotics are more likely to get yeast infections. Many common antibiotics are effective against the vaginal bacteria that would usually exist there. As a result of these microorganisms, yeast proliferation in the vagina is prevented.
- Hormonal Imbalance: Women who are pregnant, are on high doses of estrogen birth control, or who undergo estrogen hormone treatment are at increased risk for yeast infections. Pregnancy, breastfeeding, and menopause can all upset the delicate vaginal equilibrium.
- Diabetes: Vaginal yeast overgrowth is a potential complication of uncontrolled diabetes because of the increased sugar in the vaginal mucus membranes.
- Weak Immune System: Those with compromised immune systems, such as those suffering from HIV or using certain treatments (steroids, chemotherapy, post-organ transplant medications)., are more likely to develop yeast infections.
- Using External Chemicals in Genital Area: Douching and using of vaginal sprays might alter the natural pH level in the vagina. Soap and other fragrant cleaning products can be harmful to the vaginal ecosystem when used for vaginal hygiene. There is a direct correlation between this behavior and the proliferation of anaerobic microorganisms.
- Sexual Activity: In spite of the fact that yeast infections are not typically thought of as STDs, they can be spread between partners through sexual activity. Women who have never engaged in sexual activity are not immune to vaginal candidiasis, although sexually active women are more likely to experience them.

- Using of Contraceptive Devices: Yeast infections could be more common for women who use intrauterine devices (IUDs), diaphragms, or vaginal sponges. Vaginal Candidiasis are not often caused by spermicides; however, some women may have genital discomfort.

5.2.5 Diagnosis

It is common for women to self-diagnose a yeast infection when they experience vulvar irritation or vaginal discharge. Only 11% of women correctly identified their infection in one research; even those who had experienced a yeast infection before did not perform much better only 35 percent were correct. A medical examination is required to confirm the diagnosis. A doctor should do a pelvic exam, a vaginal wet prep, pH testing to rule out other causes of vaginal discharge and infection in order to make a diagnosis of vaginal candidiasis. Candida overgrowth in the vulva occurs when the vaginal pH is below 5.

- At first the doctor may inquire about patient's health background in order to identify yeast infection symptoms. Collecting data on previous genital and sex-transmitted infections is one possible step in this direction.
- A pelvic exam comes next. The external genitalia are inspected by the doctor for any symptoms of infection. The cervix and vagina are next examined by inserting a device known as speculum into the vagina and holding the vaginal walls open. A pelvic exam will reveal inflammation in persons who have vaginal candidiasis. It is difficult to get an accurate count of vaginal yeast infections since they are not a notifiable condition and are often treated clinically without laboratory testing.
- In order to identify the specific fungus causing the yeast infection, doctor may request a sample of vaginal fluid from the patient. If patient have recurring yeast infections, knowing the fungus responsible might help the doctor prescribe more targeted therapy.

Laboratory testing for identification of Vaginal Candidiasis can be done in two ways known as Microscopic Examination and Cultural examination**.**

- **Microscopic Examination:** Quickly assessing for yeast requires placing a swab of vaginal discharge in saline and putting a drop on a slide before combining with a dab of potassium hydroxide solution. The cells of the patient are lysed by the potassium hydroxide, revealing the yeast more plainly. The swab can also be rolled onto a fixed and Gram-stained slide. The staining and evaluation of this slide are not time-sensitive. Under a light microscope, inflammation is checked and the existence of yeast or mycelial forms of candida on both slides. The vaginal secretions wet mount and Gram stain can be utilized to identify additional organisms as well. Microscopy has the advantages of speed and low cost, but has the drawbacks of being insensitive and potentially biased.
- **Cultural examination:** A swab of the vaginal discharge or a portion of a vaginal wash is inoculated onto agar after a few hours of collection and cultured for up to two days at 37°C. Colonies are recognized as yeast by doing a Gram stain. Disease is often linked with yeast counts higher than 10^3 colony-forming units (cfu)/ml in vaginal discharge. Cultural test takes longer than microscopic examination but it is more effective for the identification of illness.

5.2.6 Treatment

Antifungal medication is the typical treatment for vaginal candidiasis. It is common practice to treat vaginal yeast infections with an antifungal medication administered topically or an oral dosage of fluconazole. Cultures may be necessary to test for different species of candida, which are commonly resistant to azoles, if patients do not progress after normal treatment. The use of oral antifungals is not recommended for pregnant women. Due to the potential dangers of using many standard yeast infection medications during pregnancy, doctors may want to focus instead on alleviating the symptoms of candidiasis.

5.2.7 Complications

Vaginal Candidiasis appears to be a minor condition, rather than a severe health issue. Although this is true the majority of the time, one must be mindful of the possibility of difficulties. Some complications faced by the patient are,

- Recurrent Infection: Yeast infections can typically lead to further yeast infections. If a patient experience at least four episodes of vaginal candidiasis within a year, or if a patient experience at least three episodes that are not connected to antibiotic medication, then the patient has recurrent candidiasis. It is estimated that 9% of women between the ages of 25 and 34 suffer with recurrent vaginal candidiasis (RVC) (Denning et al., 2018).
- Candidemia: An untreated yeast infection may spread to the bloodstream known as Candidemia. Candidemia is a prevalent type of invasive candidiasis in the United States, according the Centers for Disease Control and Prevention (CDC). In addition to being a widespread problem, it is also a leading cause of bloodstream infections in the United States.
- Skin Infection: If a yeast infection is not treated, it might worsen into something much more serious. Some women experience vaginal irritation, pain, and even cracking. This can cause skin infections if not treated. When left untreated, a yeast infection can weaken the immune system and spread to other organs.
- Pregnancy Complications: A yeast infection during pregnancy may increase the risk of premature birth and other complications. To yet, though, there hasn't been enough evidence to draw any firm conclusions. Infertility may occur if the vaginal pH changes due to a yeast infection. Yeast infections can alter the body's pH balance, which can be fatal to sperm on route to the uterus or fallopian tube.
- Complicated Menstruation: Intense or persistent vaginal yeast infections might disrupt your menstrual cycle. Having a yeast infection might trigger a fake estrogen response in

the body. Period cramps may become more severe, and some women may even have their periods stop altogether.

Rarely, an untreated yeast infection can cause headache, changes in mood, oral difficulties (thrush), lethargy, and gastrointestinal issues.

5.2.8 Prevention

Yeast infections of the vagina may easily be avoided with very simple behavioral modifications. Some examples of such alterations are:

- Avoid douching
- Use undergarments that allows air to circulate, such as cotton undergarments
- Wear loose-fitting clothing
- Avoid extremely hot showers and hot tubs
- Always wipe from front to back while using a restroom tissue
- Control blood sugar
- Changing tampons, pads, and panty liners frequently during menstruation
- Only use antibiotics if absolutely necessary.
- Not wearing wet clothes for long time
- Having a healthy diet

5.2.9 Epidemiology

Vaginal candidiasis is extremely common, with 13 million cases reported each year in the United States alone (Horowitz, 1991). As many as 1.4 million women seek medical attention each year for vaginal candidiasis (Benedict et al., 2018). Vaginal infections caused by Candida are second only to bacterial vaginosis in frequency of occurrence. Seventy-five percent of women, according to surveys, get thrush or yeast infection in their vagina at some point in their lives (Sobel, 2007). Forty to fifty percent of those women will have another episode (Sobel, 2014). Only around 8 percent of women get chronic candidal vulvovaginitis. The distinction

between colonization and infection is crucial since half of infected women will have a second episode and 5–8% will have recurrent vulvovaginal candidosis (RVVC) if they are not treated. When Vulvovaginal Candidosis occurs more than four times in a year, it is considered recurrent. According to recent statistics, over 138 million women globally experience RVVC each year, and another 372 million experience it over the course of their lives (Denning et al., 2018). The peak incidence years for RVVC are between the ages of 19 and 35, and a recent study found that the prevalence of RVVC increases to 9 percent in those over the age of 50 (Blostein et al., 2017). As a result of a deficiency in the normally protective immune response to a prior Candida infection, women with RVVC are more susceptible to recurrent candidiasis (Fidel & Sobel, 1996).

Candida albicans accounts for over 90% of cases of vaginal candidiasis, whereas other species of *Candida* account for the remaining 10% (Abdullahi Nasir et al., 2015). For the rest, *C. glabrata* and *C. tropicalis* are the most frequent species. Women of all ages are susceptible to *Candida spp.* infections, although they are most common in those who are pregnant (nearly 24%) and in those who are not (around 17%) (Al-akeel et al., 2013). The most prevalent cause of VVC is *Candida albicans*, however widespread use of azole antifungal medicines may have led to a change in vaginal colonization and the selection of more naturally fungal species, such as *Candida glabrata* (Mathema et al., 2001).

It must be noted that specific epidemiological statistics on this illness process are not yet accessible. The reason behind this is, over-the-counter remedies for candidal vulvovaginitis are widely available, therefore many people with the condition probably don't seek medical attention. Also, a diagnosis is based on both clinical and non-clinical evaluations. Because of this, epidemiological reports based on culture alone exaggerate disease, since 10% of women with positive candidal cultures don't have any symptoms.

Chapter 6: Literature review

Literature review

6.1 Introduction

The objective of this literature review is to provide context for the research publications linked to my study's topic. Vaginal candidiasis is a common condition among women all over the world. Poor menstrual hygiene management (MHM) is a leading cause of this illness. 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:

6.2 Association of vaginal candidiasis with different factors

(1)

The article named **"Prevalence of Vaginal Candidiasis infection in women referred to Kermanshah hygienic centers, Iran in 2010"** is a study done by Reza Faraji et al. In this study, the prevalence of vaginal candidiasis infection in women who were sent to Kermanshah hygiene clinics in Iran in 2010 is to be ascertained.

105 women who were sent to Kermanshah hygienic centers in Iran in 2010 were the subjects of this specific research. A questionnaire was prepared to gather data on the following topics: age, profession, education, symptoms, use of contraception, marital status, and diabetes mellitus. Vaginal swabs were collected twice and tested in the laboratory.

Women's ages ranged from 18 to 55. From the sample, 81% of the women experienced irritation, 74% faced itching and 87% reported about discharge. These all findings were related with

the symptoms of VVC. In terms of education, 86% of women had only completed high school, and 14% had completed college.

Most women (81%), but not all, stayed at home to care for children or elderly relatives. The remaining 19% were employed. About half of all women report using some form of contraception. Around 80% of women in this sample were in committed relationships, whereas 20% were single. Seventy percent of females were diabetic.

It has been observed that the prevalence of vaginal candidiasis infection is 9% when using a direct test, and 29% when using a Mixture Culture. Candida albicans was found to be the most common yeast isolate among these patients, accounting for 28 of the total cases (70%). Other species of candida were also found, including Candida glabrata (five cases, 12.5%), Candida krusei (three cases, 7.5%), Candida tropicalis (two cases, 5%), and Candida parapsilosis (two cases, 5%).

This study demonstrated statistically significant associations between vulvovaginal candidiasis and several demographic variables, including age, education, symptoms, contraception, marital status, and diabetes mellitus. However, no statistically significant association between vulvovaginal candidiasis and employment status was discovered.

From the study results and other investigations, it can be suggested that the discharge culture is a more sensitive diagnostic tool than direct microscopy. A vaginal culture is required for confirmation of the diagnosis, however microscopic analysis of the clinical material can be conducted quickly and may identify the likely causative agent.

The research confirmed the existence of a statistically significant correlation between a vaginal Candida culture and the presence of symptoms. Furthermore, Peer et al. found that only 74.6% of women who were infected with vaginal candidiasis really had clinical symptoms. The foregoing suggests that vaginal candidiasis infections don't always present with obvious symptoms,

and that sometimes they don't reveal any signs at all. From the study the authors also found positive relationship between contraception, diabetes, education and VC.

The authors concluded by saying that similar research must be conducted in greater quantity and for a longer duration to know more.

In addition to shedding insight on the association between various factors and VC and identifying *C. albicans* as the most prevalent yeast isolated, this study demonstrated that culture of vaginal discharge is preferable to direct smear because culture technique is more sensitive. (Reza Faraji et al., 2012)

(2)

In the article titled **"Prevalence of Vaginal Candidiasis among Female Students of a Hostel in the University of Calabar, Calabar"** authored by E. N. Mbim et al (2017) the researchers aimed to study or observe the happening of Vaginal Candidiasis among female students staying in the hostel of the University of Calabar. In this paper the researchers gave an idea about prevalence of Vaginal Candidiasis and its correlation with some parameters such as age, behavioral risk factors, number of sex partners, HIV, pregnancy, diseases.

This study was conducted in Nigeria, where female students from University of Calabar participated. The participants were female students who were staying at the university hostel at that time. Duration of the data collection was from November 2016 to January 2017. 200 female students participated in the study whose age was between 17-31. There were no criteria for either inclusion or exclusion. Researchers used a closed-ended questionnaire to assure participant uniformity. Also, vaginal swabs were taken from the participants and then microbiological analysis was done for each sample.

Of the 200 female students, 40 students had vaginal candidiasis which is 20%. Participants were aged between 17-31, where mean age is 24. Screened female college students exhibited a

peak incidence of vaginal candidiasis between the ages of 22 and 26 (32.3%). Students between the ages of 17 and 21 had the next highest prevalence, at 15 (29.4%), while those aged 27 to 31 had the lowest, at 5 (5.7%). This research found that students in their early and prime reproductive years are more susceptible to infection.

From the study it was found that the highest occurrence which is 37.5% (15 students) was linked to prolonged use of broad-spectrum antibiotics. Using antibiotics often can alter the normal vainal microbial flora and pH for which VC can occur. This was closely followed by 9 students (22.5%) who routinely wore tight-fitting, non-ventilated nylon pants. Nylon pants that are too tight prevent the vagina from breathing, causing the area to become more humid and heated in which situation the organism that cause VC can grow rapidly. The percentage of students who utilized oral contraceptive tablets was 7 (17.5%). In addition, pregnant students, douching practitioners, and those not linked with any of the practices had a much lower prevalence of 3 (7.5%).

Furthermore, based on sexual partners, study showed that those who said they had only one sexual partner were most likely to have it, number of participants present on this area is 19 (47.5%).

Also, the prevalence rates of HIV and pregnancy were determined to be three (7.5%) and one (2.5%), respectively. This study's findings on the prevalence of vaginal candidiasis corroborate those of Winston, who found that people with weakened immune systems were more likely to contract this infection. (Winston DJ, 1995)

Vaginal Candidiasis can make a woman embarrassed and discomfort thus the authors concluded by suggesting to prevent vaginal candidiasis by avoiding the risk factors that contribute to its development. Therefore, effective preventative and control methods should be created expeditiously to lower the exposure rate of women to these risk factors and favorably reduce the incidence of vaginal candidiasis in women in general.

This study demonstrated a significant frequency of vaginal candidiasis in a sample of apparently healthy female college students, necessitating intervention. (Mbim et al., 2017)

(3)

In the study **"Prevalence and risk factors for vaginal candidiasis among women seeking primary care for genital infections in Dar es Salaam, Tanzania"** the authors L.A Namkinga et al aimed to study the situation of vaginal candidiasis and factors associated with it among the women of Tanzania. The cross-sectional study was done among the patients seeking help for genital infection at Ilala Municipal Hospital.

While doing the research the authors found out that in Tanzania, vaginal infections are not given much importance or attention as STD. Infections caused by *N. gonorrhoeae, Chlamydia trachomatis, Treponema pallidum* and *T. vaginalis* are somehow given importance but vaginal candidiasis is not very known term and the authors think that the reason of this might be the mild nature of the disease. Therefore, unlike the typical STD agents, very little research has been done on the risk factors and pathogenic processes of VC.

The study was conducted from January 2002 to August 2002, where 464 women participated but menstruating women were omitted from the study. The participated women complained of genital lesions, abnormal vaginal discharge, or pain in the lower abdomen or pelvis. All study participants were questioned by a professional female nurse to collect data on their demographics, sexual behaviors, and exposure to VC risk factors such antibiotic use and prior STD exposure. Then sample was taken by looking at vulvovaginal signs and symptoms. The clinical signs and symptoms of vulvovaginal candidiasis include vulvovaginal pruritus, irritation, soreness, dyspareunia, burning on micturition, and whitish, cheesy discharge (Sobel et al, 1998).

An algorithm was used to determine the presence of VC on basis of-

1. vulvar symptoms (pruritis, pain or burning sensation and dysuria)

2. symptoms (include redness and swelling in the vulvar area, cracks in the vaginal wall, a thick, curdy discharge from the vagina)
3. a positive wet mount.

Some socio-economic and demographic factors were presented from the research population such as age, educational level, occupation, number of sex partners, marital status, pregnancy status, antibiotic use, income and age at first coitus to know about the co-relation of VC with them. Here it was seen that the majority of the women were in their twenties (20-29 years old) with elementary education and no jobs. Participants were married or living together with one sexual partner, earned about 50 US dollars (less than 50,000 Tanzanian shillings), and had their first sexual experience before the age of 20.

The total number of population was 464 where about 38.1% or 177 women had vaginal discharge, 14.7% or 68 had genital ulcers, 58.6% or 272 had genital pruritis, 3.9% or 18 women had genital warts and 585 or 12.5% of them had chancre. 45.7% of women had vaginal candidiasis. The likelihood of developing vaginal candidiasis was positively correlated with HIV (OR= 1.66 95% CI (1.1-2.7), bacterial vaginosis (OR= 2.6, 95% CI (1.7-3.8), and genital abnormalities (OR= 1.8, 95%CI (1.2-2.7), and negatively correlated with TV (OR = 0.3, 95% CI (0.1-0.6), occupation (OR = 0.549, 95% CI=(0.35-086 (0.11 - 0.73). For VC with venereal warts and syphilis, the risks were higher but not statistically significant.

As from the study it was founded that the majority of the women were in their twenties (20-29 years old) with elementary education and no jobs, these women are at a high risk of getting HIV and other STDs for which the author suggested to empower women through education and access to sexual and reproductive health services may have on their communities.

No correlation was found between VC and *N. gonorrhoeae*, genital ulcers, age at first sexual activity, number of sexual partners, educational level, marital status, or antibiotic use. This makes it hard to predict VC based on sexual and social characteristics of women.

This study's findings showing a correlation between VC and employment status suggest that STD rehabilitation programs would benefit from incorporating measures designed to increase participants' financial autonomy. Because most women with a history of using antibiotics typically take a single course or are even unable to pay the full amount, antibiotic use a risk known to be connected with VC, was not a major factor in this study.

The research showed that vaginal candidiasis affected almost half of the women participated which makes it the second most common genital infection after bacterial vaginosis. As a result, importance should be given to this disease along with BV and other STD's.

The authors concluded by suggesting some issues such as,

- To have gender-specific guidelines for syndromic detention and treatment of sexually transmitted infections and revise the national recommendations for the management of STIs
- To arrange proper training of simple screening methods (such as microscopy and pH testing) for health laboratory workers in antenatal, STD, outpatient, and family planning clinics
- To conduct more researches to identify the specific species of Candida, characterize their in-vitro susceptibility to antifungal drugs, and evaluate their clinical response to treatment.

This study demonstrated about the importance of screening for VC along with other vaginal infections as vaginal candidiasis (VC) is common among women who seek primary care for genital infections, and this study helped to identify its incidence and associated risk factors. (L.A Namkinga et al., 2005)

Chapter 7: Methodology

Methodology

7.1 Introduction

The term "research methodology" refers to the procedures followed in order to gather data, analyze that data, and develop conclusions about the topic being studied. As the study's plan, a research technique serves as an essential component. The formulation and development of a methodology is one of the most important steps in achieving the goals of a study.

Having a valid and reliable research technique ensures that conclusions are based on solid science. In addition, the plan's specifics help researchers stay on track, resulting in a more efficient, less overwhelming procedure overall. A researcher's methodology sheds light on the thought process and procedures that led to the study's findings.

7.2 Aim of the Study

The fundamental purpose of this research is to get insight into,

- Risk Factors and Prevalence of Vaginal Candidiasis
- Relationships between Vaginal Candidiasis and Other Factors
- Another goal is to generalize the sample data into a representative picture of vaginal candidiasis in Bangladesh.

7.3 Research Methodology

Here, I've used a cross-sectional methodology to analyze my data. Cross-sectional study is a type of descriptive study. For the purpose of a cross-sectional study, data is gathered from a large sample of participants at a particular time and location. Cross-sectional studies are passive in nature, collecting data without trying to change any of the observable factors.

7.4 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 thorough background on the research and its purpose. The responders' names were also concealed.

7.5 Area of Study and Participants

This cross-sectional study was performed on AK memorial hospital, Maona, Gazipur and Lubana General Hospital & Uttara Cardiac Center. Research took place between April 2019 and March 2020. The appropriate authorities were consulted and granted authorization before any data gathering began. I was provided access to patient records as well as authorization to speak with attending physicians and other hospital staff. Ultimately, permission to use the hospitals' pathology departments was obtained. This was done to aid in the process of closely monitoring the diagnostic procedures. There was a total of 244 patients enrolled in the research. In most cases, those who answered the survey were patients who visited the hospital for seeking treatment. Some of these patients required hospitalization in the gynecological units. Patients ranged in age from pre-puberty to well into menopause. The diversity of the study's participants in terms of socioeconomic status and level of education strengthens its overall coverage. Also, the geographical diversity of the research sites, with one hospital located in a metropolitan region and another in a rural community, further contributed to the study's all-encompassing nature.

To participate in the study the patient must be of reproductive age or older, Vaginal Candidiasis sufferers who came to these hospitals for treatment, vaginal candidiasis patients undergoing diagnostic testing.

7.6 Questionnaire

For collecting data, a questionnaire was prepared where participants age, marital status, socioeconomic background, educational background, menstruation and menstrual hygiene related in-

formation, symptoms, complications and risk factors were included. Sexually transmitted disease data was not obtained because individuals were unwilling to disclose personal information. Participants who could read and write were given copies of the questionnaires to answer and return immediately, while those who could not were questioned orally and their replies documented.

7.7 Laboratory Tests

In both hospitals microscopic tests were done. Specimens were obtained by swabbing the vagina and were placed on a glass slide with a few drops of saline, then covered with a coverslip. Yeast cells were looked under microscope under 400x magnification. Vaginal swabs were mixed with another drop of saline solution and 10% KOH, which dissolves patient's cells and yeast can be seen easily in slides.

7.8 Statistical Analysis

For the data analysis Microsoft Excel and IBM SPSS is used. Descriptive statistics were used to assess the data gathered for this study.

Chapter 8: Result

Result

Data was summarized and analyzed after it was collected from patient interviews and pathology lab reports. The purpose of this data analysis is to determine the prevalence of various characteristics among patients and to compare these frequencies among patients with different factors.

8.1 Distribution of patients' diagnosis

8.1.1 Distribution of Patients' Disease Diagnosis

Table 1: Frequency table distribution of patients' disease diagnosis

Disease Name	Classification	Frequency	Percentage (%)	Cumulative Percentage (%)
Vaginal Candidiasis	Yes	91	37.30	37.30
	No	153	62.70	100.0
	Total	244	100.0	

The total number of participants was 244. Among them 91 women were positive for Vaginal Candidiasis. Hence, they were selected as the study participants. Patients who were tested negative for Vaginal Candidiasis were excluded from the study.

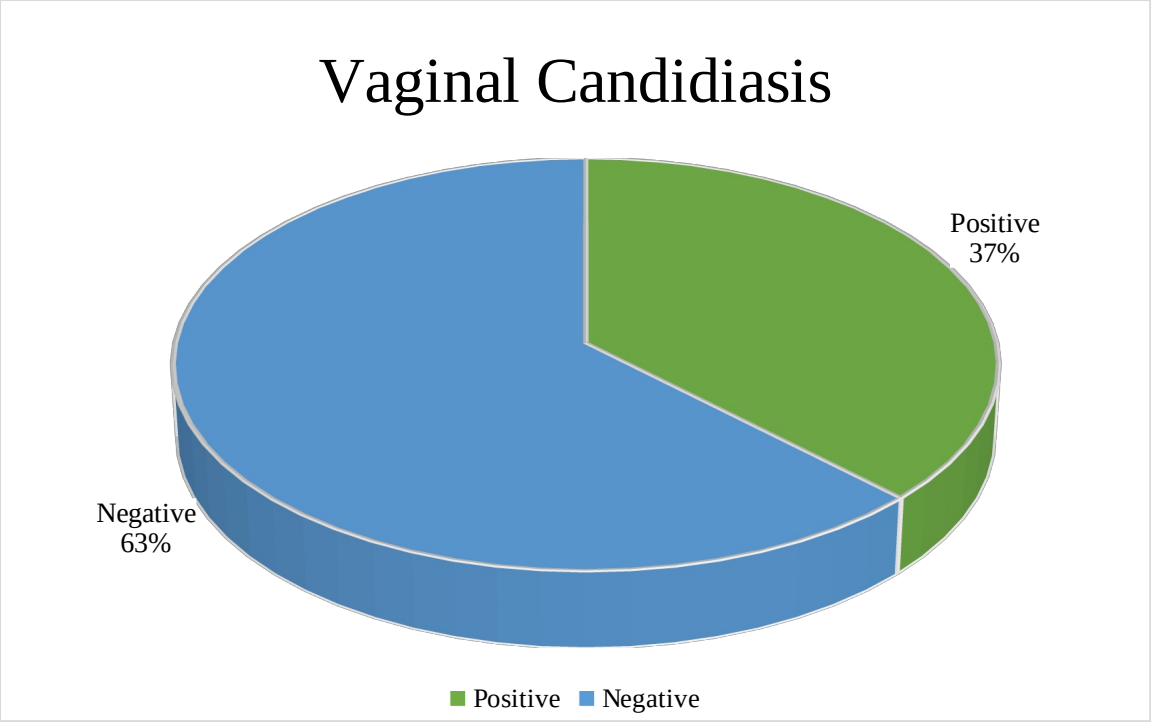

Fig 3: Distribution of Patient's Disease Diagnosis

8.1.2 Distribution of Pathogens Found Among VC Patients

Table 2: Frequency Table Distribution of Pathogens Found Among VC Patients

Pathogen found	Frequency	Percentage (%)	Cumulative Percentage (%)
Candida albicans	91	100.0	100.0

From the result it was found that, organism that caused Vaginal Candidiasis among the patients was *Candida Albicans*.

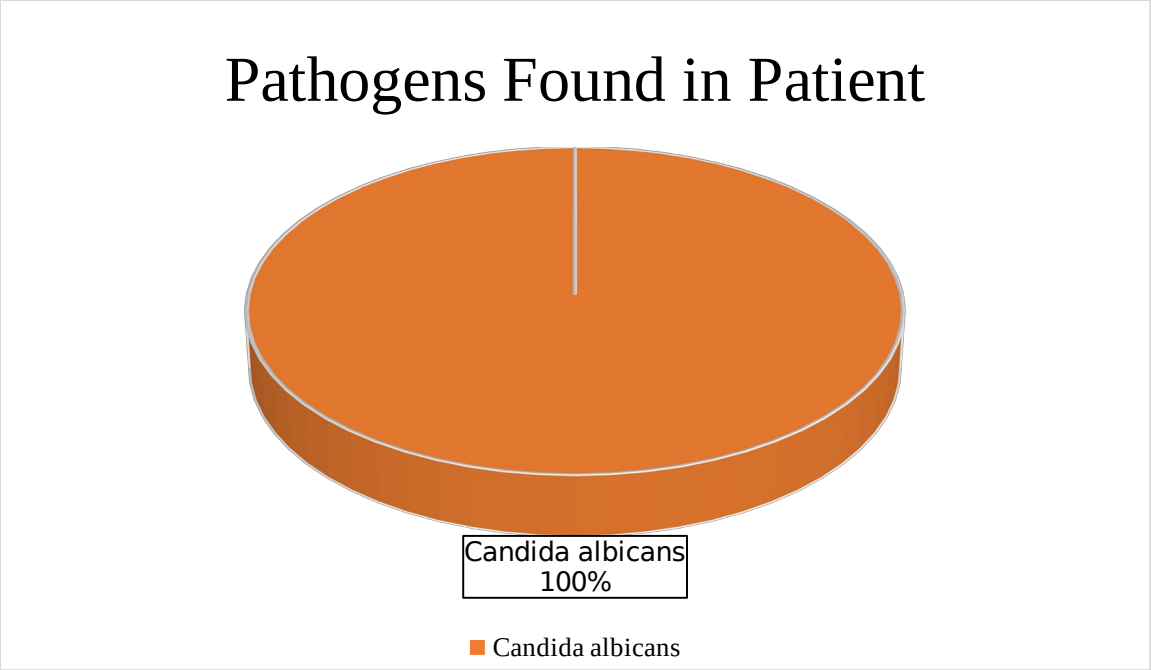

Fig 4: Distribution of Pathogens Found Among VC Patients

8.2 Association of Vaginal Candidiasis with Socio-Demographic Factor:

In this study, prevalence of vaginal candidiasis was observed among various socio-demographic factors such as age, marital status, education and social status.

8.2.1Distribution of Vaginal Candidiasis Patient Based on Age:

Table 3: Frequency Table Distribution of Age Among VC Patients

Age	Frequency	Percentage (%)	Cumulative Percentage (%)
15-24 Years	30	33.0	33.0
25-34 Years	30	33.0	65.9
35-44 Years	19	20.9	86.8
45-54 Years	10	11.0	97.8
55-64 Years	2	2.2	100.0
Total	91	100.0	

Women of reproductive age were selected for the study. Age of the patients ranges from 15 to 64 years. Among all group Vaginal Candidiasis was mostly seen on 15-24 year's range group (33%) and 25-34 year's group (33%). Occurrence of Vaginal Candidiasis was observed least among the age group of 55-64 years (2.2%). 20.9% patients are from 35-44 age group and 11% are from 45-54 years range.

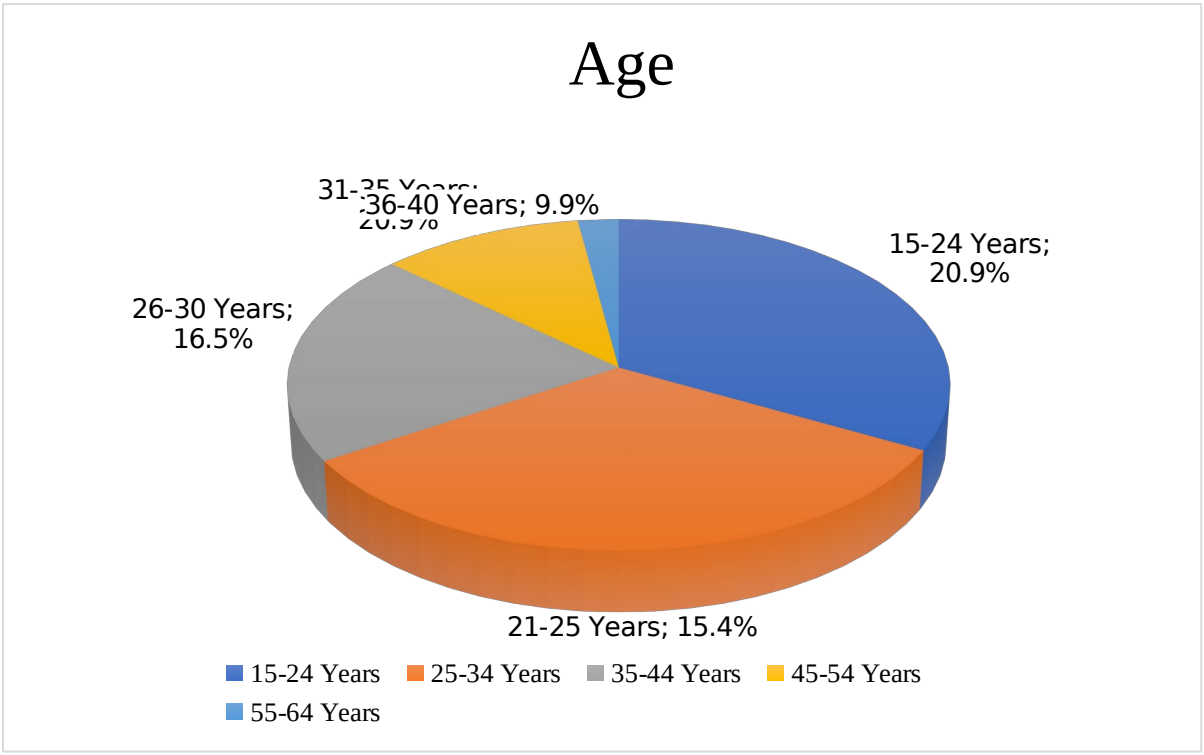

Fig 5: Distribution of Age Among VC Patients

8.2.2 Distribution of Vaginal Candidiasis Patient Based on Marital Status:

Table 4: Frequency Table Distribution of Marital Status Among VC Patients

Marital Status	Frequency	Percentage (%)	Cumulative Percentage (%)
Married	64	70.3	70.3
Unmarried	27	29.7	100.0
Total	91	100.0	

Out of 91 patients 64 were married and 27 were unmarried. The result shows that prevalence of Vaginal Candidiasis is higher in married women (70.3%), rather than unmarried patients (29.7%).

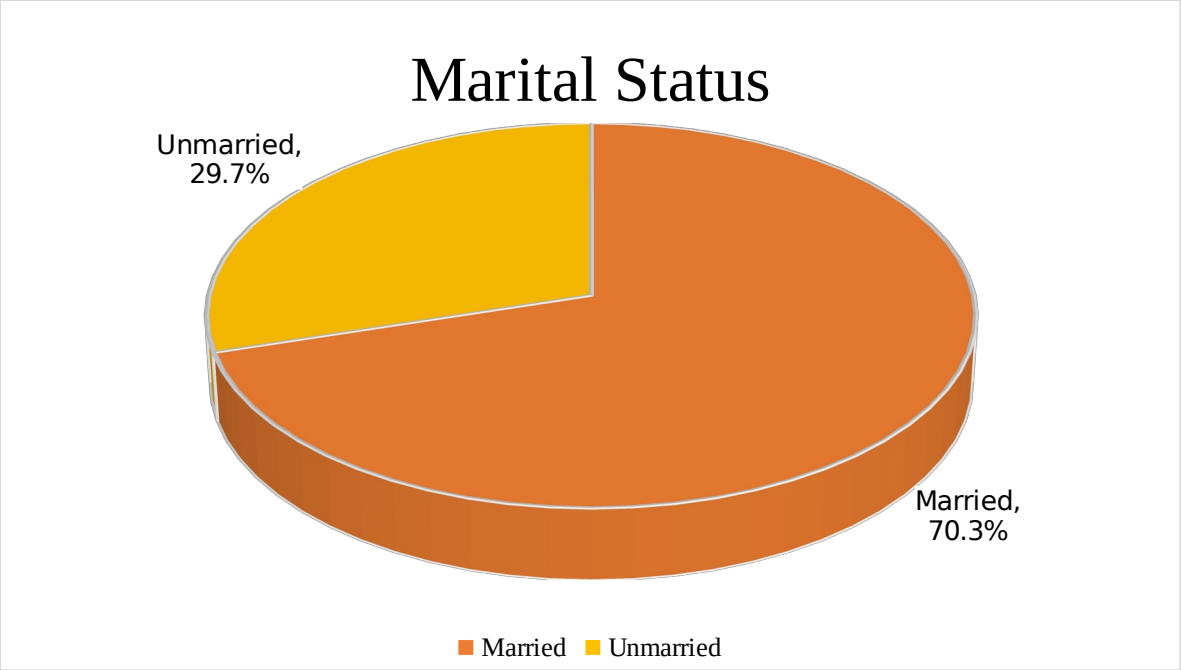

Fig 6: Distribution of Marital Status Among VC Patients

8.2.3 Distribution of Vaginal Candidiasis Patient Based on Social Status:

Table 5: Frequency Table Distribution of Social Status Among VC Patients

Social Status	Frequency	Percentage (%)	Cumulative Percentage (%)
Upper Class	6	6.6	6.6
Middle Class	36	39.6	46.2
Lower Middle Class	38	41.8	87.9
Poor	11	12.1	100.0
Total	91	100.0	

From the above table it can be said that Vaginal Candidiasis is most common among lower middle-class women, where 38 patients (41.8%) belonged to this class out of 91. Second high-

est number of patients is seen on the middle-class women, 36 patients (39.6%) are from this group. Surprisingly, the second lowest number of patients were from poor background with only 11 patients (12.15%) out of 91. 6.6% of patients were from upper class background.

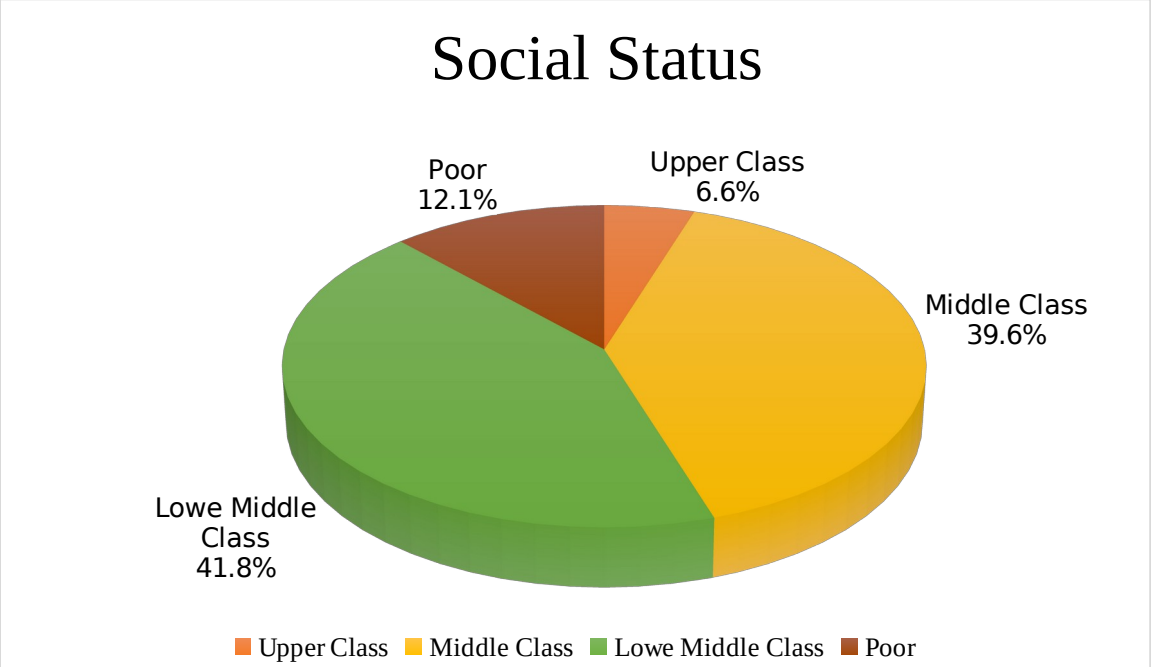

Fig 7: Distribution of Social Status Among VC Patients

8.2.4 Distribution of Vaginal Candidiasis Patient Based on Educational Background:

Table 6: Frequency Table Distribution of Educational Background Among VC Patients

Educational Background	Frequency	Percentage (%)	Cumulative Percentage (%)
None	4	4.4	4.4
Primary	7	7.7	12.1
Secondary	26	28.6	40.7
Higher Secondary	31	34.1	74.7
Graduation	23	25.3	100.0
Total	91	100.0	

The highest number of VC patients, 31, i.e. 34.1% had completed their higher secondary education. Second highest number of VC patients have completed secondary education. Surprisingly about one-fourth percent of patients (25.3%) have completed Graduation. Also, the number of primary pass patients is 7 (7.7%), which is the second lowest value seen.

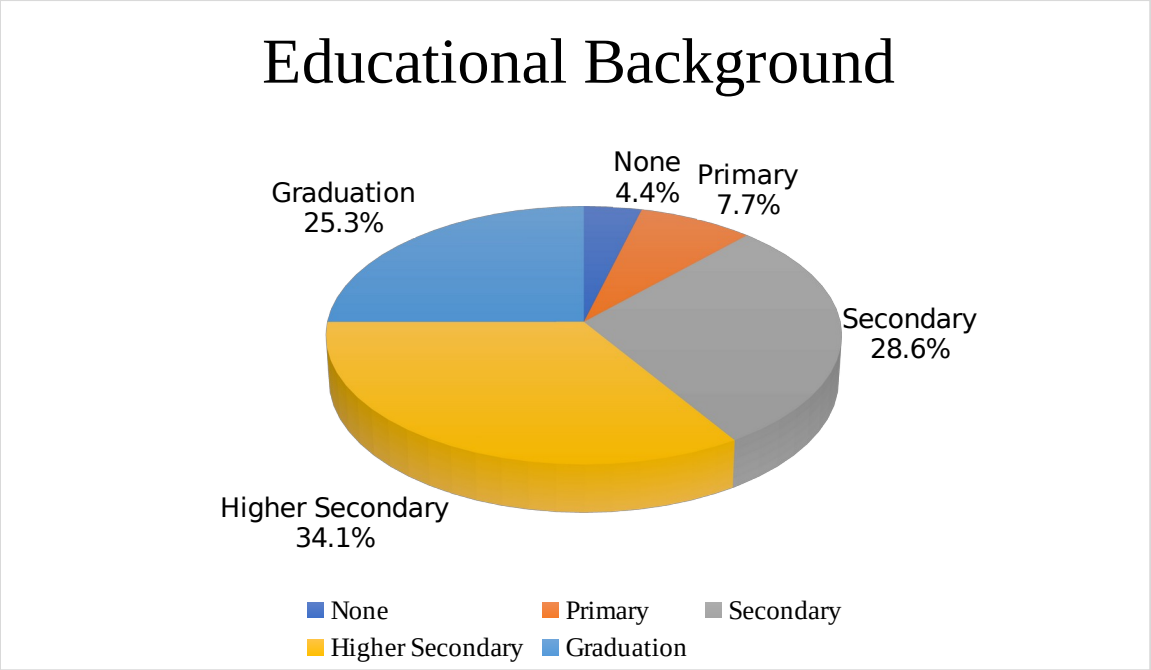

Fig 8: Distribution of Educational Background Among VC Patients

8.3 Association of Vaginal Candidiasis with Menstruation

8.3.1 Distribution of Vaginal Candidiasis Patient Based on Type of Menstrual Flow:

Table 7: Frequency Table Distribution of Type of Menstrual Flow Among VC Patients

Type of Menstrual Flow	Frequency	Percentage (%)	Cumulative Percentage (%)
Regular (1 month)	47	51.6	51.6
Irregular (2-3 month)	42	46.2	97.8
None	2	2.2	100.0
Total	91	100.0	

Among 91 participants, more than half participants have regular menstrual flow (51.6%). 2 participants were in their menopausal state. Rest of the women (46.2%) have irregular period.

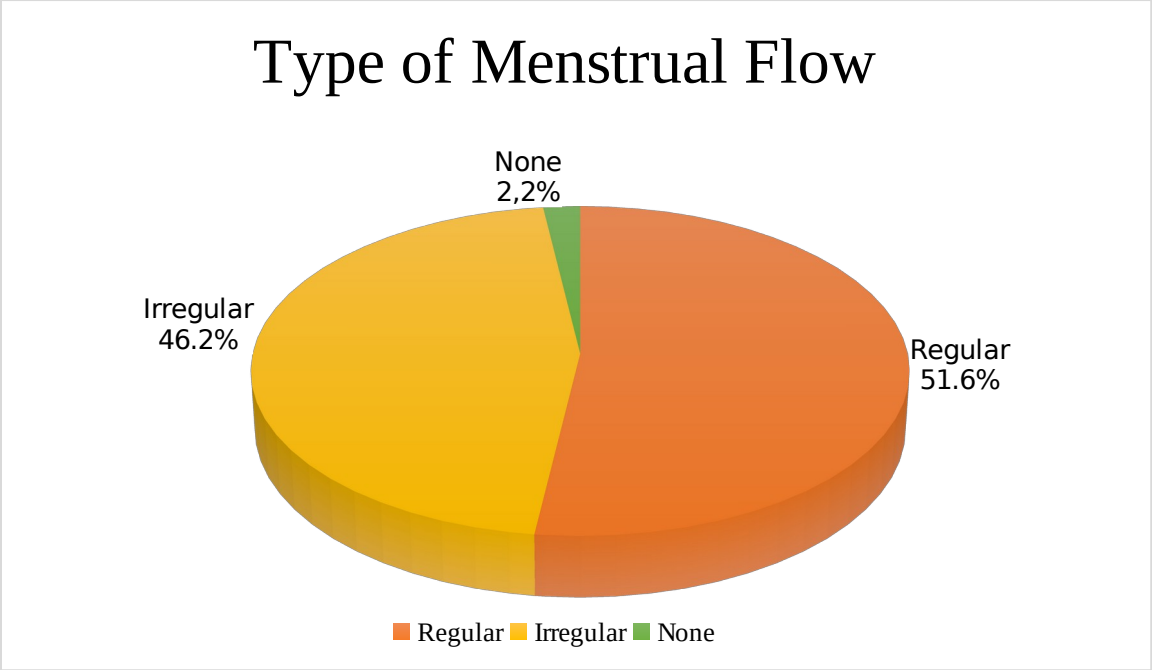

Fig 9: Distribution of Type of Menstrual Flow Among VC Patients

8.3.2 Distribution of Vaginal Candidiasis Patient Based on Duration of Menstrual Bleeding Per Cycle

Table 8: Frequency Table Distribution of Duration of Menstrual Bleeding Per Cycle Among VC Patients

Duration of Menstrual Bleeding	Frequency	Percentage (%)	Cumulative Percentage (%)
1-3 days	25	27.5	27.5
3-5 days	40	44.0	71.4
5-7 days	24	26.4	97.8
None	2	2.2	100.0
Total	91	100.0	

Out of 91 participants, 40 number of patients have a menstrual cycle consisting of 3 to 5 days which is the highest among all groups (44%). The second highest number of participants are present on 1-3 days cycle, which is 27.5%. 26.4% patients have the most day containing cycle which is 5 to 7 days. 2 women don’t have any cycle as they have menopause.

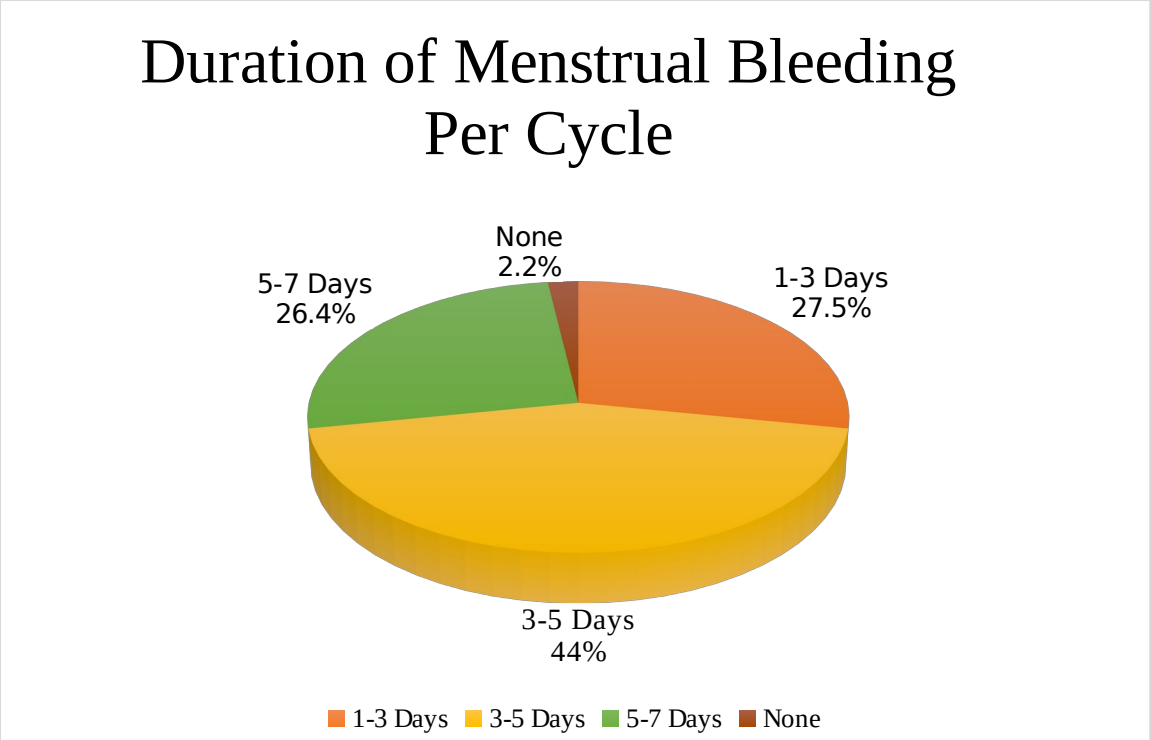

Fig 10: Distribution of Duration of Menstrual Bleeding Per Cycle Among VC Patients

8.4 Association of Vaginal Candidiasis with Menstrual hygiene:

8.4.1 Distribution of Vaginal Candidiasis Patient Based on Type of Absorbent Patient Uses During Menstruation:

Table 9: Frequency Table Distribution of Type of Absorbent Patient Uses During Menstruation Among VC Patients

Type of Absorbent	Frequency	Percentage (%)	Cumulative Percentage (%)
Cloth	30	33.0	33.0
Sanitary Napkin	29	31.9	64.8
Both	30	33.0	97.8
None	2	2.2	100.0
Total	91	100.0	

It is observed from the above frequency table that, the most patient having Vaginal Candidiasis use cloth as their absorbent which is 33% (30 patients). Moreover, 29 patients (31.9%) use sanitary napkin and 30 patients (33%) use both cloth and sanitary napkin as their absorbent during menstruation. 2 women do not use any absorbent as they are in their menopause state.

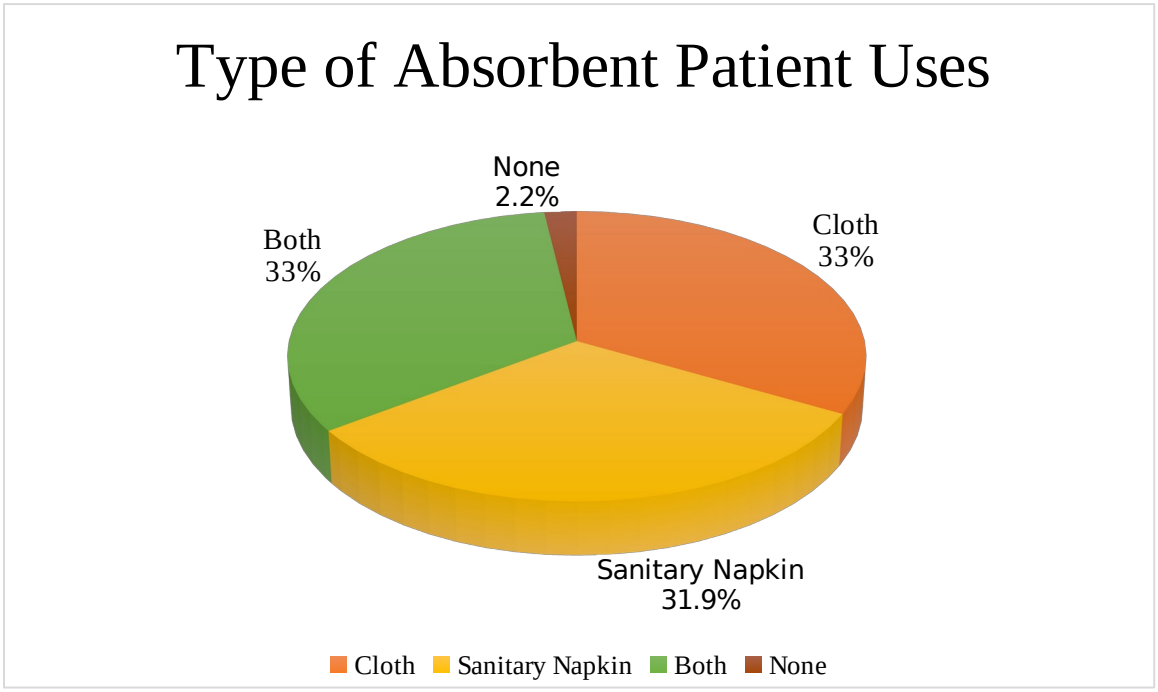

Fig 11: Distribution of Type of Absorbent Patient Uses During Menstruation Among VC Patients

8.4.2 Distribution of Vaginal Candidiasis Patient Based on Absorbent Change Rate of Patient Per Day:

Table 10: Frequency Table Distribution of Absorbent Change Rate of Patient Per Day Among VC Patients

Absorbent Change Rate in a Day	Frequency	Percentage (%)	Cumulative Percentage (%)
1-2 times	68	74.7	74.7
3-4 times	21	23.1	97.8
None	2	2.2	100.0
Total	91	100.0	

The frequency table shows that 68 patients (74.7%) change their absorbent only 1-2 times in a day, which is the highest number of patients. Only 23.1% patient change their absorbent 3-4 times. 2 patients who were in menopause during the study were placed in the category of none.

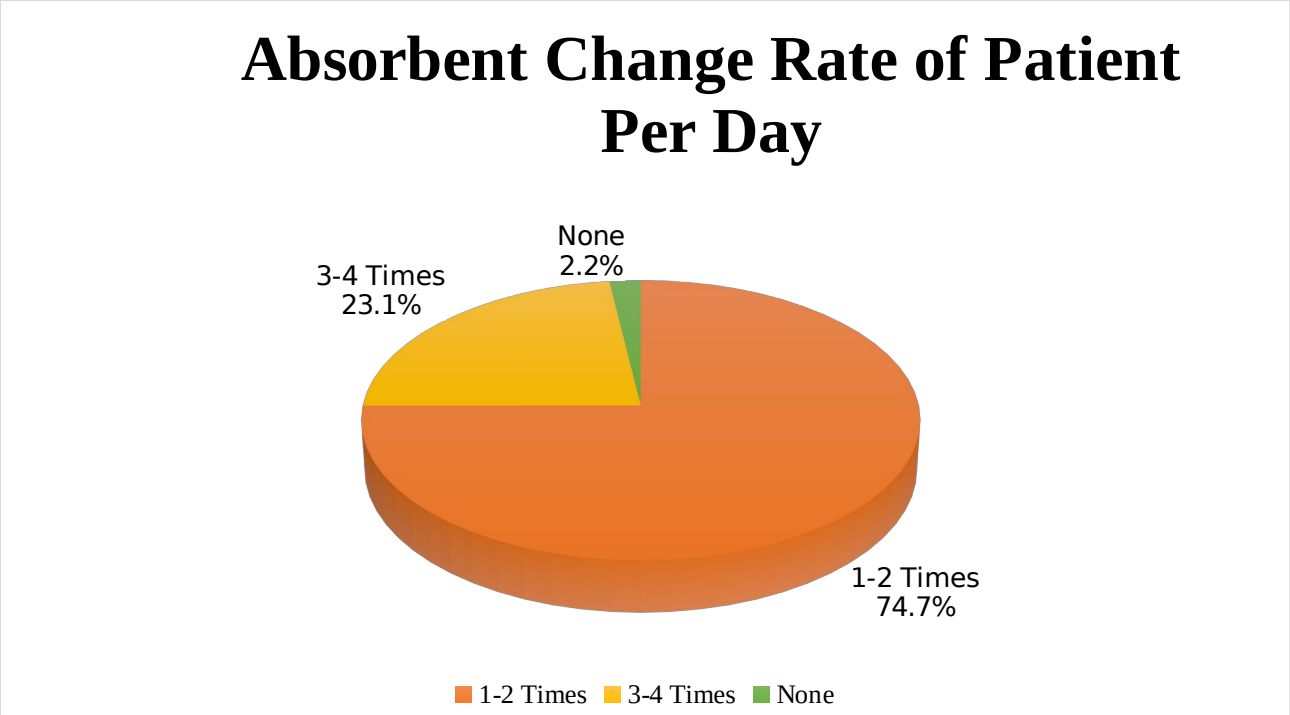

Fig 12: Distribution of Absorbent Change Rate of Patient Per Day Among VC Patients:

8.5 Association of Vaginal Candidiasis with Risk Factors:

8.5.1 Distribution of Vaginal Candidiasis Patient Based on Their Risk Factors

Table 11: Frequency Table Distribution of Factors Causing the Disease Among VC Patients

Factors	Frequency	Percentage (%)	Cumulative Percentage (%)
Use of over the Counter Antibiotic	36	15.2	15.2
Diabetes	19	8.0	23.2
Non-Cotton and Un-clean Undergarment	44	18.6	41.8
Poor Menstrual Hy-giene	83	35.0	76.8
Unsafe Intercourse	38	16.0	92.8
Infected Sexual Partner	8	3.4	96.2
Menopause	2	.8	97.0
STD	7	3.0	100.0
Total		100.0	

The frequency table of factors that caused Vaginal Candidiasis among patients shows that the factor that caused the disease most is poor menstrual hygiene (35%). The second highest risk factor is unsafe intercourse (38%). Surprisingly, non-cotton and unclean undergarment and use of over the counter antibiotic is the third and fourth factor that caused the disease, 18.6% and 14.2%. Lowest occurring risk factor was menopause, which was prevalent in only 2 patients (0.8%). The second and third lowest risk factor was STD (3%) and infected sexual partner

(3.4%). 8% of the disease was caused by diabetes. A single patient can have more than one cause factor.

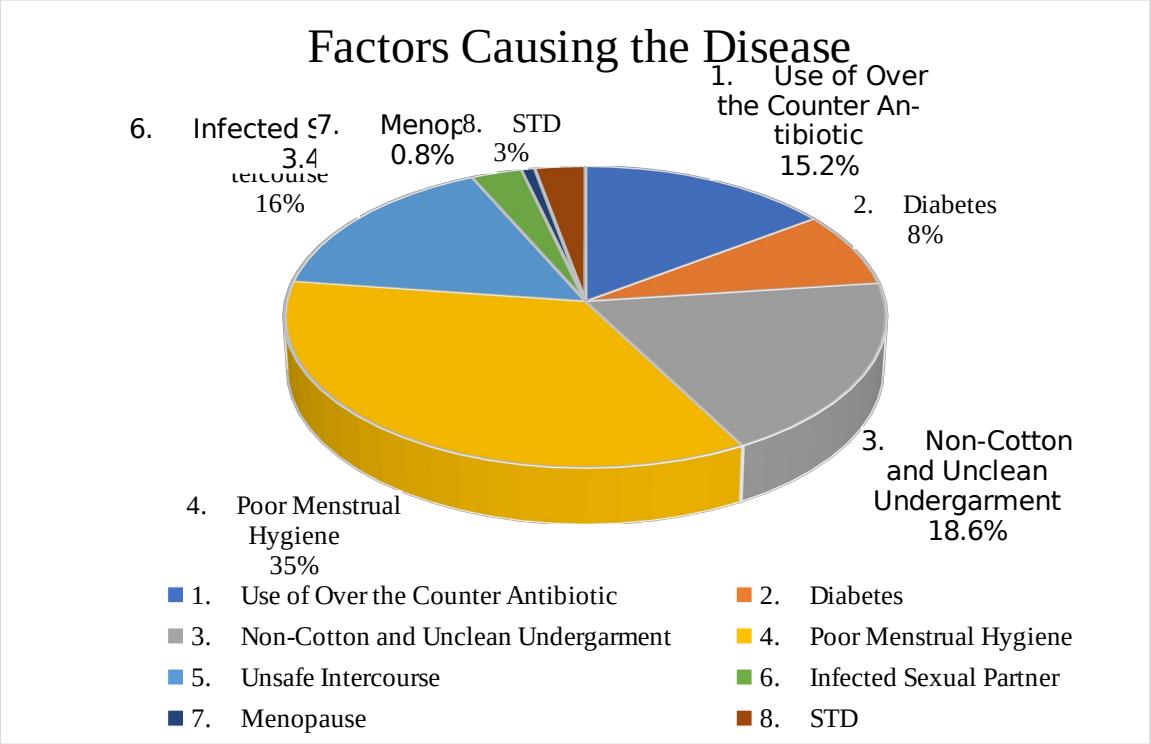

Fig 13: Distribution of Factors Causing the Disease Among VC Patients

8.5.2 Cross -table analysis of age of Vaginal Candidiasis patients based on factors that caused the disease:

Table 12: Cross -table analysis of age of Vaginal Candidiasis patients based on factors that caused the disease

Age		Factors					Total
		Use of over the Counter Antibiotic	Diabetes	Non-Cotton and Unclean Undergarment	Poor Menstrual Hygiene	Unsafe Intercourse	
15-24	Count	10	2	10	8	0	30
	Percentage (%)	11.0%	2.2%	11.0%	8.8%	0.0%	33.0%
25-34	Count	11	4	8	6	1	30
	Percentage (%)	12.1%	4.4%	8.8%	6.6%	1.1%	33.0%
35-44	Count	9	2	2	5	1	19
	Percentage (%)	9.9%	2.2%	2.2%	5.5%	1.1%	20.9%
45-54	Count	5	2	1	2	0	10
	Percentage (%)	5.5%	2.2%	1.1%	2.2%	0.0%	11.0%
55-	Count	1	1	0	0	0	2

64	Percent-age (%)	1.1%	1.1%	0.0%	0.0%	0.0%	2.2%
Total	Percent-age (%)	39.6%	12.1%	23.1%	23.1%	2.2%	100.0%

Among the participants aged between 15-24, most the patients got this disease due to use of over the counter antibiotic (11%) and use of non-cotton and unclean undergarments (11%), 8.8% had the disease due to poor menstrual hygiene and 2.2% had diabetes. Use of over the counter antibiotic is the main factor which caused the disease in most of the women, 12.1% in age range of 25-34, 9.9% in 35-44 age, 5.55% in 45-54 age and only 1.1% in participants age between 55-64. The next factor which caused the disease in most participants is poor menstrual hygiene and non-cotton and unclean undergarment. Where poor menstrual hygiene is seen on 6.6% (in 25-34), 5.5% (35-44), 2.2% (45-54) participants of different age group. Diabetes is the third causing factor, it caused disease in the women who aged between 25-34 (4.4%), total 4 person have diabetes age ranged between 35-54.

8.5.3 Cross-table analysis of marital status of Vaginal Candidiasis patients based on factors:

Table 13: Cross-table analysis of marital status of Vaginal Candidiasis patients based on factors

Factors		Marital Status		Total
		Married	Unmarried	
Use of over the Counter Antibiotic	Count	28	8	36
	Percentage (%)	30.8%	8.8%	39.6%
Diabetes	Count	8	3	11
	Percentage (%)	8.8%	3.3%	12.1%
Non-Cotton and Unclean Undergarments	Count	11	10	21
	Percentage (%)	12.1%	11.0%	23.1%
Poor Menstrual Hygiene	Count	15	6	21
	Percentage (%)	16.5%	6.6%	23.1%
Unsafe Intercourse	Count	2	0	2
	Percentage (%)	2.2%	0.0%	2.2%

Total	Percentage (%)	70.3%	29.7%	100.0%

The use of over the counter antibiotic is the reason which caused the disease in most married women (30.8%), poor menstrual hygiene affected 16.5% women, 12.1% used non-cotton and unclean undergarments, 2.2% had unsafe intercourse and 8.8% have diabetes. From the table it can be said that non-cotton and unclean undergarment mainly caused the disease in unmarried women (11%), 8.8% got it by using over the counter antibiotic, 3.3% have diabetes and 6.6% from poor menstrual hygiene.

8.5.4 Cross-table analysis of education of Vaginal Candidiasis patients based on factors:

Table 14: Cross-table analysis of education of Vaginal Candidiasis patients based on factors

Factors	Total	Educational Background					Total
		None	Primary	Secondary	Higher Secondary	Graduation	
Use of over the Counter Antibiotic	Count	4	3	9	12	8	36
	Percentage (%)	4.4%	3.3%	9.9%	13.2%	8.8%	39.6%
Diabetes	Count	0	0	2	5	4	11
	Percentage (%)	0.0%	0.0%	2.2%	5.5%	4.4%	12.1%

Non-Cotton and Unclean Under-garment	Count	0	2	8	4	7	21
	Percent-age (%)	0.0%	2.2%	8.8%	4.4%	7.7%	23.1%
Poor Menstrual Hygiene	Count	0	2	7	10	2	21
	Percent-age (%)	0.0%	2.2%	7.7%	11.0%	2.2%	23.1%
Unsafe Inter-course	Count	0	0	0	0	2	2
	Percent-age (%)	0.0%	0.0%	0.0%	0.0%	2.2%	2.2%
Total	Percent-age (%)	4.4%	7.7%	28.6%	34.1%	25.3%	100.0%

From the cross-table analysis of education and causative factor, it has been found that all participants from no educational background used over the counter antibiotic which caused the disease. Moreover, participants from primary educational background, 3.3% used over the counter antibiotic, 2.2% wear non-cotton and unclean undergarments and in 2.2% poor menstrual hygiene is seen. Additionally, among secondary education grouped women, 9.9% used over the counter antibiotic, 8.8% wear non-cotton and unclean undergarments, in 7.7% poor menstrual hygiene is seen and 2.2% have diabetes. Furthermore, those with a higher secondary education, 13.2% used over the counter antibiotic, 4.4% wear non-cotton and unclean undergarments, in 11% poor menstrual hygiene is seen and 5.5% have diabetes. Then, individuals with a graduation background 8.8% used over the counter antibiotic, 7.7% wear non-cotton and unclean undergarments, in 2.2% poor menstrual hygiene is seen, 2.2% had unsafe intercourse and 4.4% have diabetes.

8.5.5 Cross-table analysis of social status of Vaginal Candidiasis patients based on factors:

Table 15: Cross-table analysis of social status of Vaginal Candidiasis patients based on factors

Factors		Social Status				
		Upper Class	Middle Class	Lower Middle Class	Poor	Total
Use of over the Counter Antibiotic	Count	1	11	17	7	36
	Percentage (%)	1.1%	12.1%	18.7%	7.7%	39.6%
Diabetes	Count	5	3	3	0	11
	Percentage (%)	5.5%	3.3%	3.3%	0.0%	12.1%
Non-Cotton and Unclean Undergarment	Count	0	11	8	2	21
	Percentage (%)	0.0%	12.1%	8.8%	2.2%	23.1%
Poor Menstrual Hygiene	Count	0	9	10	2	21
	Percentage (%)	0.0%	9.9%	11.0%	2.2%	23.1%
Unsafe Intercourse	Count	0	2	0	0	2
	Percentage (%)	0.0%	2.2%	0.0%	0.0%	2.2%

Total	Percent-age (%)	6.6%	39.6%	41.8%	12.1%	100.0%

From the cross table, it has been observed that, in upper class participants 5.5% have diabetes and 1.1% used over the counter antibiotic as a causative factor for the disease. Moreover, participants from middle class, 12.1% patients had use of over the counter antibiotic, 12.1% use non-cotton and unclean undergarment, 9.9% had poor menstrual hygiene, 3.3 have diabetes and 2.2% had unsafe intercourse as a causative factor for the disease. Additionally, among lower middle-class grouped women 18.7% patients had use of over the counter antibiotic, 8.8% use non-cotton and unclean undergarment, 11% had poor menstrual hygiene, 3.3% have diabetes which is a causative factor for the disease. Furthermore, those from poor background, 7.7% patients had use of over the counter antibiotic, 2.2% use non-cotton and unclean undergarment, 2.2% had poor menstrual hygiene which is a causative factor for the disease.

8.6 Association of Vaginal Candidiasis with Symptoms:

8.6.1 Distribution of Vaginal Candidiasis Patient Based on Their Symptoms:

Table 16: Frequency Table Distribution of Symptoms Displayed by the Patients Among VC Patients

Symptoms	Frequency	Percentage (%)	Cumulative Percentage (%)
Pain or Burning Sensation during Urination	46	16.8	16.8
Nausea and Vomiting	1	.4	17.2
Unusual Vaginal Discharge	62	22.6	39.8
Painful Menstruation	9	3.3	43.1
Painful Intercourse	32	11.7	54.7
Itching Near the Genital	56	20.4	75.2
Irritation, Sore or Swelling Near Genital Area	68	24.8	100.0
Total		100.0	

A single patient can have more than one symptom present for Vaginal Candidiasis. Majority of the patient had unusual vaginal discharge (22.6%). 24.8% patients complained about having irritation or swelling near genital area and 20.4% patient faced itching near the genital area.

Other common symptoms were pain or burning sensation during urination (16.8%), painful intercourse (11.7%), painful menstruation (3.3) and nausea and vomiting (0.4%).

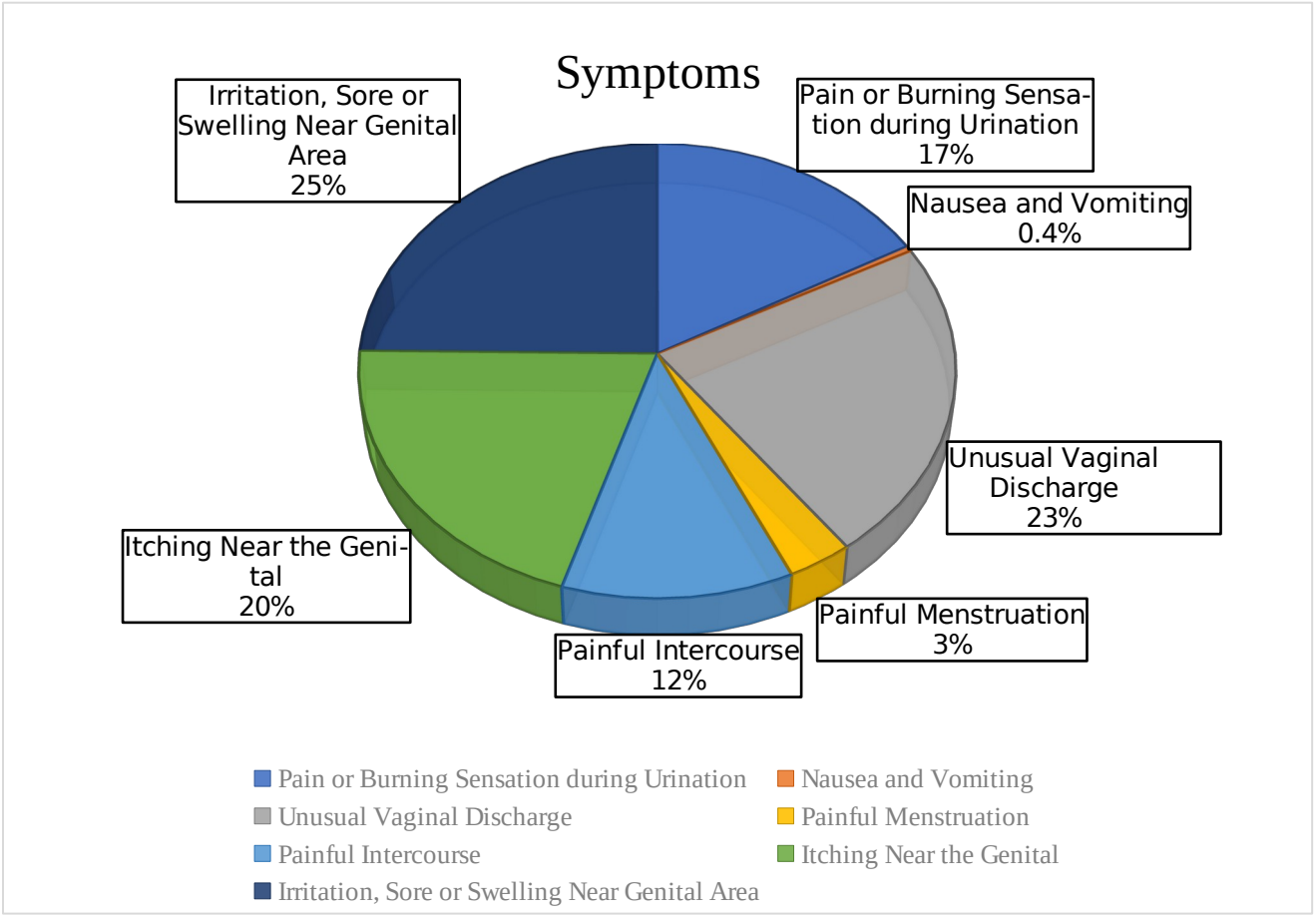

Fig 14: Distribution of Symptoms Displayed by the Patients Among VC Patients

8.6.2 Cross - table analysis of age of Vaginal Candidiasis patients based on symptoms:

Table 17: Cross - table analysis of age of Vaginal Candidiasis patients based on symptoms

Symptoms		Age					
		15-24	25-34	35-44	45-54	55-64	Total
Pain or Burning Sensation during Urination	Count	10	15	12	8	1	46
	Percentage (%)	11.0%	16.5%	13.2%	8.8%	1.1%	50.5%
Nausea and Vomiting	Count	0	0	1	0	0	1
	Percentage (%)	0.0%	0.0%	1.1%	0.0%	0.0%	1.1%
Unusual Vaginal Discharge	Count	14	10	4	2	1	31
	Percentage (%)	15.4%	11.0%	4.4%	2.2%	1.1%	34.1%
Painful Menstruation	Count	1	0	0	0	0	1
	Percentage (%)	1.1%	0.0%	0.0%	0.0%	0.0%	1.1%
Painful Intercourse	Count	1	2	0	0	0	3
	Percentage (%)	1.1%	2.2%	0.0%	0.0%	0.0%	3.3%
Itching Near the Genital	Count	4	2	2	0	0	8
	Percentage (%)	4.4%	2.2%	2.2%	0.0%	0.0%	8.8%
Irritation, Sore or	Count	0	1	0	0	0	1

Swelling Near Genital Area	Percentage (%)	0.0%	1.1%	0.0%	0.0%	0.0%	1.1%
Total	Percentage (%)	33.0%	33.0%	20.9%	11.0%	2.2%	100.0%

From the cross-table analysis, it has been observed that, women aged between 15 to 24 years, 15.4% had unusual vaginal discharge, 11% had pain or burning sensation during urination, 4.4% had itching near the genital area, 1.1% had painful menstruation and 1.1% had painful intercourse as symptoms. Moreover, women aged between 25 to 34 years, 16.5% had pain or burning sensation during urination, 11% had unusual vaginal discharge, 2.2% had itching near the genital area, 2.2% had painful intercourse and 1.1% had irritation or swelling near the genital area as symptoms. Then, women aged between 35 to 44 years, 13.2% had pain or burning sensation during urination, 4.4% had unusual vaginal discharge, 2.2% had itching near the genital area, 1.1% nausea and vomiting as symptoms. Furthermore, women aged between 45 to 54 years, 8.8% had pain or burning sensation during urination and 2.2% had unusual vaginal discharge as symptoms. Women aged between 55 to 64 years, 1.1% had unusual vaginal discharge, 1.1% had pain or burning sensation during urination as symptoms.

8.6.3 Cross-table analysis of the marital status of Vaginal Candidiasis patients based on symptoms:

Table 18: Cross-table analysis of marital status of Vaginal Candidiasis patients based on symptoms

Symptoms		Marital Status	Total

		Married	Unmarried	
Pain or Burning Sensation during Urination	Count	36	10	46
	Percentage (%)	39.6%	11.0%	50.5%
Nausea and Vomiting	Count	1	0	1
	Percentage (%)	1.1%	0.0%	1.1%
Unusual Vaginal Discharge	Count	19	12	31
	Percentage (%)	20.9%	13.2%	34.1%
Painful Menstruation	Count	0	1	1
	Percentage (%)	0.0%	1.1%	1.1%
Painful Intercourse	Count	3	0	3
	Percentage (%)	3.3%	0.0%	3.3%
Itching Near the Genital	Count	4	4	8
	Percentage (%)	4.4%	4.4%	8.8%
Irritation, Sore or	Count	1	0	1

Swelling Near Genital Area	Percentage (%)	1.1%	0.0%	1.1%
Total	Percentage (%)	70.3%	29.7%	100.0%

The cross-table analysis shows that the symptoms varied between married and unmarried patients, here 39.6% married women experienced pain or burning sensation during urination where as 11% unmarried women had this symptom. Similarly, unusual vaginal discharge was present on 20.9% married patients and 13.2% unmarried patients. Moreover, 4.4% from each married and unmarried woman faced itching near the genital area. Also, irritation, sore and swelling near the genital area was present in 1% married women and only married patients (3.3%) experienced painful intercourse and nausea and vomiting (1.1%) as a symptom. Besides, only unmarried patients (1.1%) experience painful menstruation as a symptom.

8.6.4 Cross-table analysis of education of Vaginal Candidiasis patients based on symptoms:

Table 19: Cross-table analysis of education of Vaginal Candidiasis patients based on symptoms

Symptoms		Educational Background	Total

		None	Pri-mary	Sec-ondary	Higher Sec-ondary	Gradua-tion	
Pain or Burning Sensation during Urination	Count	4	4	11	18	9	46
	Percent-age (%)	4.4%	4.4%	12.1%	19.8%	9.9%	50.5%
Nausea and Vom-iting	Count	0	1	0	0	0	1
	Percent-age (%)	0.0%	1.1%	0.0%	0.0%	0.0%	1.1%
Unusual Vaginal Discharge	Count	0	2	9	10	10	31
	Percent-age (%)	0.0%	2.2%	9.9%	11.0%	11.0%	34.1%
Painful Menstrua-tion	Count	0	0	0	1	0	1
	Percent-age (%)	0.0%	0.0%	0.0%	1.1%	0.0%	1.1%
Painful Inter-course	Count	0	0	2	0	1	3
	Percent-age (%)	0.0%	0.0%	2.2%	0.0%	1.1%	3.3%
Itching Near the Genital	Count	0	0	4	1	3	8
	Percent-age (%)	0.0%	0.0%	4.4%	1.1%	3.3%	8.8%
Irritation, Sore or	Count	0	0	0	1	0	1

Swelling Near Genital Area	Percentage (%)	0.0%	0.0%	0.0%	1.1%	0.0%	1.1%
Total	Percentage (%)	4.4%	7.7%	28.6%	34.1%	25.3%	100.0%

From the cross-table analysis of education and causative factor, it has been found that all participants from no educational background all of them had pain and burning sensation during urination (4.4%). Moreover, participants from primary educational background, 4.4% had pain and burning sensation during urination, 2.2% had unusual vaginal discharge and 1.1% had nausea and vomiting as a symptom. Additionally, among secondary education grouped women, 12.1% had pain and burning sensation during urination, 9.9% had unusual vaginal discharge, 2.2% had painful intercourse and 4.4% had itching near genital area as a symptom. Furthermore, those with a higher secondary education, 19.8% had pain and burning sensation during urination, 11% had unusual vaginal discharge, 1.1% had painful menstruation, 1.1%had irritation and swelling near the genital area and 1.1% had itching near genital area as a symptom. Then, individuals with a graduation background, 9.9% had pain and burning sensation during urination, 11% had unusual vaginal discharge, 1.1% had painful intercourse and 3.3% had itching near genital area as a symptom.

8.6.5 Cross-table analysis of social status of Vaginal Candidiasis patients based on symptoms:

Table 20: Cross-table analysis of social status of Vaginal Candidiasis patients based on symptoms

Symptoms		Social Status

		Upper Class	Middle Class	Lower Middle Class	Poor	Total
Pain or Burning Sensation during Urination	Count	2	18	18	8	46
	Percent-age (%)	2.2%	19.8%	19.8%	8.8%	50.5%
Nausea and Vomit-ing	Count	0	0	0	1	1
	Percent-age (%)	0.0%	0.0%	0.0%	1.1%	1.1%
Unusual Vaginal Discharge	Count	3	11	15	2	31
	Percent-age (%)	3.3%	12.1%	16.5%	2.2%	34.1%
Painful Menstrua-tion	Count	1	0	0	0	1
	Percent-age (%)	1.1%	0.0%	0.0%	0.0%	1.1%
Painful Intercourse	Count	0	2	1	0	3
	Percent-age (%)	0.0%	2.2%	1.1%	0.0%	3.3%
Itching Near the Genital	Count	0	5	3	0	8
	Percent-age (%)	0.0%	5.5%	3.3%	0.0%	8.8%
Irritation, Sore or	Count	0	0	1	0	1

Swelling Near Genital Area	Percentage (%)	0.0%	0.0%	1.1%	0.0%	1.1%
Total	Percentage (%)	6.6%	39.6%	41.8%	12.1%	100.0%

From the cross table, it has been observed that, in upper class participants, 3.3% showed unusual vaginal discharge, 2.2% had pain or burning during urination and 1.1% had painful intercourse as symptom. Moreover, participants from middle class, 19.8% showed pain or burning sensation during urination, 12.1% had unusual vaginal discharge, 5.5% had itching near genital area and 2.2% had painful intercourse as symptoms. Additionally, among lower middle-class grouped women, 19.8% had pain or burning sensation during urination, 16.5% had unusual vaginal discharge, 3.3% had itching near the genital area, 1.1% had irritation, sore and swelling near the genital area and 1.1% had painful intercourse as symptoms. Furthermore, those from poor background, 8.8% had pain or burning sensation during urination, 2.2% had unusual vaginal discharge and 1.1% had nausea and vomiting as symptom.

8.7 Association of Vaginal Candidiasis with Complications:

8.7.1 Distribution of Vaginal Candidiasis Patient Based on Their Complications:

Table 21: Frequency Table Distribution of Complications Faced by the Patient Among VC Patients

Complications	Frequency	Percentage (%)	Cumulative Percentage (%)
Recurrent of Infection	41	28.5	28.5
Candidemia	20	13.9	42.4
Skin Infection	66	45.8	88.2
Gastro Intestinal Problem	6	4.2	92.4
None	11	7.6	100.0
Total	144	100.0	

Surprisingly the most common complication the patient faced was skin infection (45.8%). 28.5% patient had vaginal candidiasis for multiple times which is known as recurrent infection. The other common complications were candidemia (13.9%), gastro intestinal problem (4.2%). 7.6% patients did not face any complications.

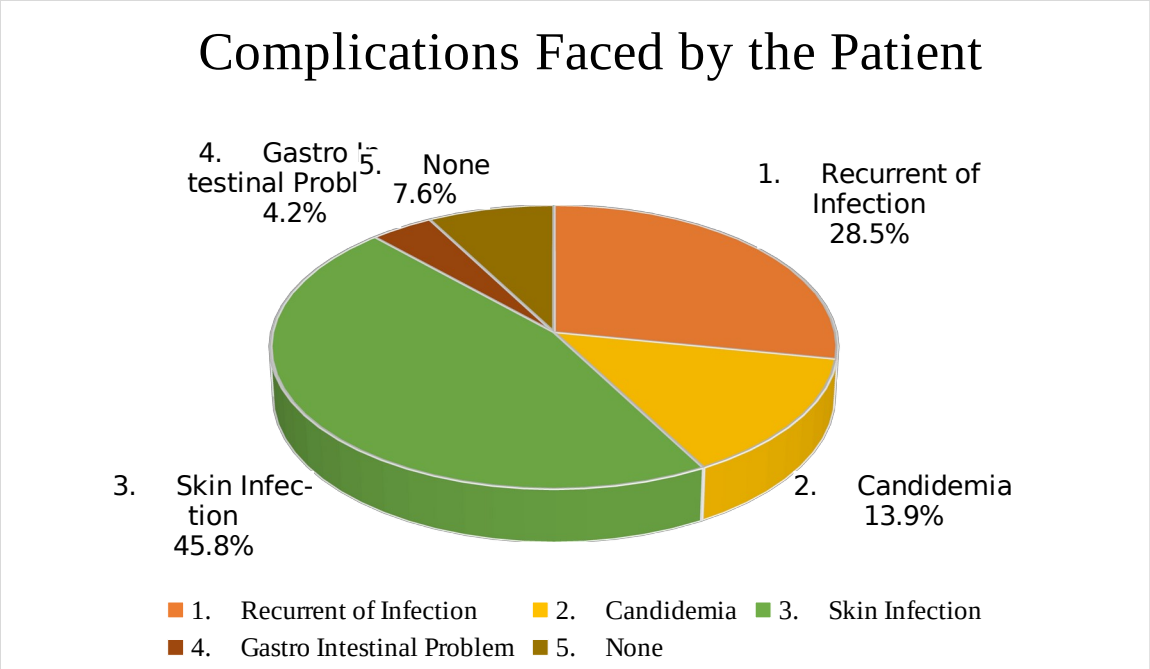

Fig 15: Frequency Table Distribution of Complications Faced by the Patient Among VC Patients

8.7.2 Cross - table analysis of age of Vaginal Candidiasis patients based on complications:

Table 22: Cross - table analysis of age of Vaginal Candidiasis patients based on complications

Age		Complications				
		Recurrent of Infection	Candidemia	Skin Infection	None	Total
15-24	Count	13	3	12	2	30
	Percentage (%)	14.3%	3.3%	13.2%	2.2%	33%
25-34	Count	18	2	6	4	30
	Percentage (%)	19.8%	2.2%	6.6%	4.4%	33%
3544	Count	5	3	7	4	19
	Percentage (%)	5.5%	3.3%	7.7%	4.4%	20.9%
45--54	Count	4	1	4	1	10
	Percentage (%)	4.4%	1.1%	4.4%	1.1%	11%
55-64	Count	1	0	1	0	2

	Percentage (%)	1.1%	0.0%	1.1%	0.0%	2.2%
Total	Percentage (%)	45.1%	9.9%	33.0%	12.1%	100%

From the cross-table analysis, it has been observed that, women aged between 15 to 24 years, 14.3% faced recurrent infection, 13.2% faced skin infection, 3.3% had candidemia and 2.2% did not face any complications. Moreover, women aged between 25 to 34 years, 19.8% faced recurrent infection, 6.6% faced skin infection, 2.2% had candidemia and 4.4% did not face any complications. Then, women aged between 35 to 44 years, 5.5% faced recurrent infection, 7.7% faced skin infection, 3.3% had candidemia and 4.4% did not face any complications. Furthermore, women aged between 45 to 54 years, 4.4% faced recurrent infection, 4.4% faced skin infection, 1.1% had candidemia and 1.1% did not face any complications. Women aged between 55 to 64 years, 1.1% faced recurrent infection, 1.1% faced skin infection as complications.

8.7.3 Cross-table analysis of marital status of Vaginal Candidiasis patients based on complications:

Table 23: Cross-table analysis of marital status of Vaginal Candidiasis patients based on complications

Complications		Marital Status		Total
		Married	Unmarried	
Recurrent of Infection	Count	29	12	41
	Percentage (%)	31.9%	13.2%	45.1%
Candidemia	Count	7	2	9
	Percentage (%)	7.7%	2.2%	9.9%
Skin Infection	Count	19	11	30
	Percentage (%)	20.9%	12.1%	33.0%
None	Count	9	2	11
	Percentage (%)	9.9%	2.2%	12.1%
Total	Percentage (%)	70.3%	29.7%	100.0%

This cross-table analysis shows that the variation of complications between married and unmarried women. Here, 31.9% of married women faced recurrent infection where 13.2% of unmarried women faced it. Moreover, 20.9% of married participants and 12.1% of unmarried participants got skin infection. 9.9% of married and 2.2% of unmarried women faced no complications where as 7.7% married participants and 2.2% unmarried participants got candidemia as a complication.

8.7.4 Cross-table analysis of education of Vaginal Candidiasis patients based on complications:

Table 24: Cross-table analysis of education of Vaginal Candidiasis patients based on complications

Complications		Educational Background					Total
		None	Primary	Secondary	Higher Secondary	Graduation	
Recurrent of Infection	Count	2	3	10	12	14	41
	Percentage (%)	2.2%	3.3%	11.0%	13.2%	15.4%	45.1%
Candidemia	Count	2	1	1	4	1	9
	Percentage (%)	2.2%	1.1%	1.1%	4.4%	1.1%	9.9%
Skin Infection	Count	0	3	12	11	4	30

	Percentage (%)	0.0%	3.3%	13.2%	12.1%	4.4%	33.0%
None	Count	0	0	3	4	4	11
	Percentage (%)	0.0%	0.0%	3.3%	4.4%	4.4%	12.1%
Total	Percentage (%)	4.4%	7.7%	28.6%	34.1%	25.3%	100.0%

From the cross-table analysis of education and causative factor, it has been found that all participants from no educational background had recurrent infection (2.2%) and candidemia (2.2%) as complication. Moreover, participants from primary educational background, 3.3% had recurrent infection, 3.3% had skin infection and 1.1% had candidemia. Additionally, among secondary education grouped women, 11% had recurrent infection, 13.2% had skin infection, 1.1% had candidemia and 3.3% showed no complication. Furthermore, those with a higher secondary education, 13.2% had recurrent infection, 12.1% had skin infection, 4.4% had candidemia and 4.4% showed no complications. Then, individuals with a graduation background, 15.4% had recurrent infection, 4.4% had skin infection, 1.1% had candidemia and 4.4% showed no complications.

8.7.5 Cross-table analysis of social status of Vaginal Candidiasis patients based on complications:

Table 25: Cross-table analysis of social status of Vaginal Candidiasis patients based on complications

Complications		Social Status				
		Upper Class	Middle Class	Lower Middle Class	Poor	Total
Recurrent of Infection	Count	2	16	18	5	41
	Percentage (%)	2.2%	17.6%	19.8%	5.5%	45.1%
Candidemia	Count	1	4	1	3	9
	Percentage (%)	1.1%	4.4%	1.1%	3.3%	9.9%
Skin Infection	Count	1	11	15	3	30
	Percentage (%)	1.1%	12.1%	16.5%	3.3%	33.0%
None	Count	2	5	4	0	11
	Percentage (%)	2.2%	5.5%	4.4%	0.0%	12.1%
Total	Percentage (%)	6.6%	39.6%	41.8%	12.1%	100.0%

From the cross table, it has been observed that, in upper class participants, 2.2% had recurrent infection, 1.1% had candidemia, 1.1% had skin infection and 2.2% showed no complications at all. Moreover, participants from middle class, 17.6% had recurrent infection, 4.4% had candidemia, 12.1% had skin infection and 5.5% showed no complications at all. Additionally, among lower middle-class grouped women, 19.8% had recurrent infection, 1.1% had candidemia, 16.5% had skin infection and 4.4% showed no complications at all. Furthermore, those from poor background, 5.5% had recurrent infection, 3.3% had candidemia, 3.3% had skin infection as complications.

8.8 Association of Types of Absorbent with different factors

8.8.1 Cross-table analysis of Age and Types of Absorbent Used During Menstruation:

Table 26: Cross-table analysis of Age and Types of Absorbent Used During Menstruation:

Age		Type of Absorbent				Total
		Cloth	Sanitary Napkin	Both	None	
15-24	Count	5	12	13	0	30
	Percentage (%)	5.5%	13.2%	14.3%	0.0%	33.0%
25-34	Count	6	14	10	0	30
	Percentage (%)	6.6%	15.4%	11.0%	0.0%	33.0%
35-44	Count	12	2	5	0	19

	Percentage (%)	13.2%	2.2%	5.5%	0.0%	20.9%
45-54	Count	7	1	2	0	10
	Percentage (%)	7.7%	1.1%	2.2%	0.0%	11.0%
55-64	Count	0	0	0	2	2
	Percentage (%)	0.0%	0.0%	0.0%	2.2%	2.2%
Total	Percentage (%)	33.0%	31.9%	33.0%	2.2%	100.0%

Among 15-24 age range 5.5% women use cloth 13.2% use sanitary napkin, 14.3% use both. Among 25-34 age range women, most of them use sanitary napkin as absorbent (15.4%), rest of them use cloth (6.6%) and both type of absorbent is used by 11%. 13.2% women aged between 35 to 44 years use cloth, 15.4% use sanitary napkin and 5.5% use both type of absorbent. Women aged between 45 to 54 years mostly use cloth (7.7%), the second highest percent of women use both type of absorbent (2.2%) and rest of 1.1% use sanitary napkin. Women of ages between 55 to 64 do not use any type of absorbent as they have menopause.

8.8.2 Cross-table analysis of Marital Status of Vaginal Candidiasis patients based on type of absorbents:

Table 27: Cross-table analysis of Marital Status of Vaginal Candidiasis patients based on type of absorbents

Type of Absorbent		Marital Status		Total
		Married	Unmarried	
Cloth	Count	26	4	30
	Percentage (%)	28.6%	4.4%	33.0%
Sanitary Napkin	Count	16	13	29
	Percentage (%)	17.6%	14.3%	31.9%
Both	Count	20	10	30
	Percentage (%)	22.0%	11.0%	33.0%
None	Count	2	0	2
	Percentage (%)	2.2%	0.0%	2.2%
Total	Percentage (%)	70.3%	29.7%	100.0%

In married women about 28.6% use cloth, 17.6% use sanitary napkin, 22% use both type and 2.2% do not use any type of absorbent. In between unmarried women 4.4% use cloth, 14.3% use sanitary napkin, 11% use both type of absorbent. Married women mostly use cloth and unmarried women use sanitary napkin mostly.

8.8.3 Cross-table analysis of education of Vaginal Candidiasis patients based on type of absorbents:

Table 28: Cross-table analysis of education of Vaginal Candidiasis patients based on type of absorbents

Type of Absorbent		Educational Background					
		None	Primary	Secondary	Higher Secondary	Graduation	Total
Cloth	Count	4	7	9	8	2	
	Percentage (%)	4.4%	7.7%	9.9%	8.8%	2.2%	30
Sanitary Napkin	Count	0	0	6	7	16	33.0%
	Percentage (%)	0.0%	0.0%	6.6%	7.7%	17.6%	29
Both	Count	0	0	11	15	4	31.9%
	Percentage (%)	0.0%	0.0%	12.1%	16.5%	4.4%	30
None	Count	0	0	0	1	1	33.0%
	Percentage (%)	0.0%	0.0%	0.0%	1.1%	1.1%	2
Total	Percentage (%)	4.4%	7.7%	28.6%	34.1%	25.3%	91

From the cross table between educational background and type of absorbent, various type of result can be seen. Patients with no educational background (4.4%) and who completed primary education (7.7%) use cloth as an absorbent. Among patient with secondary education 9.9% use cloth, 6.6% use sanitary napkin and 16.5% uses both type of absorbent. 17.6% patient who are from graduation background use sanitary napkin which is a healthy practice. Women with higher secondary background use both type absorbent (16.5%) most.

8.8.4 Cross-table analysis of social status of Vaginal Candidiasis patients based on type of absorbents:

Table 29: Cross-table analysis of social status of Vaginal Candidiasis patients based on type of absorbents

Type of Absorbent		Socio-economic Background				Total
		Upper Class	Middle Class	Lower Middle Class	Poor	
Cloth	Count	0	5	14	11	30
	Percentage (%)	0.0%	5.5%	15.4%	12.1%	33.0%
Sanitary Napkin	Count	6	21	2	0	29
	Percentage (%)	6.6%	23.1%	2.2%	0.0%	31.9%
Both	Count	0	8	22	0	30
	Percentage (%)	0.0%	8.8%	24.2%	0.0%	33.0%

None	Count	0	2	0	0	2
	Percent-age (%)	0.0%	2.2%	0.0%	0.0%	2.2%
Total	Percent-age (%)	6.6%	39.6%	41.8%	12.1%	100.0%

From the cross table, it has been observed that upper class women only use sanitary napkin (6.6%) and women from poor social class only use cloth (12.1%). Various type of result can be seen for middle class and lower middle-class people. Women from middle class background mostly use sanitary napkin (23.1%), others use cloth (5.5%) and 8.8% use both types. Lower middle-class backgrounded women use both type mostly (24.2%).

8.8.5 Cross-table analysis of factors of Vaginal Candidiasis patients based on type of absorbents:

Table 30: Cross-table analysis of factors of Vaginal Candidiasis patients based on type of absorbents

Factors		Type of Absorbent				Total
		Cloth	Sanitary Napkin	Both	None	
Use of over the Counter Antibiotic	Count	16	5	14	1	36
	Percentage (%)	17.6%	5.5%	15.4%	1.1%	39.6%
Diabetes	Count	3	5	2	1	11
	Percentage (%)	3.3%	5.5%	2.2%	1.1%	12.1%
Non-Cotton and Unclean Undergarment	Count	3	10	8	0	21
	Percentage (%)	3.3%	11.0%	8.8%	0.0%	23.1%
Poor Menstrual Hygiene	Count	8	7	6	0	21
	Percentage (%)	8.8%	7.7%	6.6%	0.0%	23.1%
Unsafe Intercourse	Count	0	2	0	0	2

	Percentage (%)	0.0%	2.2%	0.0%	0.0%	2.2%
Total	Percentage (%)	33.0%	31.9%	33.0%	2.2%	100.0%

From the cross table it has been observed that women who use cloth as absorbent, 17.6% had over the counter antibiotic, 3.3% have diabetes, 3.3% use non-cotton and unclean undergarment and 8.8% women use non-cotton and unclean undergarment. Among the patients who use sanitary napkin, using of non-cotton and unclean undergarment caused the disease in most (11%) also poor menstrual hygiene is the second highest factor which caused the disease (7.7%). Using over counter antibiotic caused the disease in most women who use both type of absorbent (15.4%).

8.8.6 Cross-table analysis of symptoms of Vaginal Candidiasis patients based on type of absorbents:

Table 31: Cross-table analysis of symptoms of Vaginal Candidiasis patients based on type of absorbents

Symptoms		Type of Absorbent				Total
		Cloth	Sanitary Napkin	Both	None	
Pain or Burning Sensation during Urination	Count	22	11	12	1	46
	Percentage (%)	24.2%	12.1%	13.2%	1.1%	50.5%
Nausea and Vomiting	Count	1	0	0	0	1
	Percentage (%)	1.1%	0.0%	0.0%	0.0%	1.1%
Unusual Vaginal Discharge	Count	5	12	13	1	31
	Percentage (%)	5.5%	13.2%	14.3%	1.1%	34.1%
Painful Menstruation	Count	0	1	0	0	1
	Percentage (%)	0.0%	1.1%	0.0%	0.0%	1.1%
Painful Intercourse	Count	1	2	0	0	3

	Percentage (%)	1.1%	2.2%	0.0%	0.0%	3.3%
Itching Near the Genital	Count	1	3	4	0	8
	Percentage (%)	1.1%	3.3%	4.4%	0.0%	8.8%
Irritation, Sore or Swelling Near Genital Area	Count	0	0	1	0	1
	Percentage (%)	0.0%	0.0%	1.1%	0.0%	1.1%
Total	Percentage (%)	33.0%	31.9%	33.0%	2.2%	100.0%

Among women who use cloth as absorbent, 24.2% had pain or burning sensation during urination, 5.5% had unusual vaginal discharge, 1.1% faced nausea and vomiting, 1.1% faced painful intercourse and itching near the genital area is seen in 1.1%. Moreover, patients who use sanitary napkin, among them 13.2% showed unusual vaginal discharge, 12.1% had pain and burning sensation during urination, 3.3% faced itching near genital area, 2.2% had painful intercourse and 1.1% had painful menstruation which showed as symptom. Additionally, patients who employ both absorbent types, 14.3% had unusual vaginal discharge, 13.2% had pain and burning sensation while urinating, 4.4% faced itching and 1.1% faced irritation or swelling near genital area. Furthermore, participants those do not use any type of absorbents, among them, 1.1% faced pain or burning sensation during urination and 1.1% had unusual vaginal discharge.

8.8.7 Cross-table analysis of complications of Vaginal Candidiasis patients based on type of absorbents:

Table 32: Cross-table analysis of complications of Vaginal Candidiasis patients based on type of absorbents

Complications		Type of Absorbent				Total
		Cloth	Sanitary Napkin	Both	None	
Recurrent of Infection	Count	12	14	14	1	41
	Percentage (%)	13.2%	15.4%	15.4%	1.1%	45.1%
Candidemia	Count	4	4	1	0	9
	Percentage (%)	4.4%	4.4%	1.1%	0.0%	9.9%
Skin Infection	Count	13	5	11	1	30
	Percentage (%)	14.3%	5.5%	12.1%	1.1%	33.0%
None	Count	1	6	4	0	11
	Percentage (%)	1.1%	6.6%	4.4%	0.0%	12.1%
Total	Percentage (%)	33.0%	31.9%	33.0%	2.2%	100%

From the cross-table analysis, it is observed that women who use cloth as absorbent, among them 14.3% faced skin infection, 13.2% had recurrent infection, 4.4% had candidemia and only 1.1% faced no complications at all. Moreover, patients who use sanitary napkin, 15.4% faced recurrent infection, 12.1% had skin infection, 4.4% had candidemia and 6.6% faced no complications at all. Additionally, patients who employ both absorbent types, 15.4% patients faced recurrent infection, 12.1% had skin infection, 1.1% faced candidemia and 4.4% patients had no complications. Furthermore, participants those do not use any type of absorbents, among them, 1.1% faced recurrent infection and 1.1% had skin infection.

8.9 Association of Absorbent Change Rate Per Day with different factors:

8.9.1 Cross - table analysis of age of Vaginal Candidiasis patients based on absorbent change rate per day:

Table 33: Cross - table analysis of age of Vaginal Candidiasis patients based on absorbent change rate per day

Age		Absorbent Change Rate in a Day			Total
		1-2 times	3-4 times	None	
15-24	Count	28	2	0	30
	Percentage (%)	30.8%	2.2%	0.0%	33.0%
25-34	Count	17	13	0	30
	Percentage (%)	18.7%	14.3%	0.0%	33.0%
35-44	Count	13	6	0	19
	Percentage (%)	14.3%	6.6%	0.0%	20.9%
45-54	Count	10	0	0	10
	Percentage (%)	11.0%	0.0%	0.0%	11.0%
55-64	Count	0	0	2	2
	Percentage (%)	0.0%	0.0%	2.2%	2.2%
Total	Percentage (%)	74.7%	23.1%	2.2%	100.0%

From the cross-table analysis of age of VC patients based on absorbent change rate, it can be seen from participants aged between 15 to 24, most of them change the absorbent rate 1-2

times per day (30.8%), rest of the participants (2.2%) change absorbent 3-4 times in a day. In all of the age range most of the participants change their absorbent only 1-2 times, result in 18.7% in 25-34, 14.3% in 35-44 and 11% on women age ranged between 45-54. Among participants who change absorbent 3-4 times a day, 14.3% are from 25-34 age and 6.6% are from 35-44 age range. Women aged among 55 to 64 years age do not need to change absorbent as they have menopause.

8.9.2 Cross-table analysis of marital status of Vaginal Candidiasis patients based on absorbent change rate

Table 34: Cross-table analysis of marital status of Vaginal Candidiasis patients based on absorbent change rate

Absorbent Change Rate in a Day		Marital Status		Total
		Married	Unmarried	
1-2 times	Count	42	26	68
	Percentage (%)	46.2%	28.6%	74.7%
3-4 times	Count	20	1	21
	Percentage (%)	22.0%	1.1%	23.1%
None	Count	2	0	2
	Percentage (%)	2.2%	0.0%	2.2%
Total	Percentage (%)	70.3%	29.7%	100.0%

Among married women 46.2% change the absorbent 1-2 times per day, where as 22% change it around 3-4 times per day. Only 1.1% of unmarried women change the absorbent using while in menstruation 3-4 times where as 28.6% change it 1-2 times.

8.9.3 Cross-table analysis of education of Vaginal Candidiasis patients based on absorbents change rate in a day:

Table 35: Cross-table analysis of education of Vaginal Candidiasis patients based on absorbents change rate in a day

Absorbent Change Rate in a Day		Educational Background					Total
		None	Primary	Secondary	Higher Secondary	Graduation	
1-2 times	Count	4	7	23	19	15	68
	Percentage (%)	4.4%	7.7%	25.3%	20.9%	16.5%	74.7%
3-4 times	Count	0	0	3	11	7	21
	Percentage (%)	0.0%	0.0%	3.3%	12.1%	7.7%	23.1%
None	Count	0	0	0	1	1	2
	Percentage (%)	0.0%	0.0%	0.0%	1.1%	1.1%	2.2%

Total	Percent-age (%)	4.4%	7.7%	28.6%	34.1%	25.3%	100.0%

From the cross-table analysis of education and absorbent change rate per day, it has been found that, all participants from no educational background change absorbent only 1-2 times a day. Moreover, participants from primary educational background, all of the 7.7% change absorbent 1-2 times per day. Additionally, among secondary education grouped women, 25.3% change absorbent 1-2 times a day and 3.3% change it 3-4 times. Furthermore, those with a higher secondary education, 20.9% change absorbents 1-2 a day and 12.1% change it 3-4 times. Then, individuals with a graduation background most of them change absorbent material 1-2 times a day (16.5%) and others (7.7%) change 3-4 times a day. From the analysis it can be said that most of the participants change absorbents 1-2 times a day.

8.9.4 Cross-table analysis of social status of Vaginal Candidiasis patients based on absorbent change rate in a day:

Table 36: Cross-table analysis of social status of Vaginal Candidiasis patients based on absorbent change rate in a day

Absorbent Change Rate in a Day		Socio-economic Background				
		Upper Class	Middle Class	Lower Middle Class	Poor	Total
1-2 times	Count	3	26	28	11	68
	Percentage (%)	3.3%	28.6%	30.8%	12.1%	74.7%
3-4 times	Count	3	8	10	0	21
	Percentage (%)	3.3%	8.8%	11.0%	0.0%	23.1%
None	Count	0	2	0	0	2
	Percentage (%)	0.0%	2.2%	0.0%	0.0%	2.2%
Total	Percentage (%)	6.6%	39.6%	41.8%	12.1%	100.0%

From the cross table, it has been observed that, in upper class participants 3.3% change absorbent material 1-2 times a day and 3.3% change 3.3% change it 3-4 times a day. Moreover, participants from middle class, 28.6% change 1-2 times a day, 8.8% change 3-4 times a day

and 2.2% do not use any absorbent. Additionally, among lower middle-class grouped women 30.8% change absorbent 1-2 times and 11% change 3-4 times a day. Furthermore, those from poor background all of them change absorbent material 1-2 times a day.

8.9.5 Cross-table analysis of factors of Vaginal Candidiasis patients based on absorbent change rate in a day:

Table 37: Cross-table analysis of factors of Vaginal Candidiasis patients based on absorbent change rate in a day

Factors		Absorbent Change Rate in a Day			Total
		1-2 times	3-4 times	None	
Use of over the Counter Antibiotic	Count	27	8	1	36
	Percentage (%)	29.7%	8.8%	1.1%	39.6%
Diabetes	Count	6	4	1	11
	Percentage (%)	6.6%	4.4%	1.1%	12.1%
Non-Cotton and Unclean Undergarment	Count	19	2	0	21
	Percentage (%)	20.9%	2.2%	0.0%	23.1%
Poor Menstrual Hygiene	Count	15	6	0	21
	Percentage (%)	16.5%	6.6%	0.0%	23.1%

Unsafe Intercourse	Count	1	1	0	2
	Percentage (%)	1.1%	1.1%	0.0%	2.2%
Total	Percentage (%)	74.7%	23.1%	2.2%	100.0%

From the cross-table analysis of symptoms of VC patients based on absorbent change rate, it can be seen that, patients who change absorbent 1-2 times a day, 29.7% used over the counter antibiotic, 20.9% use non-cotton and unclean undergarment, 16.5% had poor menstrual hygiene, 1.1% had unsafe intercourse and 6.6% have diabetes which caused the disease. Additionally, VC patients who change absorbent 3-4 times per day, among them 8.8% used over the counter antibiotic, 2.2% use non-cotton and unclean undergarment, 6.6% had poor menstrual hygiene, 1.1% had unsafe intercourse and 4.4% have diabetes as causative factor. Moreover, participants who do not change absorbent, 1.1% used over the counter antibiotic, 1.1% have diabetes which caused the disease.

8.9.6 Cross-table analysis of symptoms of Vaginal Candidiasis patients based on absorbent change rate:

Table 38: Cross-table analysis of symptoms of Vaginal Candidiasis patients based on absorbent change rate

Symptoms		Absorbent Change Rate in a Day	Total

		1-2 times	3-4 times	None	
Pain or Burning Sensation during Urination	Count	35	10	1	46
	Percentage (%)	38.5%	11.0%	1.1%	50.5%
Nausea and Vomiting	Count	1	0	0	1
	Percentage (%)	1.1%	0.0%	0.0%	1.1%
Unusual Vaginal Discharge	Count	22	8	1	31
	Percentage (%)	24.2%	8.8%	1.1%	34.1%
Painful Menstruation	Count	0	1	0	1
	Percentage (%)	0.0%	1.1%	0.0%	1.1%
Painful Intercourse	Count	2	1	0	3
	Percentage (%)	2.2%	1.1%	0.0%	3.3%
Itching Near the Genital	Count	8	0	0	8
	Percentage (%)	8.8%	0.0%	0.0%	8.8%
Irritation, Sore or Swelling	Count	0	1	0	1

Near Genital Area	Percentage (%)	0.0%	1.1%	0.0%	1.1%
Total	Percentage (%)	74.7%	23.1%	2.2%	100.0%

From the cross-table analysis of symptoms of VC patients based on absorbent change rate, it can be seen that, patients who change absorbent 1-2 times a day, 38.5% had pain or burning sensation while urinating, 24.2% showed unusual vaginal discharge, 8.8% had itching near genital area, 2.2% had painful intercourse and 1.1% faced nausea and vomiting. Additionally, VC patients who change absorbent 3-4 times per day, among them 11% had pain or burning sensation while urinating, 8.8% showed unusual vaginal discharge, 1.1% had painful intercourse, 1.1% had painful menstruation and 1.1% faced irritation and swelling near genital area as symptom. Moreover, participants who do not change absorbent, 1.1% had pain or burning sensation while urinating, 1.1% showed unusual vaginal discharge as symptoms.

8.9.7 Cross-table analysis of complications of Vaginal Candidiasis patients based on absorbent change rate:

Table 39: Cross-table analysis of complications of Vaginal Candidiasis patients based on absorbent change rate

Complications		Absorbent Change Rate in a Day			Total
		1-2 times	3-4 times	None	
Recurrent of Infection	Count	32	8	1	41

	Percentage (%)	35.2%	8.8%	1.1%	45.1%
Candidemia	Count	7	2	0	9
	Percentage (%)	7.7%	2.2%	0.0%	9.9%
Skin Infection	Count	21	8	1	30
	Percentage (%)	23.1%	8.8%	1.1%	33.0%
None	Count	8	3	0	11
	Percentage (%)	8.8%	3.3%	0.0%	12.1%
Total	Percentage (%)	74.7%	23.1%	2.2%	100.0%

From the cross-table analysis of complications of VC patients based on absorbent change rate, it can be seen that, patients who change absorbent 1-2 times a day faced recurrent infection most (35.2%), from rest 23.1% had skin infection, 7.7% had candidemia and 8.8% faced no complication at all. Additionally, VC patients who change absorbent 3-4 times per day, among them, 8.8% faced recurrent infection and another 8.85 had skin infection, 2.2% had candidemia and 3.3% had no complication. Moreover, participants who do not change absorbent, 1.1% faced skin infection and 1.1% faced recurrent infection.

Chapter 9: Discussion

Discussion

In this study, patients who visited the hospitals for treatment of genital infection and some patient who were admitted in the hospitals gynecological units participated. The total number of participants of this study is 244, where 91 of them have Vaginal Candidiasis. Vaginal Candidiasis is a type of reproductive tract infection which is caused by overgrowth of a yeast named *Candida*. Every year millions of women faces this infection. This is the most occurring RTI after Bacterial Vaginosis.

37.30% of total population of this study are a patient of this disease. The other participants have Bacterial Vaginosis. According to research by Brande et al. (1996), yeast infections affect around 75% women at some point in their lives. This research shows that up to 37.30 percent of women tested had vaginal candidiasis. However, when compared to Brande et al. assessment, this result comes in significantly lower.

Though other species of *Candida* can cause yeast infection, *Candida albicans* is the most common responsible variant which cause Vaginal Candidiasis. About eighty to ninety percent of the fungal species recovered from women vulvovaginal candidiasis is Candida albicans. (Boselli et al., 2004). From this study it was found out that *Candida albicans* is the pathogen responsible for the disease in all patients.

Highest prevalence was seen among the participants who aged between 15-34 years (33%). Which followed by 20.9% patients are from 35-44 age group, 11% are from 45-54 years range and 2.2% within the age range of 55-64 years. Vaginal candidiasis is more prevalent among reproductive-age women than among those of any other age (Müller, J., 1993) (Emeribe, A. U. et al, 2015). From this study is was found that patients in their early and peak reproductive years are more susceptible to illness. Estrogen is a female hormone responsible for maturing the vaginal lining, which contain glycogen and Candida albicans feeds on glyco-

gen. Function of Estrogen is most on reproductive aged women rather than younger and older ones which lead reproductive aged women more vulnerable to Vaginal Candidiasis.

From the result it was found that prevalence of Vaginal Candidiasis is higher in married women (70.3%), rather than unmarried patients (29.7%). According to a study conducted by Dou et al. (2015), the researchers found out that married women were more likely to experience Vaginal Candidiasis. Patients between the ages of 15 and 34 years old had the highest rates of vaginal candidiasis, and 70.3% of all patients were married. Vaginal candidiasis is more common among younger, more sexually-active women than among older, less-active women. Prevalence of Vaginal Candidiasis is higher in women with higher secondary education background and in lower middle-class background. Women with better socioeconomic status and education levels likely to be more informed about reproductive health than those with lower socioeconomic status and lower levels of education. As a result, they were able to adopt preventative steps that reduced their risk of testing positive for Vaginal Candidiasis. It was also shown that married and unmarried individuals experienced quite different symptoms and consequences.

Menstrual hygiene is one the most important factor that can cause vaginal candidiasis among women. Changing a sanitary pad every four to six hours, cleaning oneself properly, avoid douching, discarding of used pads properly, and sticking to a single method of absorbent are all part of maintaining good menstrual hygiene. Not maintaining proper menstrual hygiene can lead women to be infected by multiple RTI such as bacterial vaginosis, vaginal candidiasis, urinary tract infection etc. In this study we tried to know about the participant's practice about menstrual hygiene and tried to know if this can be a factor which can cause the disease in them. This study showed that among cloth, sanitary napkin and mixture of both, most patients use cloth and both cloth and sanitary napkin as an absorbent. 33% use cloth and 33% use both types. Also, from this study it was found that, 74.7% women change absorbents 1-2

times a day and only 23.1% change it 3-4 times per day. From these results it can be said that most of the patients have poor menstrual hygiene. Women who used reusable sanitary napkins had a higher risk of contracting Candida than those who used disposable ones, according to research by Torondel et al. (2018).

Patients with positive cultures may experience symptoms such as vaginal itching either with or without vaginal discharge (50%), vaginal discharge alone (30%), or no symptoms at all (20%) (Oriel et al., 1972). All of the participants in our research displayed symptoms. A vaginal yeast infection due to Candida can result in a foul-smelling, viscous, white to yellow discharge, as well as itching, discomfort, and even edema. Painful walking, urination, and sex are among possible side effects (Bohanon NJ.,1998). The most common symptoms patients faced in this study are irritation and swelling near genital area (24.8%), unusual vaginal discharge (22.6%), itching near genital area (20.4%), pain or burning sensation during urination (16.8%) and painful intercourse (11.7%).

Pregnancy, hormone replacement, poorly managed diabetic mellitus, immunosuppression, the use of antibiotics and glucocorticoids, and genetic predispositions are all hypothesized to increase the risk of infection in the host (Sobel, 2007). From this study risk factors that caused the disease in patients to be found are, poor menstrual hygiene (35%), unsafe intercourse (38%), non-cotton and unclean undergarment (18.6%), use of over the counter antibiotic (14.2%), diabetes (8%), infected sexual partner (3.4%), STD (3%) and menopause (0.8%). The increased prevalence of VVC in diabetic women compared to nondiabetic women has led researchers to speculate that diabetes mellitus (DM) may be a risk factor for the development of VVC. For women with diabetes, the prevalence of VVC is estimated to be 32.5–67.5%, while for those without diabetes it is 11–23% (Goswami et al., 2006). Yeast needs sugar to survive. Without proper management, diabetes can cause dangerously high blood sugar levels. Because of this spike in sugar levels, yeast growth may be excessive, especially

in the genital region. Inadequate hygiene, for instance, can serve as a reservoir for Candida spores in the digestive tract, leading to an elevated spore burden (Ferrer, 2000). As reported by Ahmad and Khan (2009) in India, the prevalence of VVC was 36 percent greater among women who reported having poor genital cleanliness compared to those who reported having good personal hygiene. Some writers have linked the growth of VVC to wearing clothes that are too tight or don't allow for enough air circulation, as well as to wearing synthetic underwear. According to a Brazilian research, the prevalence of VVC is 65.8 percent greater in women who wear tight and/or synthetic underwear compared to those who don't (39.1 percent) (Holanda et al., 2007). *Candida* can overgrow in humid environment which can lead to infection. Increased perineal wetness and warmth may lead to the expansion of Candida, which has been linked to VC and poorly ventilated clothing/synthetic underwear (Sobel, 2014). Hypoallergenic and hypersensitive responses at the vaginal site have been linked to synthetic underwear, which may modify the vaginal environment and contribute to VVC (Neves et al., 2005). Antibiotic-treated women had a higher risk of developing vulvovaginal candidiasis (VVC) than antibiotic-naive women, according to studies conducted in India (Ahmad & Khan, 2009), Greece (Grigoriou et al., 2006), and Italy (Spinillo et al., 1995, 1999). As the vaginal bacterial microflora is the primary line of defense against Candida, its decline after antibiotic usage may explain the correlation between the two conditions (Gibbs, 1987).

The main complication participants faced in this study is recurrent infection. Only around 5 percent of women may get four or more vaginal yeast infections in a single year, a medical term known as Recurrent Vaginal Candidiasis (RVC). Even while RVC is more prevalent in diabetic women and women with compromised immune systems due to diseases like HIV, it can occur in any woman.

Chapter 10: Conclusion

Conclusion

In practically every area of their life, which includes the availability of health care, employment opportunities, political involvement, and financial management, Bangladeshi women confront obstacles and difficulties. Reproductive health is essential for all women, yet it remains a significant obstacle, especially in low- and middle-income nations like Bangladesh. Sexual and Reproductive Health and Rights (SRHR) for women still remains as a taboo in our country. This study was done to know about the prevalence of Vaginal Candidiasis in women of reproductive age of Bangladesh. Vaginal Candidiasis is known to be as the second most common type of reproductive tract infection occur in women due to the overgrowth of *Candida* yeast. The study was conducted over the course of almost a year with the purpose of evaluating the incidence and various risk factors of Vaginal Candidiasis among Bangladeshi women. Attempts were made to expand the variety of the patient group by performing the study in two healthcare institutions located in distinct geographic areas. The result got from this study is not enough to establish the situation of Vaginal Candidiasis among women as our study participants number is low because most of the women of this country do not seek any medical assistance for reproductive health concerns. They seek medical attention only when the symptoms persist for an extended period of time or cause significant difficulties. Poor menstrual hygiene is one of the leading causes of the disease Vaginal Candidiasis. Women in our country tend to use cloth most rather than sanitary napkin as an absorbent and change the absorbent only 1-2 times a day and wear tight fitting non-cotton undergarments which gives *Candida* to have a perfect environment to grow. In Bangladesh, most of the women tries to treat Vaginal Candidiasis with home remedies such as coconut oil, hot water with salt etc. But this is not a good practice as these remedies can worse the situation. In most of the hospital, detection of Vaginal candidiasis is done only after doing pelvic examination and listing the symptoms. Many other illnesses, including sexually transmitted

diseases and bacterial vaginosis, have symptoms with yeast infections. Due to the absence of precise evidence, a diagnosis should not be relied only on clinical symptoms alone. Laboratory testing should be done to know which variant of *Candida* caused the disease as treatment for each can vary. If the disease it not treated properly it can cause recurrent infection. Due to its chronic and recurrent character, recurring Candida has a devastating impact on the quality level of life of infected women, where persistent symptoms might result in sadness and anxiety. Living with candidiasis can make a women's daily life miserable. Women with chronic illnesses sometimes feel embarrassed and helpless, and their personal and professional lives suffer as a result. The unpleasant odor of the discharge makes it difficult for them to interact with others. There is evidence that these symptoms can lead to a diminished feeling of personal worth. Women's also have right to live a healthy life and healthy life consists of good reproductive health as well. But various types of reproductive infection make this situation as a challenge for them. Education about reproductive health, reproductive health diseases and infections, and menstrual hygiene needs to be taught in schools so that from a young age, female can learn and know how to have a healthy life style. Also, proper training for screening methods and distinguishing between different RTI can be arranged in hospitals. Government should lower the price of menstrual products and provide WASH facilities for women. Professionals in the medical field should highlight the need of regular examinations and practicing good reproductive hygiene in preventing these diseases. Preventing drug-resistant Candida strains, reducing the incidence of RVVC, and taking into account potential medication interactions will all be more pressing concerns in the years to come. One of the most difficult tasks will be to stop fungal infections from developing resistance to antimycotic drugs.

In conclusion, it can be said that Vaginal candidiasis is a common problem in Bangladesh, and its prevalence may be reduced if researchers had the chance to participate in research on the disease condition and other RTIs.

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