

The Role of Mycoplasma in Infections Transmitted from Mother to Child

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ABSTRACT

The current study aimed to demonstrate the role Mycoplasma diseases transmitted from mother to premature infants in Maysan Governote, who gave birth naturally in Al-Zahrawi Hospital in Maysan Governorate for the period from July 1, 2020, to 20 November 2020. As mycoplasma was diagnosed in the eye of a premature infant, 39 cases were among them, 17 joint cases, at a rate of (43.5%), and the number of single cases was 22 cases, at a rate of (56.4%). It was also diagnosed in 53 cases of the same child's chest, as the number of joint cases was recorded 9 cases, at a rate of (16.9%), while the number of single cases was recorded at 44 cases, at a rate of (83%). As for the mother, the infection rate was 63, or 63%. The incidence of infection also increased in the second age group 20-29, as the percentage of mycoplasma bacteria reached 39%. Ureaplasma urealyticum recorded the highest infection with 21 cases and a rate of (33.3), followed by infection with M. hominis bacteria 14 cases with a rate of 22.2%, while the bacteria M. pirum recorded 10 cases with a percentage of 15.8%, M. fermentans recorded 8 infections and 12.6%, while bacteria genitalium M. It recorded 7 infections, with a rate of 11.1%, and finally, M. pneumoniae recorded 3 infections, with a rate of 4.76%. Thus, the number of mycoplasma infections under the current study is 63.

Keywords: genital pathogens, premature child, cervix.

1. Introduction

Bacterial diseases transmitted from mother to infants It is an infection that occurs to the newborn during the postpartum period or the first four weeks after birth. The infection is transmitted from inside the uterus through the placenta or passing through the birth canal during childbirth The infection of the newborn occurs after birth and in some cases it develops or It extends until after birth in the first weeks or month (Kumar, 2013), some types of infections that affect the child during the birth period do not show symptoms of infection until later and there is a higher risk of infection of premature or underweight newborns with respiratory diseases when infected with transmitted germs them from their infected mothers (Mendoza et al, 2011). The effects of these infections may extend to the long term, reaching the childhood stage as well as the stage of adulthood, and these infections weaken the strength of the body and it becomes easy to contract diseases, i.e., weaken the immune system of the infected people, and in some cases, newborns with respiratory tract infection have a susceptibility to infection and infections in the future. Cause of lung disease. Antibiotics can be an effective treatment for neonatal infections, especially when the pathogen is quickly identified (Jawetz et al, 2016). Premature babies are the most susceptible to infection, and premature rupture of the membranes surrounding the fetus, such as the rupture of the perinatal sac, can be associated with neonatal infection and significantly increases the risk of sepsis by allowing bacteria to enter the uterus before the child is born, and research and studies are still ongoing to find A

treatment for these infections and also a preventive treatment for the mother to avoid infection from children (Melit et al, 2016). sexually transmitted diseases (STD) are a variety of pathogens clinical syndromes and infections that can be acquired and sexually transmitted from father to mother and vice versa, and then transmitted through the birth canal to the child and cause conjunctivitis and pneumonia. These diseases are also transmitted to those who have sex with a new sexual partner, as well as with those who have sex with more than one sexual partner or a sexual partner who has a sexually transmitted infection. Therefore, the pregnant mother should be routinely examined to ensure that she is free of germs, especially mycoplasma for the inevitability of these groups above contracting this serious infection, as women aged between (25-35) years are at increased risk of infection, they should also be retested During the third trimester of pregnancy to prevent postpartum complications (Ermolaera et al, 2014).

2. Material and Methods

collected 300 samples divided between 100 samples from the cervix mothers 100 samples coulter media Monophasic –Diphasic – Culter- Setup (MDCS) as for 200 samples the rest was divided between 100 samples from the eye of a premature baby 100 of them were coulter on the medium (MDCS) to detect the presence of mycoplasma in the eyes of the affected child, while the last 100 samples were taken from the chest of the same child. Preterm infants, 100 of them were cultured on the medium (MDCS) to detect the presence of mycoplasma in the chest of a premature infant. The swabs were collected from

premature babies with their mothers who were suffering from acute respiratory infections and eye infections and were placed inside special sterile plastic boxes and transferred within less than an hour to the hospital laboratory, then the samples were transferred by an icebag according to the method (Furr and Taylor_Robinson, 1987). Inoculated with mono-biphasic medium (MDCS) (AL_Ghizawi, 2001) and incubated aerobically at 37°C for (24-72) hours. As in Figure (1-1). In addition, I collected 25 samples from the cervix of the mothers and 25 samples from the chest and eyes of children of full age and weight and considered as a control group to isolate mycoplasma. The primary result of detecting the presence of Mycoplasma it is by changing the color of the medium of the bacteria Mycoplasma from red to yellow after 24-72 hours of culturing the bacteria on the medium, this is in the case of the presence of bacteria in the infected sample, but in the absence of bacteria in the infected sample, the color of medium remains smaller in the upper part of the middle tube after changing the color of the medium, the dyeing step comes with a dye Nigrosine stain because it is a bacteria Mycoplasma negative for gram stain so we resort to Nigrosine stain as the bacteria appear in the form of glowing crystals, then a procedure step comes Biochemical test if 11 special tests are bone for bacteria of Mycoplasma (Furr and Taylor_Robinson, 1987).as shown in figure number (1-2)



Figure (1-1) Monophasic- Di phasic-Culture-Setup (MDCS) medium.

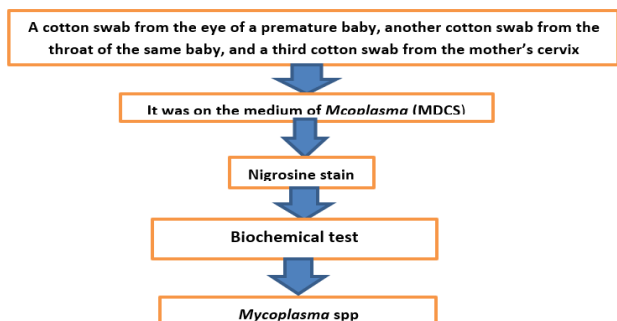


Figure (1-2) is a diagram illustrating the design of the study.

3. Results

The results of this study showed that it was possible to isolate Mycoplasma & Ureaplasma bacteria from the eyes and chest of premature infants, from the cervix of their mothers, from infants of incomplete age (premature birth), underweight and with lung diseases and conjunctivitis, in addition to blind children whose mothers were infected With acute

infections of the genitourinary tract, and they suffer from diseases of the cervix, which were causing premature birth, and the transmission of these diseases from mother to child while passing through the birth canal for natural childbirth in Al-Zahravi Hospital / Maternity Hall in Maysan Governorate. 300 samples were collected by four swabs from premature babies, two swabs from the eyes, two swabs from the chest of the same child, and two swabs from the cervix of their mothers from the same affected premature baby. Biphasic monophasic medium (MDCS) was used to show the role of mycoplasma bacteria in causing urogenital tract infection of the mother, which in turn is the cause of diseases transmitted from mother to premature baby. Mycoplasma was diagnosed in the eye of a premature baby 39 cases. And The results of the statistical analysis showed that there are no significant differences between the eyes of patients, as well as it was diagnosed in 53 cases of the same child's chest. Also, the results of the statistical analysis also showed that there were no significant differences between the patients' chests U. Ureaplasma colonies appeared after(24-48)hours of incubation in dark golden-brown color. The genital mycoplasma M. hominis is in the form of a fried egg (Fride-egg) and appeared after(48-72) hours, and it is in this shape similar to M. fermentans.Also, colonies of M. genitalium bacteria appeared after 24-48 hours in a spherical shape. As for M. pirum bacteria, it appeared after(24-48)hours and was characterized by the clear spherical colonies shape.Also, colonies of M. pnemoniae appeared in a spherical shape after(24-48) as a figure. This study is considered the first study at the level of Iraq in the diagnosis of Mycoplasma bacteria from mothers and premature babies The results of the current study showed that it was possible to detect mycoplasma bacteria in the cervix of mothers, as 100 swabs were collected, as the patients were divided into 4 age groups. As for the second age group (20-29 years), it recorded 39 cases, which is the largest of the study sample, which included 25 injuries, with a rate of 39.6%. The third age group was also registered (39-30 years), with 26 cases, 23 cases, and a rate of 36.5%. As for the last age group (40-49 years), it recorded 12 injuries, of which only 3 cases, at a rate of 4.7%. As in Figure (1-3), when analyzing the results statistically, there were significant differences. $P < 0.05$, $\chi^2 = 14.800$.



$P < 0.05$, $\chi^2 = 14.800$

Figure (1-3) Distribution of study samples according to the age groups of mothers infected with mycoplasma bacteria.

For the first age group, 17-19 years, it reached 12 infections, distributed as 5 infections, due to the presence of *U. urealyticum*, at a rate of 41.6%, which means that the highest infections were recorded compared to the rest of the bacteria. Also, 3 cases were recorded due to the presence of *M. pneumoniae* bacteria at a rate of 25%. *M. hominis* recorded two infections with a rate of 16.6%. Also, only one infection was recorded at a rate of 8.3% for the presence of *M. pirum* & *M. fermentans* bacteria. The second age group, 20-29 years, recorded the largest number of patients, with 39 cases. Mycoplasma was isolated in 25 cases, with a percentage of 64%, and the highest infections were in the presence of *U. urealyticum* 8 bacteria, 32%, followed by 6 infections, *M. hominis*, and 24. Also, 4 cases of *M. genitalium* and *M. fermentans* bacteria were recorded with a rate of 16%, and three cases of *M. pirum* infection were diagnosed with a rate of 12%. Twenty-six cases appeared in the third age group,

30-39 years, of which 23 cases of mycoplasma were recorded, with 8 cases, 34.7%, for the presence of *U. urealyticum* bacteria, and 6 cases for the presence of *M. pirum* bacteria, with a rate of 26%. Also, 5 cases were recorded, and 21.7% for the presence of *M. pneumoniae* bacteria. Both *M. fermentans* & *M. genitalium* bacteria recorded two infections with a rate of 8.6%. Only 12 cases were recorded in the fourth and last age group, 40-49 years. Of them, 3 cases of Mycoplasma infection were recorded, and one infection was caused by the presence of *M. hominis* & *M. genitalium* *M. fermentans* bacteria, with a percentage of 33.3% in each.

As shown in Table (1-1): it shows the number of people infected with mycoplasma bacteria, their percentages and their distribution according to age groups. When analyzing the results statistically, there were significant differences. $P < 0.05, \chi^2 = 89.820$

Table (1-1): Number of mothers infected with mycoplasma bacteria, percentage and their distribution according to age groups.

Age in years	The total number of samples	The number of cases of bacteria <i>U. Urealyticum</i> (%)	The number of cases of bacteria <i>M. Hominis</i> (%)	The number of cases of bacteria <i>M. Pirum</i> (%)	The number of cases of bacteria <i>M. Fermentans</i> (%)	The number of cases of bacteria <i>M. Genitalium</i> (%)	The number of cases of bacteria <i>M. Penominae</i> (%)	The total
17-19	19	5(41.6)	2(16.6)	1(8.3)	1(8.3)	0	3(25)	12
20-29	43	8(34.7)	6(26)	3(13)	4(17.3)	4(17.3)	0	25
30-39	26	8(34.7)	5(12.7)	6(26)	2(7.6)	2(7.6)	0	23
40-49	12	0	1(33.3)	0	1(33.3)	1(33.3)	0	3
The total	100	21	14	10	8	7	3	63

Table (1-2) shows cases of mycoplasma infection and its relationship to some pathological conditions that were found frequent and associated in women who suffer from urogenital infections and were also observed with premature infants. For females, the highest incidence of arthritis was recorded for nine cases out of a total of 63 samples, with a percentage of 21.4%, distributed between the presence of *M. fermentans* in four cases, 44.4%, and two cases, 22.2%, due to the presence of *M. genitalium* & *M. hominis*, and one case, and 11.1% to the presence of bacteria *U. urealyticum*. The incidence of diabetes was also recorded in six cases, at a rate of 9.5%, distributed between the presence of *U. urealyticum* bacteria in 3 cases, at a rate of 50%. And the presence of *M. pneumoniae* bacteria in two cases, with a rate of 33.3%, and one infection with *M. hominis*, with a rate of 16.6%. Urinary cystitis cases were also recorded in five cases, with a rate of 7.9%, distributed between the presence of *U. urealyticum* and *M. fermentans* bacteria, in two cases, 40% each, and one infection, and 20% were caused by the presence of *M. genitalium*. The results of the statistical analysis showed that there were no significant differences.

Table (1-2): Infection with mycoplasma bacteria for mothers and its relationship to some disease cases.

Disease cases	The number	Percentage
Arthritis disease	9	14.2%
Diabetes	6	9.5%
Urinary factory disease	5	7.9%

As for Figures (1-4), (1-5) and (1-6): they show the effect of infection with different types of Mycoplasmas, its association and disease states among the women under study.

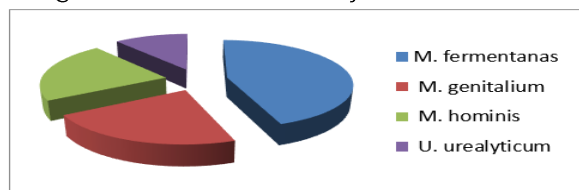


Figure (1-4) Mycoplasma types isolated from patients under study who suffer from arthritis

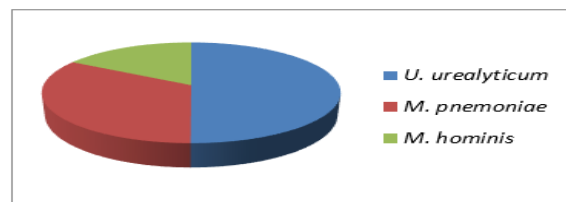


Figure (1-5) Types of Mycoplasmas isolated from patients under study who suffer from diabetes



Figure (1-6) Mycoplasma types isolated from patients under study who had cystitis infections recorded.

The study sample was divided according to the economic level into three categories as in Table (1-3) included the first category of people with limited

income (weak), which represents the largest percentage of the total study samples 54 samples, of which 38 cases of mycoplasma infection were recorded, while the second category is for middle-income people 35 samples were recorded, of which 22 cases of infection were recorded, while the third category included people with good incomes, as 11 samples of the study samples recorded 3 cases of mycoplasma infection. And with the percentage of *U. urealyticum* for the first category, 38 cases were recorded, distributed among 20 cases of infection in 8 cases and by 21%. Also, *M. hominis* bacteria were recorded, followed by the presence of 52.6% bacteria. *M. genitalium* 5 cases and by 13.1%. As for the bacteria *M. fermentans*, 3 cases, with a rate of 10.7%. Finally, *M. pirum* bacteria recorded two infections with a rate of 7.1%. As for the second

category, it recorded 22 infections, 34.9% distributed among 8 infections, 36.3% due to the presence of *M. hominis* bacteria, and 6 infections due to the presence of *M. pirum* bacteria at a rate of 27.2%. As for *M. genitalium*, it recorded 5 infections, with a rate of 22.7%, and *U. urealyticum* recorded 3 infections, at a rate of 13.6%. Finally, the third category recorded 3 infections, all of which were due to the presence of *M. fermentans* bacteria at a rate of 100%. The results of the statistical analysis showed that there were significant differences $P < 0.05$, $\chi^2 = 27.860$ for the total number of samples examined. As for bacterial infections according to the pathogen, the results of the statistical analysis also showed that there were significant differences under the probability level of $P < 0.05$, $\chi^2=241.933$.

(1-3) Table of the distribution of mycoplasma infection for infected mothers according to the economic level.

Economic level	The number of samples examined	Bacterial infection <i>U. urealyticum</i>	Bacterial infection <i>M. hominus</i>	Bacterial infection <i>M. genitalium</i>	Bacterial infection <i>M. pirum</i>	Bacterial infection <i>M. fermentans</i>
Weak	54 (54%)	20(52.6%)	8(28.5%)	5(17.8%)	2(7.1%)	3(10.7%)
Average	35 (35%)	3(13.6%)	8(36.3%)	5(22.7%)	6(27.2%)	0
Good	11 (11%)	0	0	0	0	3(100%)
The total	100	23	16	10	8	6

27.860 Bacterial infections by pathogen $P < 0.05$, $\chi^2 =$
 The total number of samples examined the probability level is $P < 0.05$, $\chi^2= 241.933$.

The current study showed that most of the women infected with genital infections caused by mycoplasma bacteria live in the districts and sub-districts. At a rate of 34.9%, in the west of the governorate, 18 cases were recorded, and at a rate of 28.5%, it included Sayed Ahmed Al-Rifai, Al-Maimuna and Al-Salam sub-districts. As for the

governorate center, it recorded 23 infections, with a rate of 36.5%, as shown in Table (1-4). As for the results of the statistical analysis, it showed that there were significant differences $P < 0.05$, $\chi^2= 13.073$

4-1 (Infection of mothers with mycoplasma bacteria and its relationship with places of residence

Governorate center	Governorate East	Governorate West	Governorate North	Governorate South
23(36.5 %)	22(34.9%)	18 (28.5%)	0	0

$P < 0.05$, $\chi^2= 13.073$

4. Discussion

A premature baby is a baby who is born before the 37th week, that is, three to four weeks before the date of birth. In pregnancy through a vein or tube, premature birth occurs due to the occurrence of bacterial infections in the cervix in addition to malnutrition of the mother during pregnancy and high blood pressure for the mother during pregnancy, and because many organs are incomplete and underdeveloped in a premature baby, so it must be cared for in the preterm infants' halls to receive Care is like feeding the baby and providing devices for breathing, as this care limits the risk of premature infants dying. Premature infants whose cases were followed up in the current study were all suffering from underweight or their weight exceeded 2 kilograms and their age did not exceed eight months. Most of the children whose case was studied were suffering from acute respiratory infections, conjunctivitis, or both. The results of the current study showed that it is possible to isolate and diagnose mycoplasma, ureaplasma, as most of the

bacteria present in premature infants that cause premature birth are represented by the bacteria *Mycoplasma* spp, *Ureaplasma urealyticum*. (Edlund et al, 2012).

When these germs are present in the eye of the child, in the larynx, or even in the cervix and descend through the birth canal, they will stick to these organs through the peripheral structures, which is helped by the presence of polysaccharides (LPS) and release of cytokines and degradation factors represented by α -haemolysins and β -haemolysins (Agarwal et al, 2014). I suppose Vincent, (2012) There is a strong relationship between oxidation processes and the presence of different types of bacteria, as the presence and adhesion of *Mycoplasma genitalium* to the cervix causes premature birth.

The current study recorded that most of those infected with *Mycoplasma* bacteria fell into the second age group 20-29 years and who suffer from urogenital infections, and this is consistent with what was found (Du Plessis et al, 2015). Genital infections are one of the main causes of premature birth in a high percentage of premature babies all over the

world, in addition to the suffering of affected females from hormonal imbalances and change in pH, as well as the growth of opportunistic microorganisms, and that this period is the period of sexual maturity in which it occurs. Pregnancy is at a high rate compared to the thirties and forties, but the presence of bacteria that cause genital infections and sexually transmitted infections is a sufficient reason for an early birth. (Shapiro and Dalton, 2005) These women may have the bacteria transmitted to them from their husbands, as women are more infected than males due to several factors, including the menstrual cycle, sexual activity, pregnancy or the use of contraceptives (Workowski, 2015). All factors help the presence and spread of mycoplasma bacteria when one of the spouses is infected with mycoplasma bacteria without symptoms because infection with it is asymptomatic at first, which leads to a defect in the function of the sex glands and the descent of secretions (abnormal secretion) in infected women Yang et al, 2019). Mycoplasma may be transmitted from an infected husband to his wife because it is a sexually transmitted disease (Taylor-Ribinson, 1980). The percentage of *U. urealyticum* isolated and diagnosed by 34.7% increase in the age group (20-29) (the increase in this age group is due to hormonal changes and increased sexual activity (Al-Mosawi, 2005). 2015) when he detected cases of genital infections and diagnosed the highest percentage of *U. urealyticum* bacteria. Genitourinary tract infection occurs as a result of contamination of the genitourinary tract with bacteria, and female infections are more than males due to the anatomical structure of the female reproductive system, in addition to the presence of the prostate gland in men, as it eliminates some germs through its secretions, such as urinary tract infection, cystic neuritis, and disease Sugar (Kupis et al, 2015). This study showed the presence of a number of disease cases that were reluctant with cases of genital infections and premature births of premature babies as a result of infection of mothers with mycoplasma bacteria. The study agrees with the results of the study of Kadhim, (2010) in Basra, when he isolated mycoplasma bacteria for the first time at a level of joints when it was the main cause of arthritis of the knee and ankle joint. Also, the study of Gilroy et al, (2001) agrees when *M. fermentans* is isolated from the knee joint. The current study also recorded (6 infections) with a rate of 3.11% for diabetic patients, and to know the relationship between urogenital infections caused by infection with mycoplasma bacteria and patients with diabetes, this is due to the fact that most diabetics suffer from infections in the bladder that cause difficulty in emptying the bladder and thus it is difficult to drain the bladder. Bacteria outside the body In addition to the fact that high blood sugar is a favorable environment for the presence of bacteria, as well as because diabetes suppresses their immunity and this is due to a dysfunction in the work of phagocytic cells (Jeanette et al, 2005). In a recent study in China, it was found

that there is a close relationship with the presence of mycoplasma bacteria and diabetes patients (Vandepitte et al., 2012). The study also recorded (5 cases) with a rate of 9.4% for urinary bladder infection. These cases were simultaneous and infected with mycoplasma bacteria, as people who suffer from bladder infections have difficulty emptying the bladder and thus it is difficult to sweep bacteria out of the body and this is a suitable environment for bacteria growth (Jeanette et al, 2005). The rate of isolation of ureaplasma bacteria increases in those with a weak economic level, and the infection decreased in patients with a good high level. The reason for the presence of mycoplasma, ureaplasma bacteria is due to the fact that these types of bacteria are opportunistic bacteria, as the rate of infection increases and their pathogenicity and activity increase when the immunity of patients and most people with limited income (with a weak economic level) occurs, i.e. weakness occurs in the body's immune system in addition to Hormonal changes and nutritional deficiency (Waites et al, 2005; Al-Mosawi, 2005). The poor economic level of patients such as low income, poor sanitation services and an increase in the number of members in the family are all factors that contribute to the increase in the incidence of mycoplasma bacteria. The cultural level and health awareness lag in different regions, which results in an increase in infections in the event of a low level in the districts and sub-districts compared to the center of the governorate (Wood et al, 2014).

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