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Epidemiological study of Trichomoniasis with the effect of estrogen hormones LH and FSH among married women in Samarra city, Iraq

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ABSTRACT

The study included the collection of 50 female vaginal specimens for the detection of vaginal trichomonas parasite infection by direct microscopy of the sample obtained by the female specialist doctor in primary health care centers in Al-Moalemeen neighborhood, Al-Jubairia first district and Samarra General Hospital in Samarra city, November 2017 Until January 2018, the samples were a group of women married to different age groups and different residential areas with symptoms ranging from lower abdominal pain to vaginal Secretions of various colors with heartburn and redness in the vaginal area. The highest rate of infection according to the age recorded was from 26-35 to 52.6%, while the highest rate according to the residential area was in the city 39.5% and the highest rate of women who had previously had pregnancy was 61.9%. There was a relationship between the number of Abortion and parasite infection, and the highest rate was within 1-2 abortion by 58.3%. The symptoms of itching with abdominal pain and vaginal Secretions showed the highest rate of 77.7%. The results showed a high estrogen hormone and a low hormone LH, FSH compared to negative control.



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INTRODUCTION

Trichomonas vaginalis is a type of Flagellated Protozoa that causes a disease called Trichomoniasis, a sexually transmissible disease (Hillier, 2013), this parasite is common worldwide, with a number of infections occurring in different parts of Iraq, and more than 170 million infections worldwide each year. This parasite has only one stage, the active Trophozoite stage (Mushrif *et al.*, 2010), the parasite infects the Urinary and reproductive tract in females, and the infection usually occurs in the vagina, cervix and vulva. It may affect the vaginal glands, such as the skene gland and the Bartholin

gland (Chinyere *et al.*, 2010). It causes yellow, white, or green secretion filled with air bubbles and sometimes a bad odour contained trichomonas, bacteria, Epithelial and white and red blood cells with itching sensation, burning, Dyspareunia, Dysuria with abdominal pain (Chandrasekhar *et al.*, 2013). In addition, the vulva suffers from redness and Erythema and Edema in severe cases. There may be congestion in the walls of the vagina as well as the appearance of small hemorrhagic spots in the vaginal and cervical mucosa of the uterus, and this appearance is known as Strawberry (Schwebke and Hook, 2013). Infection in males is mostly without Asymptomatic as the parasite may infect the prostate gland, seminal vesicles, Urethra, and less the epididymis, and testes. Infection may occur in the urinary bladder, causing cystitis.

In some cases, purulent urethritis is also observed with small mucosal white pus secretion and the sensation of burning during urination and retention of urine, itching and pain after the process of sexual intercourse. Complications include prostatitis and cytolysis of the cells of the prostate (Lustig

et al., 2013), and has been referred to a relationship between parasitic infection and prostate cancer in males (Al-Amash *et al.*, 2018) sexual hormones effect Direct or indirect on the effectiveness of parasites and its pathogenicity. There are many studies on the parasite, but the relationship between parasite and hormones were limited and studied from other aspects, and there are hypotheses that the hormones may directly change the virulence of organisms (Stover *et al.*, 1986) Since the parasite lives in the reproductive canal, It has a relationship with sexual hormones, including the FSH this hormone secreted from the front pituitary gland and is responsible for the activation of estrogen in the ovaries, while estrogen secreted from the inner lining of the follicle Crav and secreted under the influence of the hormone FSH and there is a relationship between the estrogen and metabolic products produced by the parasite in the Vagina and with vaginal pH in the case of infection parasite and this will be detailed research and because studies are minimal regarding the parasite and hormones was the reason for the selection of this research, the Objectives of the study is an epidemiological study of Trichomoniasis in the city of Samarra on women and detection of LH, FSH and estrogen hormones by ELISA and its relationship to infection.

MATERIALS AND METHODS

Samples collection

The study was conducted for the period November 2017 until January 2018. The study included the collection of 50 vaginal samples of women who are visiting the primary health care centre in the Al-Moalemeen neighbourhood and those who are visiting Samarra General Hospital where a swab was taken with the help of the female doctor and then put the swab Obtained previously in a normal saline solution. The sample shall be examined within a period of no more than one hour from the time of collection under the optical microscope by means of direct examination by placing a drop of the sample solution on the slide, making sure to mix it well before placing it on the slide and then put the lid of the slide and examine the optical microscope We first examine the x10 objective lens and observe the presence of the parasite through its distinct movement on the x40 lens. The patient's information was collected according to the following questionnaire.

The Trichomoniasis Survey for Women Form number:

Result of microscopy: -

Patient name	Gender	age	Residential area
Number of abortions	Number of pregnancies		Number of children
Type of specimen			
Symptoms			

After completing the patient form, intravenous blood samples were obtained by 10 ml of women in the Menopause age group only because they were a stable age-test for sex hormones, using a syringe. And then placed in a special laboratory tube in the centrifuge for 15 minutes and 3000 cycles/minute, and divided the resulting serum from the separation process by using a micropipette to the following:

1. Put 1 ml of serum produced in plastic tubes 5 ml sterile and tagged and then placed in the freezer at -20 degrees Celsius for preservation in case of re-examination or the need for more serum.
2. Put the remaining serum in Plain plastic tubes free of any anticoagulant to conduct hormonal tests. Samples that contained red blood cell decomposition were neglected. For accuracy in the results, each model was numbered, and the name and date were written.

Determination of Luteinizing Hormone (LH) in Blood serum

The concentration of the LH hormone was estimated using the steps included with the special analysis kit, and according to the instructions of the manufacturer, company specialised of ELISA (Lenton *et al.*, 1982).

Determination of follicle stimulating hormone (FSH) in the serum

The hormone FSH was estimated using the steps included with the special analysis kit, and according to the instructions of the manufacturer, company specialised of ELISA (Vitt *et al.*, 1998).

Estrogen levels in the serum

The hormone Estrogen was estimated using the steps included with the special analysis kit, and according to the instructions of the manufacturer, company specialised of ELISA (Vitt *et al.*, 1998).

RESULTS AND DISCUSSION

Epidemiology according to Age group

The results of the current study showed that the percentage of vaginal trichomoniasis was (38%) as in Table (1) and the highest rate of infection in the age group (26-35) years, where it was (52.6%) followed by the age of (15-25) The rate (38.8%) and the lowest at age (36-45) year (11.1%) The results were consistent with (Al-ibrahimi, 2008; Al-Abodi,

2018; Ayoup, 2010). The study did not agree with (Alsomaeday, 2006) in Tikrit, (Entsar *et al.*, 2016) in Baghdad, and (Hussian, 2010) in Babylon.

The cause of the high incidence in these age groups is due to the fact that they represent the early years of marriage and the increase in sexual activity as well as the arrival of reproductive hormones to the highest levels (Muzher, 2008) as estrogen increases and the epithelium of the vagina become mature and increase the level of Glycogen in the cavity of the vagina, which helps in the growth of parasite. The decrease in menopause is due to the lack of sexual activity and hormonal changes.

Table 1: Number of people with Trichomoniasis according to age group

Age group	Examined	Patients	Percentage %
15-25	18	7	38.8
26-35	19	10	52.6
36-45	9	1	11.1
46-56	4	1	25
Total	50	19	38

*Indicate significant differences at a potential level ($P < 0.05$)

The relationship between the parasite and the residential area

The results indicated in Table (2) that the rate of infection in women living in the city reached 39.5% and that the rural population is 28.5%. This study agrees with (Alsomaeday, 2006; Entsar *et al.*, 2016) about the infection of women in the city more than rural and not compatible with the study (Ayoup, 2010; Al-Zubaidi, 2005) Showed that the incidence of rural women is more than the city. The reason for this in the study is that urban women tend to visit hospitals when they have any symptoms, as well as the near of hospitals to urban women compared to rural women. As well as Rural women are busy with field work. Most of the women visitors from this group avoid performing a medical examination and taking a swab.

Table 2: Number of infection represents the Trichomoniasis according to a residential area

Residential area	Examined samples	Patients	Percentage%
Urban City	43	17	39.5
Rural	7	2	28.5
Total	50	19	38

*Indicate significant differences at a potential level ($P < 0.05$)

The relationship of infection between pregnancy and childbirth

The study showed that women with Trichomoniasis according to pregnancy and childbirth, where the women who have previously pregnancy had

the highest pregnancy in the city of Samarra (61.9%), followed by women who have not pregnancy before (20.6%) as in Table (3) These results are consistent with (Al-ibrahimi, 2008; Al-Abodi, 2018) while not consistent with (Amash *et al.*, 2018).

Table 3: Number of infection in Trichomoniasis between women who previously have0 pregnancy and have not pregnancy before

Infected women	Examined samples	Patients	Percentage %
Previously have pregnancy	21	13	61.9
Have not pregnancy Before	29	6	20.6
Total	50	19	38

*Indicate significant differences at a potential level ($P < 0.05$)

Relationship of infection after childbirth

Table (4) shows that the highest incidence of trichomoniasis in women according to the number of births, where the higher the number of births, the higher rate of infection, where the highest incidence rate in the women who gave birth (11-14) and reached (50%), followed by (0-4) births (42.8%) and the lowest percentage of (5-10) births (23%) and did not correspond with these results (8), where the highest rate of infection in the few births (0-4) births and not show in (11-14) any infection.

Table 4: number of infection in trichomoniasis among women according to the number of birth

No of births	Examined samples	No. of incidence	Percentage %
0-4	35	15	42.8
5-10	13	3	23
11-14	2	1	50
Total	50	19	38

*Indicate significant differences at a potential level ($P < 0.05$)

Parasite relationship with abortion in pregnant women

Table 5: The number of abortions related to the infection of Trichomoniasis

No. of abortions	Examined samples	No. of Incidence	Percentage %
1-2	12	7	58.3
3-4	1	1	100
5-7	1	1	100
Total	14	9	64.2

*Indicate significant differences at a potential level ($P < 0.05$)

Table 7: the rate of infection according to the associated symptoms

Symptoms	Examined samples	No. of incidence	Percentage %
Vaginal secretions with abdominal pain	25	9	36
Vaginal itching with abdominal pain	8	2	25
Itching with secretions	5	1	20
Itching, secretions and abdominal pain	9	7	77.7
No symptoms	3	0	0
Total	50	19	38

*Indicate significant differences at a potential level ($P < 0.05$)

The study showed that there was a relationship between the number of abortions and the percentage of infection as in Table (5). There was an increase between the percentage of infection and the number of abortions. The percentage was (58.3%) for the number of abortions 1-2 and 100% the results were consistent with (Ayoup, 2010) and differed with (Entsar *et al.*, 2016).

The appear and not appear of symptoms

The study showed that women who had symptoms showed a higher proportion than women without symptoms and that study agreed with (8) as in Table (6).

Table 6: number of infection with Trichomoniasis according to the appearance and not appearance of symptoms

Appearance of symptoms	Examined samples	No. of samples	Percentage %
Symptoms appear	47	19	40.4
No symptoms	3	0	0
Total	50	19	37

Clinical symptoms associated with infection

The clinical symptoms associated with the infection of Trichomoniasis in the women in the city of Samarra were the symptoms (itching, abdominal pain and secretions), the highest percentage was (77.7%) followed by symptoms (secretions and abdominal) by (36%) and came Consistent with (Schwebke and Hook, 2013) as in Table (7) vaginal secretions containing many components, including the epithelial cells of the vagina and sometimes white blood cells Pus cells and microorganisms such as bacteria and fungi as well as the parasite causing the disease to feed on the contents of the vagina and destroy the epithelial cells and analyzes the red blood cells To take advantage of the iron . The study also found that a number of women suffer from lower abdominal pain as the vaginal wall consists mainly of smooth muscle cells that are longitudinal and there are only a few of these fibres that are circularized to the inside. This muscle layer is surrounded by the vaginal tissue (Vaginal

Sheath) it is rich in angular vesicles, and when the endothelial lining of the vagina is affected by the infection, the entire wall is affected, and pain increases when pressure is placed on the lower abdomen (Muzher, 2008).

Hormones Results

Estrogen Hormones: Figure (1) and Table (8) showed a significant increase in the level of estrogen between the control group and the group of infected women and at a probability level of $p < 0.05$ with a concentration of the hormone in the total number of infected women (100.788 ± 54.826) MUI / ml compared with control group (84.515 ± 49.949) MUI / ml. The results are consistent with the results of (Ali and Abdul, 2015) study in the city of Babylon, where the hormone was increased in patients with parasite and (Inceboz *et al.*, 2012), where estrogen was studied in laboratory and explained that B-Estradiol-17 was changed in pH and made suitable for parasite growth and was consistent with (Markel and Voges, 2006, Martinotti *et al.*, 1985, Sugarman and Mummaw, 1988), where increased concentration of estrogen reduces the symptoms of the disease.

Table 8: Average \pm standard error of the concentration of estrogen (mlu / ml) for infected women compared to the control group

Group	No.	Estrogen Average \pm standard error
Control	25	84.515 ± 49.949
Patients	25	$100.788 \pm 54.826^*$

* Significant ($P < 0.05$)

FSH-stimulating hormone

Table 9: Average \pm standard error of FSH (mlu / ml) stimulating hormone for infected women compared to the control group

Group	No.	FSH Average \pm standard error
Control	25	11.513 ± 10.946
Patients	25	$9.802 \pm 8.026^*$

* Significant ($P < 0.05$)

Figure (2) and Table (9) showed a significant decrease in the level of follicle stimulating hormone between the control group and the group of infected women and at a probability level of < 0.05 .

The concentration of FSH in the total number of infected women was 9.802 ± 8.026 (MUI / ml) compared with the Control group (10.946 ± 11.513) MUI / ml. These results are consistent with the conclusion (Al-Sammarai, 2012).

The normal PH of vaginal wall in women is 3.8-4.5. There is an interrelated relationship between vaginal estrogen and the metabolic products of naturally occurring vaginal microbes (Boskey *et al.*, 1999). Estrogen spreads from the vaginal epithelial layers. In response to estrogen, the Glycogenic components of the vaginal cells are increased and secreted to the vagina, which prepares the growth of different strains of hydrogen peroxide and lactic acid, which generates acidic pH (Roy *et al.*, 2004). In the case of vaginal infections, the pH rises 4.5 < This is an indication of parasitic *Trichomonas vaginalis* or other microorganisms (Caillouette *et al.*, 1997) in the absence of vaginal infections, pH elevation may reflect low levels of estrogen in the circulatory system (Eli, 1993).

And we conclude through studies there is a positive relationship between estrogen hormone and parasite, when there is a parasitic infection, the pH becomes acidic, and the concentration of estrogen becomes high

While the hormone FSH which is a sex hormone is a Carbohydrate protein glycoprotein secreted by the back lobe of the pituitary gland in response to the GnRH gonadotropin-releasing hormone released from the hypothalamus

In this study, we observe the morbidity of the hormone compared with the control group. This disorder in the hormone ratio is due to the infection by this parasite as it changes the pH of the vagina. Through this property. The level of FSH secretion varies with this condition. Studies have noticed that the PH level increases in the case of this parasite infection, where it turns into acidic medium 5-4 < thus it's affecting the FSH secretion

Yellow body stimulating hormone (LH hormone)

Table 10: Average \pm standard error of the concentration of yellow body stimulating hormone HL (PG/ML) for infected women compared with the control group

Group	No.	LH Average \pm standard error
Control	25	22.828 \pm 18.296
Patients	17	20.111 \pm 14.251

* Significant (P < 0.05)

Table (10) showed a significant decrease in the level of LH hormone between the control group and the group of infected women at a probability level of p < 0.05. The concentration of LH in the total number of infected women was $14.251 \pm$

20.111, MUI / compared to the control group (18.296 ± 22.828) MUI / ml and these results are consistent with (Samurai, 2013) and we observe that this hormone does not change the significance of not being affected by the presence of parasite.

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