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Abortion Related of Infectious Agents in Women in Thi-Qar Province

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***Abstract*— This study was conducted in Thi-Qar province for the period from October 2019 to February 2020. During this period, 120 women who underwent abortion out of 1452 pregnant women their ages range from 15 to 45 years old, the control group consisted of 40 pregnant women, ranging in age from 18 to 42 years old. The current study showed that the rate of abortion among pregnant women was 8.26% of them 4.96 is a spontaneous abortion and 3.3% is the first abortion. The current study showed, according to age, that the highest incidence of miscarriage were among women under the age of 25, while the lowest incidence were in women who were between 35 to 45 years old. The current study also indicated, according to body mass index, that the highest incidence of abortion were among women who had a fat body structure, while the lowest incidence were among women who had an overweight body. The results also showed that the incidence of abortion for the first time was higher than the incidence of repeated abortion in relation to age, habitation and body mass index. The results also showed that the highest incidence of abortion for both types was in the second month of pregnancy, while the lowest incidence of abortion was in the eighth month for repeated abortion and in the seventh month for abortion for the first time. With regard to the infection of the studied microorganisms, the current study indicated that the percentage of infection with B. abortus bacteria was 6.7%, while infection with the Parvovirus B19 was 5.8%, while the study did not record any infection with the Trichomonas vaginalis parasite.**

Keywords— Spontaneous Abortion, Parvovirus B19, *B. abortus*, *T. vaginalis*

I. INTRODUCTION

Habitual abortion, known as recurrent miscarriage, is clinically defined by two or more consecutive pregnancy failures or stillbirths, which leads to great physical and psychological damage to the patients. The causes of habitual abortion are complex and diverse, and recent studies have shown that it is associated with genetic factors, immune factors, endocrine factors, viruses, bacterial, parasitic infections, and so on (Lv *et al*., 2019). In regard to immune factors, the allogeneic antibodies generated due to the blood-group incompatibilities of female individuals and their fetus are sometimes important reasons for habitual abortion (Guillaume and Rossier, 2018).

Parvovirus B19 (B19V) is a small, non-enveloped DNA virus that belongs to the genus Erythrovirus of the family Parvoviridae, B19V is best known as the causative agent of erythema infectiosum, a generally mild febrile rash illness that mainly affects children (Adam *et al.*, 2015). However, the spectrum of clinical signs of B19V infection can range from asymptomatic to chronic or recurrent illnesses, including arthritis and arthropathy (Abdulhassan *et al* ., 2017). Due to the efficient replication of B19V in the erythroid progenitor cells, the infection can also lead to life-threatening aplastic crisis in patients with underlying haemoglobinopathies, as well as to chronic anaemia in immunocompromised patients, B19V is usually spread through respiratory droplets, but it can also be transmitted via contaminated blood products (Sharada Raju *et al.*, 2014). Importantly, B19V can also be transmitted vertically from mother to fetus where it can cause severe fetal anaemia, miscarriage, fetal death or hydrops fetalis. The risk of vertical transmission of B19V is up to about one third of acutely infected pregnant women (Kerr, 2016).

Brucellosis is a chronic infectious disease caused by the bacteria of the Brucella genus, this disease affects many types and leads to significant economic losses, and hence is an important bacterial zoonotic disease worldwide (de Souza Filho *et al.*, 2015). The Brucella genus reproduces within the trophoblast, macrophages, and dendritic cells, and the endothelial and reproductive retinal system is colonized, in addition, brucellosis is not only the main cause of miscarriage and infertility in humans, it is also a disease that causes abortion and infertility in animals. *B. abortus* utilizes diverse evasion mechanisms, this pathogen can penetrate host cells through lipid rafts (Caudill *et al.*, 2017). Once inside cells, the establishment of a persistent infection relies on the ability of the bacterium to form a Brucella-containing vacuole (BCV),

which traffics from the endocytic compartment to the endoplasmic reticulum (ER), forming a replicative BCV. It is in this replicative BCV that the bacteria begin to multiply (Budnick *et al.*, 2018).

Trichomonas vaginalis, is the common flagellated parasitic causes the most common non-viral sexually transmitted disease worldwide in women and men (Malli *et al*., 2020). Trichomoniasis infection has been observed on every continent and climate and no seasonal changes. The outcome of infection with vaginitis varies depending on many factors, such as the genetic diversity of isolates and the host's immune response (Dai *et al.*, 2016). The incidence of trichomoniasis depends on many factors including age, sexual activity, number of sexual partners, presence of other STDs, sexual habits, and menstruation stage. Along with Chagas disease, cystic disease, toxoplasmosis and toxoplasmosis, trichomoniasis belongs to a group of neglected parasitic infections (Kadir *et al.*, 2014).

II. Material and Method

A. Sample Collection

Vaginal swab and whole blood samples were collected from 120 patients who suffered from abortion and 40 pregnant women as control of different ages and who were diagnosed by a physician examination, for the purpose of diagnosing a patients infected with Parvovirus B19, *B. abortus* and *T. vaginalis* . Patients took care and medication at Bent-alhuda teaching hospital and Al-Haboobi teaching hospital in Al-Nasiriya city, south Iraq from October 2019 was given. The samples were collected from patients in a clean invasion collection swab . Samples were properly labeled at the collection point and immediately transported to the investigated laboratory for microscopy, culture. A formula was prepared for all patients, including: date, age, mouth of abortion, length, weight , and the clinical history, and habitation.

B. Identification of T. vaginalis

Direct wet mount by using normal saline(0.9%) method : vaginal swab or urine samples were investigated wet smears with saline and examined microscopically at low (10X) and high (40X) magnifications within 15 minutes. The identification of *T. vaginalis* was made by the characteristic movement of the protozoan and the presence of flagella.

C. Identification of B. abortus

To circumvent the necessity of making repeat subcultures, an ingenious biphasic flask, containing solid agar and a liquid phase. After inoculation, the flask is supplemented with 5% CO2 and tilted so that the liquid covers the solid medium and incubated in the upright position. Flasks are examined every 3 days for the presence of colonies . If no growth is observed, flasks are tilted again and re-incubated, and the cycle is repeated for at least days.

III. The Results

A. The incidence of Miscarriage among Pregnant Women

A total of 1452 pregnant women threatening to abort the fetus, we conducted tests to find out the stability of the fetus's condition in Bint-Al Huda Teaching Hospital, as well as in outpatient women's clinics. The results showed that among these women who were reviewed, 120 women had a miscarriage of 8.26 %, and the study also showed that the percentage of women subjected to first abortion was 4.96%, while the women exposed to spontaneous abortion were 3, 3% as summarized in Fig. 1.

Fig. 1: The incidence of miscarriage among pregnant women

B. Distribution of Abortion Women and Control According to Age Groups

The results of the current study recorded that there were a highest abortion status in the first age groups from 15-25 years of patients with percentage 51.7 %, and second age groups with percentage 40.0 %, while the lowest abortion status in the third age groups with percentage 8.3% as summarized in TABLE 1.

The result also showed that non-significantly difference between patients and control at p. value ≥ 0.05.

TABLE1. Distribution of abortion women and control according to age groups

Women / Age Groups	Patients		Control		Total	
	No.	%	No.	%	No.	%
15- 25 years	62.0	51.7	23.0	57.5	85.0	53.1
26 – 35 years	48.0	40.0	12.0	30.0	60.0	37.5
36 – 45 years	10.0	8.30	5.00	12.5	15.0	9.40
Total	120	100.0	40.0	100	160	100
CalX² = 2.941	TabX² = 5.99		DF= 2		P. Value = 0.230	

C. Prevalence of Abortion Type According to Age Group

The results of the current study indicated that there were a highest abortion type was F. abortion in the first age groups from 15-25 years of patients with percentage 32.5 %, and second age groups with percentage 30.0 %, while the lowest abortion type S. abortion in the third age groups with percentage 4.1% as summarized in TABLE .2.

The result also showed that non-significantly difference between types of abortion at p. value ≥ 0.05.

TABLE2. Prevalence of abortion type according to age group

Women / Age Groups	S. Abortion	F. Abortion			Total	
	No.	%	No.	%	No.	%
15- 25 years	23.0	19.2	39.0	32.5	62.0	51.7
26 – 35 years	18.0	15.0	30.0	25.0	48.0	40.0
36 – 45 years	5.00	4.10	5.00	4.2	10.0	8.30
Total	46.0	38.3	74.0	61.7	120	100
$CalX^2$ = 3.461	$TabX^2$ = 5.99	DF= 2		P. Value = 0.117		

D. Distribution of Abortion Women and Control According to Body Mass Index

The results of the current study illustrated that there were the highest abortion status in the women with BMI was fat with percentage63.3%, and the lowest status of abortion in the women of BMI was obese with percentage 14.2%. Also most pregnant women in control were with BMI were over Wight .

The results also showed that there were a statistically significant differences at p. value ≥ 0.05 as summarized in TABLE 3.

TABLE3. Distribution of abortion women and control according to body mass index

Women / BMI	Patients		Control		Total	
	No.	%	No.	%	No.	%
Normal	27.0	22.5	1.00	2.50	28	17.5
Over Wight	76.0	63.3	30.0	75.0	106	66.3
Obese	17.0	14.2	9.00	22.5	26.0	16.3
Total	120	100	40.0	100	160	100
$CalX^2$ = 18.613	$TabX^2$ = 5.99		DF= 2		P. Value= < 0.0001	

E. Prevalence of Abortion Type According to BMI

The results of the current study illustrated that there were the highest abortion type was F. abortion in the women with BMI was fat with percentage 42.5%, and the lowest status of abortion type was F. abortion in the women of BMI was obese with percentage 6.7%.

The results also showed that there were a statistically significant differences between type of abortion and that the samples are not independent and contain a correlation between them according to BMI at p. value ≥ 0.05 as summarized in TABLE4.

TABLE4. Prevalence of abortion type according to BMI

Abortion Type / BMI	S. Abortion		F. Abortion		Total	
	No.	%	No.	%	No.	%
Normal	12.0	10.0	15.0	12.5	27.0	22.5
Fat	25.0	20.8	51.0	42.5	76.0	63.3
Obese	9.00	7.50	8.00	6.70	17.0	14.2
Total	46.0	38.3	74.0	61.7	120	100
$CalX^2$ = 12.016	$TabX^2$ = 5.99		DF= 2		P. Value= 0.002	

F. Identification of Pathogenic Microbes in Abortion Women

A total of 120 clinical sample of urine, blood and vaginal swab collected from women with abortion. The result of the current study indicated that 6.7% had positive result for *B. abortus*, and 5.8% had positive result for Parvovirus, and non-patient infected with *T. vaginalis*. While 87.5 non recorded infection with infectious agents as summarized in Fig.2.

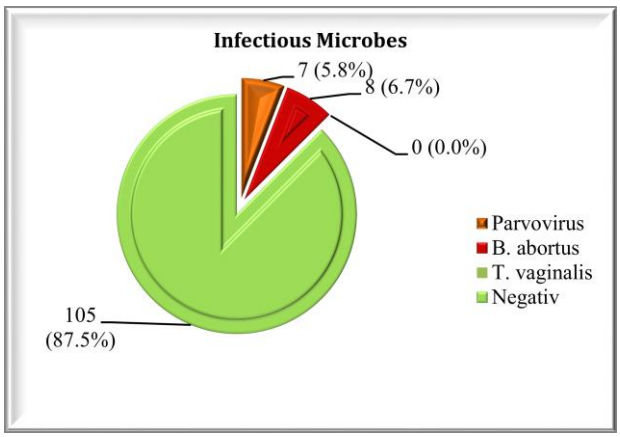

Fig.2. Infectious percentage in abortion women

G. *Prevalence of Infectious Microbes According to Age Groups*

The results of the current study indicated that there were the highest infection with *B. abortus* in the first and second age group with percentage 26.7%, and no infection in the third age group. In Parvovirus the highest infection in the third age group with percentage 26.7%, while lowest infection in the second age group with percentage 6.7% as summarized in TABLE5.

The result also showed that a significantly difference between patients and control and samples were non-independent and there is a correlation between them.

TABLE5. Incidence of infectious microbes according to age groups

Pathogen / Age Groups	*B. abortus*		Parvovirus		Total	
	No.	%	No.	%	No.	%
15- 25 years	4.00	26.7	2.00	13.3	6.00	40.0
26 – 35 years	4.00	26.7	1.00	6.7	5.00	33.3
36 – 45 years	0.00	0.0	4.00	26.7	4.00	26.7
Total	8.00	53.3	7.00	46.7	15.0	100
$CalX^2$ = 6.429	$TabX^2$ = 5.99		DF= 2		P. Value = 0.040	

IV. Discussion

A. *Incidence of Abortion among Pregnant Women*

The fact that the observed incidence of recurrent abortion is much higher than expected by chance alone suggests that recurrent abortion is a clinical entity distinct from sporadic miscarriages. This is supported by the finding that recurrent abortion tends to occur, unlike sporadic miscarriage, when the fetus has a normal chromosome constitution. Recently, the genetic knowledge about the etiology of diseases has expanded rapidly. Progress has, however, been much slower in elucidating the genetic causes of female infertility and recurrent abortion. Although many studies have been conducted to identify the underlying mechanisms, the cause of miscarriage remains unknown in approximately 50% of cases (Kaare, 2009; del Fabro *et al.*, 2011).

The current study indicate the percentage of the incidence of abortion and recurrent abortion in this study 8.26 % among 1452 pregnant women, the current study agreed with previous study of Abdul-Karim et al ., (2009), in Bagdad Province, they study *Chlamydia trachomatis* and rubella in women with full-term deliveries and women with abortion and concluded the percentage of abortion in pregnant women was 6.4 %. The result disagreed with study of Azo and Akbay, (2016), in the Kurdistan of Iraq, they study prevalence and risk factors of abortion among a sample of married women, and study 7551 cases and concluded the percentage of abortion women in new mirage was 27.7%. The result also disagreed with study of (Alsedawy and Hemza, 2010), in al Muthana province, the study prevalence of Toxoplasmosis in pregnant women and concluded the ratio of the abortion was high and reached to 69.4% from total infected women and 54.3% of total abortions were due to *Toxoplasma* infections. A investigative research performed by Pazol *et al.*, (2014), in United State, they studied the incidence of abortion cases in 48 different regions in the CDC, where the rate of abortion since 2005 to 2014 was 65,239 cases. And the percentage of abortion in 2005 was 1.2 %, and the percentage of abortion decrease by 0.3% in 2014 for all age group of pregnant women. The reasons for differences in the prevalence rate of our study and studies in other countries or other Iraqi province is unknown.

B. *Incidence of Spontaneous and First Abortion among Pregnant Women*

The current results indicate that the percentage of women with first abortion was 61.7%, while the women with spontaneous abortion was 38.3%. according to age group the results recorded the first age group record the highest percentage with first abortion status with 32.5%, while the third age group record the lowest percentage with both first and spontaneous abortion with 4.20%.

The current results agreed with study provided by Jerman *et al* .,(2016), in the United State of America, they study the characterize of abortion women from 2008 – 2014 and concluded the most spontaneous and firs abortions occur in women of ages ranged from 20 – 24 years, and the lowest cases of miscarriage occur in women of ages above 30 years. The result agreed with study of Jones and Jerman, (2017), in the United Kingdom, they study population group abortion rates, and concluded the most abortion women lie in the age group ranged from 19 – 29 years, while the rate of abortion decline with increasing age. The result also agreed with study of Muanda *et al* ., (2017), they study use of antibiotics during pregnancy and risk of spontaneous abortion, and concluded a direct relationship between used of some antibiotic and frequent miscarriages.

The current results disagreed with study of Ahmadi *et al.*, (2016), in Iran they study the Relationship between *Chlamydia trachomatis* genital infection and spontaneous abortion, and indicated the majority of women suffer from spontaneous abortion fall into the age group ranged from 35-39 years.

The induce of spontaneous abortion it is may be due to several reasons, including classes of antibiotics were associated with an increased risk of spontaneous abortion, the presence of unmeasured confounders could be a possible explanation for these results, also some potential confounders are not available in the Quebec Pregnancy Cohort, including smoking status, folic acid use, alcohol intake.

C. Prevalence of Infectious Microbes among Abortion Women

The current results recorded that there were a 5.8% of women infected with Parvovirus, and the highest of virus infection was in the third age group, while the second group recorded the lowest infection, according to body mass index, the highest infection was in the obese group, while women with normal body mass recorded the lowest infection.

The current study agreed with study of Shabani *et al.*, (2015), they study the relation between parvovirus B19 infection and fetal mortality and spontaneous abortion, and recorded a 6% of pregnant women they were aborted due to infection Parvovirus B19, and the most infection occur in the second trimester of pregnant. The results also agreed with study of Hussein, (2016), he study Parvovirus B19 antibodies in pregnant women with spontaneous abortion, and concluded 11.1% of women they were spontaneous aborted due to Parvovirus B19 and also recorded the most infection in the women that age ranging from 28-39 years.

The current study disagreed with Iraqi study performed by Abdulhassan *et al* ., (2017), in Baghdad, they study Parvovirus B19 in bad obstetric history by using real time PCR, and concluded 20% of pregnant women they were aborted by infection with Parvovirus B19, and the most infection in age group of 30-39, while the lowest infection in women less than 20 years.

The mechanism of how some pregnancies lead to adverse maternal outcome is not fully understood though endothelial dysfunction, the findings of present study supported evidence are available in the study that reported that advanced maternal age and gestational hypertension has been suggested to play a role in adverse pregnancy outcome (Francis *et al.*, 2017). The higher risk of infection has to be due to a higher exposure rate among women with children at home. This fact most likely represents a mixture of a higher exposure rates multigravida women generally have a higher rate of daily contacts compared with nulliparous women, and probably a reduced level of active immunity, because of the stress factor. Furthermore, serious medical disease may be found in multigravida women which causes clearly impairs the level of active immunity and thereby increases the susceptibility to infection (Staroselsky *et al.*, 2009). During pregnancy, the B19 virus can infect red precursor cells and induce apoptosis or these cells break down, leading to anemia and congestive heart failure, which leads to the death of the fetus. There for management of Parvovirus B19 infection in pregnant women is important for prompt diagnosis transferring aqueous embryos can reduce the risk of fetal death.

With regard to bacterial infection, the current study recorded that 7.6% of the women who had an abortion infected with *B. abortus*, and the highest of bacterial infection was equal between the first and second age groups, while the study did not record any infection in the third age group, according to body mass index, the highest infection was in the fat group, while women with normal body mass non infection were reported.

The current study agreed with study of Ali *et al.*, (2016), in Pakistan, they study Brucellosis in pregnant women, and concluded 5.8% of twenty five of pregnant women suffer from abortion by infection with *B. abortus*. The current study also agreed with study of (Kurdoglu, 2015), they study Effect of Brucellosis on women's health and reproduction, and concluded among 200 pregnant women who had undergone abortion 10% of them they were aborted due to an infection by *B. abortus*. The current study got a results less than the result get by Inan *et al.*, (2019), they study Brucellosis in pregnancy: results of multicenter, and concluded among 242 pregnant women who had undergone abortion 14% of them they were aborted due to an infection by *B. abortus*.

However, brucellosis in pregnant women also poses severe risks to newborns. Infection has been shown to be the leading cause of neonatal mortality. These women are often engaged in animal keeping and thus are in close contact to infected animals or abortion material. Thus, our women may be exposed to a similar risk as high risk professionals (De Bolle *et al.*, 2015).

With regard parasitic infection the current study did not record any infection with *T. vaginalis* in all abortion women.

The current study agreed with study of Ahmadi *et al.*, (2018), in Iran, they study group B Streptococci and *T. vaginalis* infections in pregnant women and those with spontaneous abortion, and concluded among 109 women with spontaneous abortion 7.2% infected with group B Streptococci and ate of prevalence of *T. vaginalis* in both groups as zero.

The current study disagreed with study of Nouraddin and Alsakee, (2015), in Irbil, they study prevalence of *T. vaginalis* among pregnant women undergone abortion by wet preparation, and showed among 440 women 3.18%

infected with *T. vaginalis*. The result also disagreed with study of Rostami *et al.*, (2017), in Iran, they study genital infections and reproductive complications associated with *T. vaginalis*, and concluded the rate of infection of *T. vaginalis* in aborted women was 19.3%.

The trichomoniasis was higher among women from rural areas comparing with urban residents which may be attributed to lack of knowledge about the disease and its transmission routes among rural residents as well as limited health services in rural communities. In this study the housewives were more susceptible to infection than employer women. This finding may be explained by the fact that the employer women may use vaginal washing and antiseptics after coitus and/ or to the existence of health education programmers about sexually transmitted infections arranged by the maternal care office (Kadir *et al.*, 2014).

Also the personal hygiene and sanitary habits in addition to relatively higher sexual education at least at educated women, all the factors that may contribute to such lower incidence of trichomoniasis. However, such lower rate of infection may also be attributed to some technical limitations. Such as Participant selection and sample size in addition to the procedures that have been used to identify the parasite.

V. Conclusion

The incidence of spontaneous abortion was less than the incidence of abortion for the first time, most of the aborted women live in Al-Nasiriya District, the women under the age of 25 years were most likely to undergo both types of abortions, women with body mass index fat were most likely to undergo both types of abortions, most abortions occurred in the second month of pregnancy, while the lowest cases were in the eighth month. Highest incidence of infection was with *B. abortus* , while the lowest cases of infection were with Parvovirus B19, while the study did not record any infection with *T. vaginalis* parasite.

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