International Journal of Pharmaceutical research and Applications
Volume 8, Issue 4, Jul.-Aug. 2023, pp: 1789-1798 www.ijprajournal.com ISSN: 2456-4494

Prevalence of Menstrual Abnormalities and Reproductive Tract Infections with Associated Factors

D. Poojitha1, K. Venu Gopal Krishna1, V. Venkata Rajesh1, K. Venkata Naga Priyanka1*, Dr. D. Dhachinamoorthi2, Dr. A. Sridevi3, Dr. M. Bhargavi4.

1Pharm-D, Department of Pharmacy Practice, QIS College of Pharmacy, Ongole, Prakasam (Dt), AP-523001.
2M. Pharm, Ph.D, FIC., Principal & professor, Department of Pharmacy Practice, QIS College Of Pharmacy, Ongole, Prakasam (Dt), AP-523001.
3MBBS, MD., Associate professor, Department of Obstetrics & Gynaecology, GGH, Ongole, Prakasam (Dt), AP-523001.
4Pharm-D, Assistant Professor, Department of Pharmacy Practice, QIS College of Pharmacy, Ongole, Prakasam (Dt), AP-523001.
**Corresponding Author: K. Venkata Naga Priyanka, PharmD, Department of Pharmacy Practice, QIS College of Pharmacy, Ongole, Prakasam (Dt.), AP-523001, India. E-Mail ID: kolakaluripriyanka1999@gmail.com*

Date of Submission: 01-08-2023 Date of Acceptance: 13-08-2023

ABSTRACT:
Background: Menstruation is a normal physiological process of periodic and cyclical shedding of progestational endometrium begins during adolescence. Menstrual abnormalities lead to conditions such as dysmenorrhoea, amenorrhea, abnormal uterine bleeding (menorrhagia, polymenorrhea, oligomenorrhea). Reproductive tract infection (RTI) is defined as the infection of the reproductive or genital tract. All RTI's are sexually transmitted diseases (STD's) but all STD's are not RTI's (e.g. AIDS, Hepatitis-B). **Methods:** A prospective observational study was conducted in tertiary care hospital over period of 6 months. The study sample was 171. A well-designed questionnaire was prepared and data was collected such as demographics, present clinical history including symptoms, past history of MA and RTI's. Statistical analysis of data was performed with the graph pad prism using One-way ANOVA. Significant value is $P < 0.05$ in all statistical evaluations. **Results:** Prevalence of MA (72%) are higher than RTI's (28%). PCOS is an important risk factor for MA and hypothyroidism for RTI's. Age group of 21-30 are mostly affected with MA and RTI. It is common in normal body weight people, middle class people, uneducated and primarily educated people, and urban people. MA are mostly found in people with regular menstruation, menstrual cycle between 28-35 days, heavy blood flow, menarche at age 12, menstrual blood flow of <7 days. **Conclusion:** Irregular menstruation and RTI's is an important indicator of current and potential health problems. In our study, we conclude that MA has highest prevalence over RTI's and various factors are associated with it.

KEY WORDS: Menstrual abnormalities (MA), Reproductive tract infections (RTI's), Risk factors.

I. INTRODUCTION

Menstruation is a periodic and cyclical shedding of Progestational endometrium accompanied by loss of blood, which is a normal physiological process in women of reproductive age that begins during adolescence and may be associated with various symptoms[1]. If they have missed three or more periods, if the menstrual cycle is fewer than 24 days, more than 38 days, or fluctuates in length from month to month, periods that last more than seven days and have menstrual flows that are thicker or lighter than typical, menstrual cycles characterised with physical aches, cramps, nausea, or vomiting, bleeding or spotting after sex, after menopause, or in between periods menstrual abnormalities are of many types as following amenorrhea, dysmenorrhea, abnormal uterine bleeding has oligomenorrhea, polymenorrhea and menorrhagia[2].

Dysmenorrhea is pain in the uterus before, during or between 1 and 3 days before menstruation. Pain peaks 24 hours after the onset of menstruation and subsides with 2-3 days. It is usually sharp, pinching, throbbing, or dull, constant pain. It can radiate to the feet[3]. Dysmenorrhea can be primary and secondary[4]. It may be caused due to pelvic inflammatory disease, ovarian cysts, ectopic pregnancy. The intrauterine device contraceptive can also cause secondary dysmenorrhea[5]. Risk factors

International Journal of Pharmaceutical research and Applications
Volume 8, Issue 4, Jul.-Aug. 2023, pp: 1789-1798 www.ijprajournal.com ISSN: 2456-4494

include early menarche, heavy menstrual loss, family history of dysmenorrhea, smoking, premenstrual syndrome, pelvic inflammatory disease[6].

Amenorrhea is a menstrual disorder related to reproductive age group women with absence or abnormal cessation of menstrual cycles[1]. Generally, menstrual cycle is a natural process that only ceases during pre-pubertal, pregnancy, breast feeding and menopause[7,8]. It is a symptom rather than disease. In India, the prevalence rate is about 21.3%[9]. There are two types of Amenorrhea depending on occurrence of before and after the first-time menstruation[10]. The primary amenorrhea is an uncommon problem that failure to attain menarche by the age of 14 without secondary sexual characters or lack of menstruation by the age of 16 or older[11]. The secondary amenorrhea is defined as absence of three consecutive menstrual cycles or cessation of more than six months[12]. The evaluation and treatment of amenorrhea is based on their cause[13].

Abnormal uterine bleeding (AUB) is a condition of irregularities in the menstrual cycle involving frequency, regularity, duration, and volume of flow outside of pregnancy. Up to one-third of women will experience abnormal uterine bleeding in their lifetime. Abnormal menstrual cycle has a frequency of 24 to 38 days, lasts 7 to 9 days, with 5 to 80 millilitres of blood loss. Variations in any of these 4 parameters constitute AUB. Menorrhagia, oligomenorrhea, polymenorrhea are various terms used to describe the nature of AUB[14]. Clinical features include anaemia, heavy menstrual blood flow, bleeding at unusual times, fatigue[15].

Reproductive tract infection is a general one that covers both sexually transmitted illnesses and other infections of the reproductive system that are not spread through sexual activity. Reproductive tract infections (RTIs) are caused by organisms normally present in the reproductive tract, or introduced from the outside during sexual contact or medical procedures[16]. Reproductive tract infections consist of different types like pelvic inflammatory disease (PID), bacterial vaginosis, trichomonal vaginitis, chlamydia and vulvovaginal candidiasis.

Pelvic inflammatory disease (PID) is the inflammation of the adnexa of the uterus, namely the uterus, the fallopian tubes, the ovaries, and the pelvis. It is caused by persistent pathogenic infections that permits the microorganisms to ascend from the initial infection point (the vagina and the endocervix) to the endometrium or beyond[17]. It may be caused due to few organisms like N. gonorrhea, Ch. Trachomatis, Endogenous aerobic and anaerobic genital mycoplasma. Risk factors include age at first intercourse, frequency of intercourse, number of sexual partners, marital status. Clinical features include lower abdominal pain, cervical tenderness, adnexal tenderness, fever, cervical discharge, dysuria and post coital bleeding[18].

Bacterial vaginosis is an alternation of normal bacterial vaginal flora that results in the loss of H2O2 producing lactobacilli and overgrowth of predominantly anaerobic bacteria[19]. Causes due to some species like mobiluncus, bacteroides species, peptostreptococci, mycoplasma, gardnerella vaginalis, ureaplasma urealyticum. Clinical feature includes vaginal odour, vaginal discharge, vulvar irritation, dysuria and dyspareunia[20]. Trichomonal vaginitis or Trichomonas vaginalis is a sexually transmitted parasite infection. It is caused by sexually transmitted flagellated parasite-trichomonal vaginalis[21]. Signs and symptoms include urethral discharge, dysuria, vaginal discharge (which is often diffuse, malodorous, yellow-green), itching, vulvar irritation and abdominal pain[22]. Chlamydia is a sexually transmitted infectious disease caused by the bacterium chlamydia trachomatis[23]. Infection is asymptomatic in about 80% of patients. In symptomatic it is associated with vaginal discharge/dysuria. Risk factors are sex with multiple partners, vaginal douching and age below 25years[24]. Treatment involves antibiotics[23].

Vulvovaginal candidiasis is a mucosal fungal infection of lower reproductive tract caused by candida albicans, especially the vulva and vagina[25]. After bacterial vaginosis, it is the second most usual infection of vaginitis that particularly observed in 20 to 40 years of age around 70 to 75% at least once in their life time[26]. Symptoms includes pruritis, redness, burning sensation, dysuria, dyspareunia and vaginal discharge (fluor albus or curdy)[27,28]. The risk factors are uncontrolled diabetes mellitus, immunosuppression, antibiotics use, genetics, oral contraceptives, sexual activity and hygiene[29]. Currently, the treatment consists of topical-azoles or fluconazole. Amphotericin B can be used as alternative therapy for VVC effected by non-albicans Candida[30]. The improper treatment of VVC create problem for not only individual but also their sexual partners because of vaginal itching leads to blisters and uncomforted sex. It also provides way for entry of Human immunodeficiency virus (HIV)[31].

International Journal of Pharmaceutical research and Applications
Volume 8, Issue 4, Jul.-Aug. 2023, pp: 1789-1798 www.ijprajournal.com ISSN: 2456-4494

II. METHODOLOGY

A prospective observational study was conducted in gynaecology and obstetrics at government general hospital over period of 6 months. The study sample was 171.

Eligibility criteria and data collection tools:
People who are willing to participate, patients who are diagnosed with menstrual abnormalities and reproductive tract infections. A well-structured pretested proforma was prepared and used for the study. It consists of various information including demographics, present clinical history including symptoms and past history.

Data collection:
The data was collected from patient's using questionnaire form who are attending gynaecology inpatient and outpatient department in tertiary care hospital (GGH). 15-20mins is given to subjects to fill the proforma if the subjects are illiterate then they can use the help of the others to fill the questionnaire. The subjects are encouraged to take the help of any other representatives if they need clarification on any questions, how to complete the questionnaire. The data collected from the subjects to be analysed using the statistics analysis methods.

Study procedure:
Patient were included based on eligibility criteria, a well-designed questionnaire was prepared by us and data was collected such as demographics, present complaints, past history, menstrual abnormalities and reproductive tract infections then association of factors with demographics were analysed and finally results were prepared.

Statistical analysis:
Statistical analysis of data was performed with the graph pad prism using One-way ANOVA. Statistical significance was considered for $P < 0.05$ in all statistical evaluations. Microsoft excel is used for creating figures and tables.

III. RESULTS AND DISCUSSION

The current study includes a total of 171 patients visiting the gynaecological department during six months, among them prevalence of menstrual abnormalities was 72% and the prevalence of reproductive tract infections was 28% (see Figure 1).

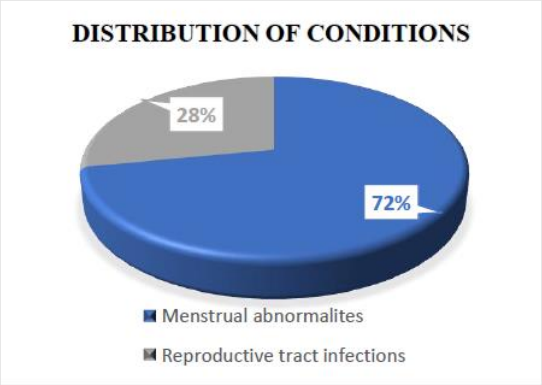

Figure 1

Based on age-wise categorisation 21-30 age group are more prone to menstrual abnormalities and reproductive tract infections that is 38.21% and 52.08% respectively. In body wise distribution normal people are more prone to menstrual abnormalities and reproductive tract infections that is 70.73% and 89.58% respectively, married are more prone to menstrual abnormalities and reproductive tract infections that is 82.93% and 95.83% respectively. Menstrual Abnormalities are highly affected to uneducated people and reproductive tract infections are highly affected to primary educated people. Our study was controversial to Mohamed Diadhiou et. Al[32], they stated illiterate people are more effected than educated people. Menstrual abnormalities and reproductive tract infections are highly effects to people living in urban area. Middle class people are more prone to menstrual abnormalities and reproductive tract infections (see Table 1). Controversial to our study Yeunhee Kwak et. Al[33], stated that upper middle-class people were more prone than middle class people.

Among the study population, out of 123 (MA), patients with amenorrhea are 24.39%, menorrhagia are 23.58%, oligomenorrhea are 10.57%, polymenorrhea are 6.5%, dysmenorrhea are 6.5%, menorrhagia with oligomenorrhea are 6.5%, menorrhagia with dysmenorrhea are 6.5%, polymenorrhea with menorrhagia are 5.69%, Amenorrhea with Oligomenorrhea are 2.44%, dysmenorrhea with oligomenorrhea are 2.44%, dysmenorrhea with polymenorrhea 1.63%, amenorrhea with polymenorrhea are 0.81% and amenorrhea with menorrhagia are 0.81% (see Figure 2). Among 123 menstrual abnormalities 51.22% are regular, menarche is highest at age 12 that is 41.46%, length of menstrual cycle is highest in between 28 to 35 days that is 52.03%, intensity of menstrual blood flow is heavy that is 47.15%, duration of menstrual

International Journal of Pharmaceutical research and Applications
Volume 8, Issue 4, Jul.-Aug. 2023, pp: 1789-1798 www.ijprajournal.com ISSN: 2456-4494

blood flow is highest at less than 7 days that is 65.04%, natal status is highest at multiparous that is 42.28% (see Table 2).

Table 1: Distribution of demographics in menstrual abnormalities and reproductive tract infections

CHARACTERISTICS	MA No of subjects (%)	RTIS No of subjects (%)
Age		
11 to 20	16 (13.01)	1 (2.08)
21 to 30	47 (38.21)	25 (52.08)
31 to 40	38 (30.89)	9 (18.75)
41 to 50	22 (17.89)	13 (27.08)
Body type		
Obese	29 (23.58)	4 (8.33)
Normal	87 (70.73)	43 (89.58)
Lean	7 (5.69)	1 (2.08)
Marital status		
Married	102 (82.93)	46 (95.83)
Unmarried	21 (17.07)	2 (4.17)
Economical status		
poor	36 (29.27)	21 (43.75)
Middle	80 (65.04)	25 (52.08)
Upper	7 (5.69)	2 (4.17)
Educational level		
Primary	32 (26.02)	19 (39.58)
Secondary	23 (18.70)	7 (14.58)
Tertiary	23 (18.70)	6 (12.50)
None	45 (36.59)	16 (33.33)
Occupation		
Employed	29 (23.58)	18 (37.50)
Unemployed	76 (61.78)	29 (60.41)
Student	18 (14.63)	1 (2.08)
Locality		
Rural	32 (26.02)	22 (45.83)
Urban	81 (73.98)	26 (54.17)

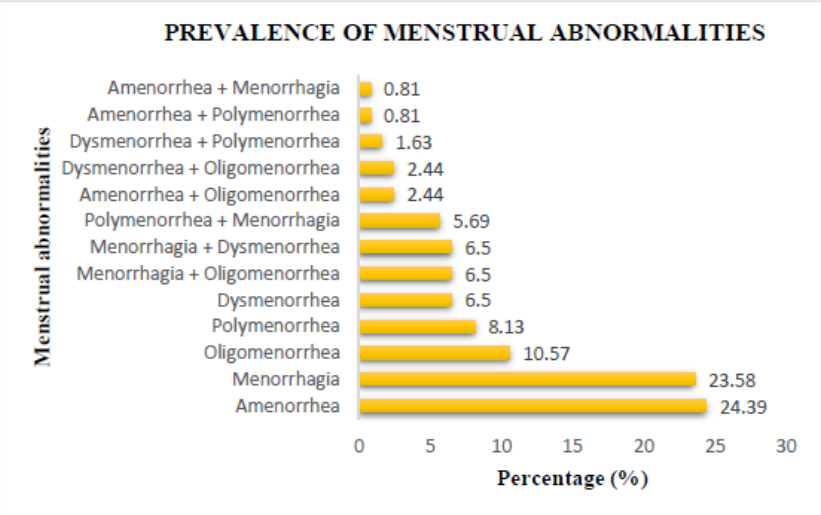

Figure 2

International Journal of Pharmaceutical research and Applications
Volume 8, Issue 4, Jul.-Aug. 2023, pp: 1789-1798 www.ijprajournal.com ISSN: 2456-4494

Table 2: Distribution of menstrual characteristics

CHARACTERISTICS	FREQUENCY	PERCENTAGE (%)
Regularity		
Yes	63	51.22
No	60	48.78
Age at Menarche		
11	23	18.7
12	51	41.46
13	29	23.58
14	18	14.63
15	2	1.63
Length of Menstrual cycle		
<21days	19	15.45
28-35days	64	52.03
>35days	40	32.52
Intensity of Menstrual blood flow		
Heavy	58	47.15
Absence	19	15.45
Infrequent	18	14.63
Normal	28	22.76
Duration of Menstrual blood flow		
<7 days	80	65.04
>7days	43	34.96
Natal status		
Nulliparous	35	28.46
Primiparous	34	27.64
Multiparous	52	42.28
Grandparity	2	1.63

International Journal of Pharmaceutical research and Applications
Volume 8, Issue 4, Jul.-Aug. 2023, pp: 1789-1798 www.ijprajournal.com ISSN: 2456-4494

Among the study population, (n=171), 41.67% participants had vulvovaginal candidiasis, 25% had bacterial vaginosis, 22.92% had pelvic inflammatory disease, 6.25% had trichomonas vaginalis, 4.17% had chlamydia (see Figure 3). Among all the risk factors PCOS stands at first with 15.79% followed by fibroids with 9.94%, hypothyroidism 8.19%, bulky uterus with 5.85%, stress with 5.26%, hypertension with 3.51%, lack of physical activity with 3.51%, UTI with 3.51%, HIV with 2.34%, diabetes mellitus with 2.34%, polyps with 1.75%, infertility with 1.75%, endometriosis with 1.17% and depression with 0.58% (see Figure 4).

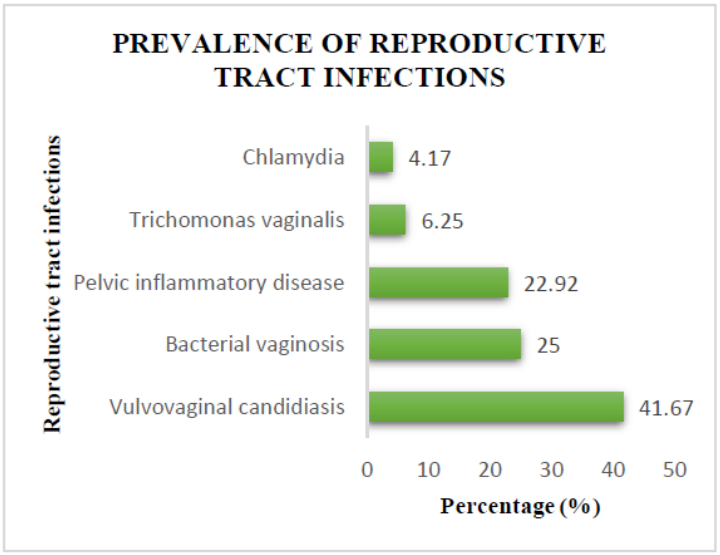

Figure 3

The highest found risk factors in menstrual abnormalities are following, in amenorrhea, oligomenorrhea; POCS (48.15%), (25.93%); in menorrhagia, fibroids (56.25%); in polymenorrhea, fibroids (25%), in dysmenorrhea, fibroids (18.75%) (see Table 3). As per statistical analysis, there was a strong clinical association between risk factors and menstrual abnormalities ($p<0.0001$, by using One-way ANOVA). Our study was controversial to Emanuel Ansong et.al[34], stated that stress was highly prevalent than other factors.

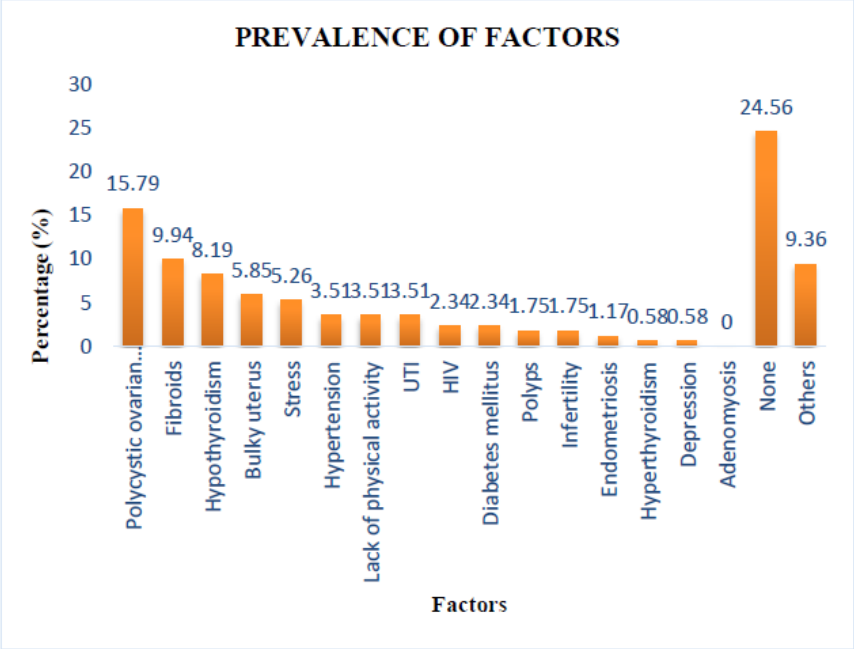

Figure 4

International Journal of Pharmaceutical research and Applications
Volume 8, Issue 4, Jul.-Aug. 2023, pp: 1789-1798 www.ijprajournal.com ISSN: 2456-4494

Table 3: Factors associated with menstrual abnormalities

Factor	A n (%)	M n (%)	O n (%)	P n (%)	D n (%)	Total
Polycystic ovarian syndrome	13 (48.15)	6 (22.22)	7 (25.93)	0 (0.00)	1 (3.70)	27
Fibroids	0 (0.00)	9 (56.25)	0 (0.00)	4 (25.00)	3 (18.75)	16
Stress	4 (50.00)	2 (25.00)	1 (12.50)	1 (12.50)	0 (0.00)	8
Hypothyroidism	1 (12.50)	5 (62.50)	2 (25.00)	0 (0.00)	0 (0.00)	8
Bulky uterus	0 (0.00)	6 (85.71)	0 (0.00)	1 (14.29)	0 (0.00)	7
Lack of physical activity	1 (25.00)	1 (25.00)	1 (25.00)	1 (25.00)	0 (0.00)	4
HIV	0 (0.00)	1 (25.00)	1 (25.00)	2 (50.00)	0 (0.00)	4
Polyps	0 (0.00)	2 (66.67)	1 (33.33)	0 (0.00)	0 (0.00)	3
Infertility	0 (0.00)	1 (33.33)	1 (33.33)	0 (0.00)	1 (33.33)	3
Hypertension	0 (0.00)	3 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	3
Diabetes mellitus	0 (0.00)	2 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	2
Endometriosis	0 (0.00)	1 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
UTI	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (100.00)	1
Hyperthyroidism	1 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
Depression	0 (0.00)	1 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
None	14 (56.00)	4 (16.00)	3 (12.00)	3 (12.00)	1 (4.00)	25
Others	1 (11.11)	5 (55.55)	1 (11.11)	1 (11.11)	1 (11.11)	9
A = Amenorrhea, M = Menorrhagia, O = Oligomenorrhea, P = Polymenorrhea, D = Dysmenorrhea, $p<0.0001$						

The highest found risk factors in reproductive tract infections are following, in vulvovaginal candidiasis, hypothyroidism (50%); in bacterial vaginosis, hypothyroidism (33.33%); in pelvic inflammatory disease, lack of physical exercise (100%); in trichomonas vaginalis, UTI 25%; in chlamydia, UTI (20%) (see Table 4). As per statistical analysis, there was a strong clinical association between risk factors and reproductive tract infections ($P<0.0008$, by using One-way ANOVA). Our study was controversial to pravina kafle et.al[35], they stated that women using cloth during menstruation have higher prevalence for menstruation.

International Journal of Pharmaceutical research and Applications
Volume 8, Issue 4, Jul.-Aug. 2023, pp: 1789-1798 www.ijprajournal.com ISSN: 2456-4494

Table 4: Factors associated with reproductive tract infections

Factors	VVC n (%)	BV n (%)	PID n (%)	TV n (%)	C n (%)	Total
Hypothyroidism	3 (50.00)	2 (33.33)	1 (16.67)	0 (0.00)	0 (0.00)	6
UTI	2 (40.00)	0 (0.00)	0 (0.00)	1 (20.00)	2 (40.00)	5
Hypertension	3 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3
Bulky uterus	2 (66.67)	0 (0.00)	1 (33.33)	0 (0.00)	0 (0.00)	3
Lack of physical activity	0 (0.00)	0 (0.00)	2 (100.00)	0 (0.00)	0 (0.00)	2
Diabetes mellitus	1 (50.00)	1 (50.00)	0 (0.00)	0 (0.00)	0 (0.00)	2
Stress	0 (0.00)	0 (0.00)	1 (100.00)	0 (0.00)	0 (0.00)	1
Endometriosis	0 (0.00)	0 (0.00)	1 (100.00)	0 (0.00)	0 (0.00)	1
Fibroids	1 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1
None	8 (47.05)	5 (29.41)	3 (17.64)	1 (5.88)	0 (0.00)	17
Others	1 (14.28)	1 (14.28)	5 (71.42)	0 (0.00)	0 (0.00)	7

VVC = Vulvovaginal candidiasis, BV = Bacterial vaginosis, PID = Pelvic inflammatory disease, TV = Trichomonas vaginalis, C = chlamydia, $p < 0.0008$

IV. CONCLUSION

In the present study, we observed highest prevalence for menstrual abnormalities than reproductive tract infections. The findings of the study showed that MA and RTIs are highly observed in 21-30 age group people. It is common in normal body weight people, middle class people, uneducated and primarily educated people, and urban people. Our study results showed that numerically a greater number of participants with menstrual abnormalities had PCOS as highest risk factor, whereas hypothyroidism is the main risk factor for reproductive tract infections. In our study findings, MA are mostly found in people with regular menstruation, menstrual cycle between 28-35 days, heavy blood flow, menarche at age12, menstrual blood flow of <7 days. Irregular menstruation and reproductive tract infections is an important indicator of current and potential health problems. Thus, it is necessary to evaluate the factors associated with irregular menstruation and reproductive tract infections to determine appropriate treatment strategies. So, there is need to do such type of studies in high population.

V. LIMITATIONS

In our study, we discuss about a factor associated with certain disorder based on their prevalence of individuals but there was no explanation of exact association between two variables. We also avoided the factors associated with combination of menstrual abnormalities due to insufficient data.

ACKNOWLEDGMENT

It is a pleasure to convey our gratitude towards staff from department of pharmacy practice and we are also thankful to other staff members from different departments. Lastly, we would like to thank our parents and friends for their caring and help.

VII. AUTHOR CONTRIBUTION

All authors contributed to this work and approved final manuscript.

CONFLICT OF INTEREST
No conflict of interest

REFERENCES

[1]. Sivadasan S, Ali AN, Marimuthu K, Nazer ZA, Chigurupati S, Veerasamy R. Menstrual disorders among students-an overview. Research Journal of Pharmacy and Technology. 2014 Jun 1;7(6):704-711.
[2]. Abnormal Menstruation, Clevel and Clinic, 2019, 825.
[3]. Naziz Rafique, Mona H.Al- Sheikh. Prevalence of menstrual problems and their association with psychological stress in young female students studying health sciences, Saudi Med J 2018; Volume.39 (1) : 67_73. doi: 10.15537/smj.2018.1.21438.
[4]. JoAnn V. Pinkerton, MD, University of Virginia Health System, Dysmenorrhoea, MSD Manual professional Edition, 2021 December.

[5]. Newbery G, Neelakantan M, Cabral MD, Omar H. Amenorrhea in adolescents. Pediatric Med. 2019; 2:30.
[6]. Alaetin Unsal, Unal Ayranci, Mustafa Tozun, Gul Arslan, Elif Calik, Prevalence of dysmenorrhoea and it's effect on quality of life among a group of female university students, Upsala Journal of Medical Sciences, 2010 April 7. doi: 10.3109/03009730903457218.
[7]. Khan NT, Jameel N. Amenorrhea-An abnormal cessation of normal menstrual cycle. Clin J Obstet Gynecol. 2020 Apr 9;3:033-036. doi: 10.29328/journal.cjog.1001046.
[8]. Kafeel H, Rukh R, Zubair A, Ghazala A, Muzaffar H, Raees H, Riaz K, Qudsia T, Ali Z. PREVALENCE AND FACTORS ASSOCIATED WITH FUNCTIONAL SECONDARY AMENORRHEA. Int J Pharm. 2014;4(1):16-21.
[9]. Kulshrestha S, Durrani AM. Prevalence of menstrual disorders and their association with physical activity in adolescent girls of aligarh city. Int J Health Sci Res. 2019;9(8):384-93.
[10]. American Society of Reproductive Medicine Practice Committee. Current evaluation of amenorrhea. Fertility and sterility. 2008 Nov;90 (Suppl 3):S219-25.
[11]. Samal R, Habeebullah S. Primary amenorrhea: a clinical review. Int J Reprod Contracept Obstet Gynecol. 2017 Nov 1;6:4748-53.doi: http://dx.doi.org/10.18203/2320-1770.ijrcog20174981
[12]. Maruthini D, Balen A. Modern management of amenorrhoea. Trends in Urology, Gynaecology & Sexual Health. 2008 Mar;13(2):24-28.
[13]. Newbery G, Neelakantan M, Cabral MD, Omar H. Amenorrhea in adolescents. Pediatr Med. 2019;2:30. doi: http://dx.doi.org/10.21037/pm.2019.06.06.
[14]. Davis E, Sparzak PB. Abnormal Uterine Bleeding. StatPearls; Jan 2022 [Updated 2022 Feb 10].
[15]. JANET ALBERS.R, SHARON HULL.K, ROBERT WESLEY.M. Abnormal Uterine Bleeding. American Family Physician-2004, April15; 69:1915-26.
[16]. World Health Organization. Sexually transmitted and other reproductive tract infections: a guide to essential practice. 2005.
[17]. D Kumar, N Singh. Evidence based clinical genecology. JP medical Ltd, 2017.
[18]. Sexually transmitted infections (STI's). World Health Organization. (Assessed October,2018).
[19]. Spiegel CA. Bacterial vaginosis. Clin Microbiol Rev. 1991;4(4):485-502.doi: 10.1128/CMR.4.4.485.
[20]. RN Mokwele, BS Ndzamba, N schellack. Bacterial vaginosis: An Overview. S Afr Pharm J 2019;86(2):13-16.
[21]. Burkman RT. Berek and Novak's gynecology. JAMA. 2007;297(14):1601-4.doi: 10.1007/s13224-014-0538-z.
[22]. Nanda N, Michel RG, Kurdgelashvili G, Wendel KA. Trichomoniasis and its treatment. Expert Rev Anti Infect Ther. 2006;4(1):125-35.doi: 10.1586/14787210.4.1.125.
[23]. Mohseni M, Sung S, Takov V. Chlamydia. StatPearls;[2021 December 12].
[24]. CDC – Self study Gonorrhoea 2. Centres for disease control and prevention, Centres for Disease control and prevention.
[25]. Willems HM, Ahmed SS, Liu J, Xu Z, Peters BM. Vulvovaginal candidiasis: a current understanding and burning questions. Journal of Fungi. 2020 Feb 25;6(1):27. doi:10.3390/jof6010027.
[26]. Zeng X, Zhang Y, Zhang T, Xue Y, Xu H, An R. Risk factors of vulvovaginal candidiasis among women of reproductive age in Xi'an: a cross-sectional study. BioMed research international. 2018 Jun 7;2018:1-8. doi: https://doi.org/10.1155/2018/9703754.
[27]. Cassone A. Vulvovaginal C andida albicans infections: pathogenesis, immunity and vaccine prospects. BJOG: An International Journal of Obstetrics & Gynaecology. 2015 May;122(6):785-94. doi: 10.1111/1471-0528.12994.
[28]. Rathod SD, Klausner JD, Krupp K, Reingold AL, Madhivanan P. Epidemiologic features of Vulvovaginal Candidiasis among reproductive-age women in India. Infectious diseases in obstetrics and gynecology. 2012 Oct 15;2012:1-8.
[29]. Bitew A, Abebaw Y. Vulvovaginal candidiasis: species distribution of Candida and their antifungal susceptibility pattern. BMC women's health. 2018 Dec;18(1):1-10. doi: https://doi.org/10.1186/s12905-018-0607-z.

[30]. Dovnik A, Golle A, Novak D, Arko D, Takač I. Treatment of vulvovaginal candidiasis: a review of the literature. Acta Dermatovenerol Alp Pannonica Adriat. 2015 Jan 1;24(1):5-7. doi: https://doi.org/10.1186/s12905-018-0607-z.
[31]. Trisnadewi NN. Vulvovaginal candidiasis (VVC): A review of the literature. Immunodeficiency. Bali Dermatology and Venereology Journal (BDV). 2020;3(1):15-18. doi: 10.15562/bdv.v3i1.37.
[32]. Mohamad D, Awa Ba D, Mahadou S B, Serge C A, Ibrahim M, Omar G, M D N Guege, Amy N, Epainete G, A G Diallo, Jean C M. Prevalence and risk factors of lower reproductive tract infections in symptomatic women in Darkar, Senegal. Infect Dis (Auckl). 2019; 12: 1178633719851825. doi: 10.1177/1178633719851825. eCollection 2019.
[33]. Kwak Y, Skim Y, Beak KA. Prevalence of irregular menstruation according to socioeconomic status: A population-based nationwide cross-sectional study. PLoS ONE 14(3): e0214071. doi: 10.1371/journal. Pone .0214071.
[34]. Emmanuel Ansong, Samuel Kofi Arhil, Yaoyao Cai, Xin Xin Xu, Xueqing Wu. Menstrual characteristics, disorders and associated risk factors among female international students in Zhejiang Province, china:a cross sectional survey, BMC Women's Health, 2019 February 18. doi:10.1186/s12905-019-0730-5.
[35]. Laksham KB, Selvaraj R, Kar SS. Menstrual disorders and quality of life of women in an urban area of Puducherry: A community-based cross-sectional study. J Family Med Prim Care 2019;8:137-40. doi: 10.4103/jfmpc_209_18.