RESULTS

A total of 100 pregnant women was included in this study; 70 of them were symptomatic, complaining mainly of dysuria and/or vaginal discharge, and 30 of them were asymptomatic and were considered as a control group. All women were coming from Qualyobia Governorate. Seventy-five of them (75%) were housewives and the rest (25%) were employed.

The age of the symptomatic group (1st group) ranged from 16 to 39 years with a mean of 26.7 ± 5. The age of the asymptomatic group (2nd group) ranged from 17 to 40 years with a mean of 26.3 ± 6.2 (Table 1). Statistical analysis of the difference in age between the first and the second groups showed no significant difference between both groups as seen in Table 2.

The gravidity of the first group ranged from 1 to 8 with a mean of 2.7 ± 1.7, while the gravidity of the second group ranged from 1 to 7 with a mean of 3 ± 1.8. (Table 1). Statistical analysis of the difference in gravidity between the first and the second groups showed no significant difference between both groups (Table 2).

The parity of the first group ranged from 0 to 6 with a mean of 1.3 ± 1.5, while the parity of the second group ranged from 0 to 5 with a mean of 1.5 ± 1.5. (Table 1). Statistical analysis of

the difference in parity between the first and second groups showed no significant difference between both groups (Table 2).

As regards to the number of abortions, in the first group it ranged from 0 to 3 with a mean of 0.4 ± 0.7, while in the second group it ranged from 0 to 2 with a mean of 0.5 ± 0.7 (Table 1). Statistical analysis of the difference in number of abortions between the first and the second groups showed no significant difference between both groups (Table 2).

The duration of marriage of the first group ranged from 0.3 to 18 years with a mean of 5 ± 4.6, while that of the second group ranged from 0.4 to 20 years with a mean of 5 ± 5.2 (Table 1). Statistical analysis of the difference between both groups showed no significant difference between them (Table 2).

Regarding gestational age in the first group it ranged from 12 to 34 weeks with a mean of 20 ± 4.8, while in the second group it ranged from 13 to 35 weeks with a mean of 20 ± 5.8 (Table 1). Statistical analysis of the difference in gestational age between the first and second groups showed no significant difference between both groups (Table 2). From these observations we can safely state that both groups were matched.

Among the symptomatic group Chlamydia trachomatis was detected by Direct Immunofluorescence Test (DIF) in 24.3% (17/70)

while in the asymptomatic group the incidence of Chlamydia trachomatis was 10% (3/30). The difference between both groups was statistically insignificant ($X^2 = 2.67$, P> 0.05) as shown in Table (3) and Fig.(1).

As seen in Table (4) and Figure (2), the incidence of Chlamydia trachomatis in symptomatic women under the age of 25 was 29.6% (8/27), while in those above the age of 25 was 20.9% (9/43) but this difference was statistically insignificant ($X^2 = 2.291$; P>0.05).

Table (5) and Figure (3) revealed that the presence of Chlamydia infection among symptomatic women was decreased with increased parity but this difference didn't reach significant level ($X^2 = 2.12$; P> 0.05).

Among the symptomatic group, 12 of them (17.1%) were complaining of dysuria only and Chlamydia trachomatis was determined in 8.3% of them (1/12) but the relation between presence or absence of dysuria alone and the incidence of Chlamydia trachomatis was statistically insignificant (Table 6 and Figure 4).

Forty-one (58.6%) of the symptomatic women were complaining of vaginal discharge only. The prevalence of Chlamydia trachomatis among those women was 17.1% (7/41). Statistical

analysis to the relation between the presence or absence of vaginal discharge among pregnant women and the incidence of Chlamydia trachomatis showed no significant relation (Table 6 and Figure 4).

The last group of the symptomatic women were complaining of dysuria and vaginal discharge. They constitute 24.3% (17/70) of the symptomatic women and Chlamydia trachomatis was determined in 52.9% of them (9/17). Statistical analysis to the relation between the presence of dysuria and vaginal discharge together revealed highly significant relationship (X^2 = 10.02; P<0.01) (Table 6 and Figure 4).

As regard to the duration of symptoms among the symptomatic group, the duration of vaginal discharge ranged from 1 to 12 weeks with a mean of 5.5 ± 3.2 in the Chlamydia positive group while in the Chlamydia negative group the duration of vaginal discharge ranged from 1 to 8 weeks with a mean of 3.6 ± 2.1. The difference was statistically significant (Table 7).

In other words, the incidence of Chlamydia trachomatis seems to be higher in patients having vaginal discharge for long duration than those patients who have vaginal discharge for short duration and this difference was statistically significant.

Also among the group complaining of dysuria, the duration of dysuria in the Chlamydia positive group ranged from 1 to 8 weeks with a mean of 3 ± 2.1, while in the Chlamydia negative group, the duration of dysuria ranged from 1 to 2 weeks with a mean of 1.5 ± 0.5. The difference was statistically significant as shown in Table (8).

In other words, the incidence of Chlamydia trachomatis was higher in patients having dysuria for long duration than those patients having dysuria but for shorter duration and this difference was statistically significant.

By clinical examination of all women included in our study we noticed the following, as shown in Table (9) and Figure (5):

* Four women (4%) had urethritis and urethral discharge (characterized by meatal redness or swelling with minimal mucopurulent urethral discharge) and Chlamydia trachomatis was determined in 25% of them (1/4) (one case only). Statistical analysis to the incidence of Chlamydia trachomatis in relation to presence of urethritis and urethral discharge was insignificant $(X^2 = 0.06; P > 0.05)$.

* Thirty-four (34%) had cervical discharge (Mucopurulent discharge in the endocervix) and Chlamydia trachomatis was detected in 35.3% of them (12/34). Statistical analysis to the

relation between incidence of Chlamydia trachomatis and presence of cervical discharge was significant (X^2 = 3.92; P < 0.05).

* Eight women (8%) had cervicitis and ectopy (congested cervix and hypertrophic ectopy usually associated with mucopus) and the incidence of Chlamydia trachomatis among them was 75% (6/8). Statistical analysis to the relation between presence of cervicitis and ectopy and incidence of Chlamydial infection was highly significant (X^2 = 12.91; P < 0.001).

* When we compared the incidence of Chlamydia trachomatis in patients having any abnormal signs related to chlamydial infection to those patients appeared normal by clinical examination, we found significant difference between both groups. The incidence of Chlamydial infection in apparently normal women was 6.1% (2/33) but it was 26.9% (18/67) in those women having any abnormal signs related to Chlamydial infection and this difference was statistically significant (X^2 = 4.075; P < 0.05) (See Table 10 and Figure 6).

As regard to the site of samples taken for detection of the Chlamydial infection, there was higher incidence of the Chlamydia trachomatis in these samples taken from the cervix than those samples taken from the urethra. The incidence of Chlamydia trachomatis was 28.9% (13/45) in cervical samples but in urethral samples, it was 12.7% (7/55) and this difference was

statistically significant $(X^2 = 4.04$; $P < 0.05)$ (Table 11 and Figure 7).

Table (12) showed the evaluation of direct immunofluorescence Test (DIF) as a diagnostic test for Chlamydia trachomatis by comparing its results with tissue culture results which is taken as a reference method.

* Twenty samples (20%) were positive by DIF test, sixteen of them were positive by tissue culture method (80%) and four were negative (20%). The true positive result was 80% while the false positive was 20%.

* Eighty samples (80%) were negative by DIF test, 2 samples of them were positive by tissue culture method (2.5%) and the rest (78 samples) were negative (97.5%). The true negative result was 97.5% while the false negative was 2.5%.

DIF Test has a sensitivity of 88.9%, specificity of 95.1%, positive predictive value (PPV) of 80% and negative predictive value (NPV) of 97.5%.
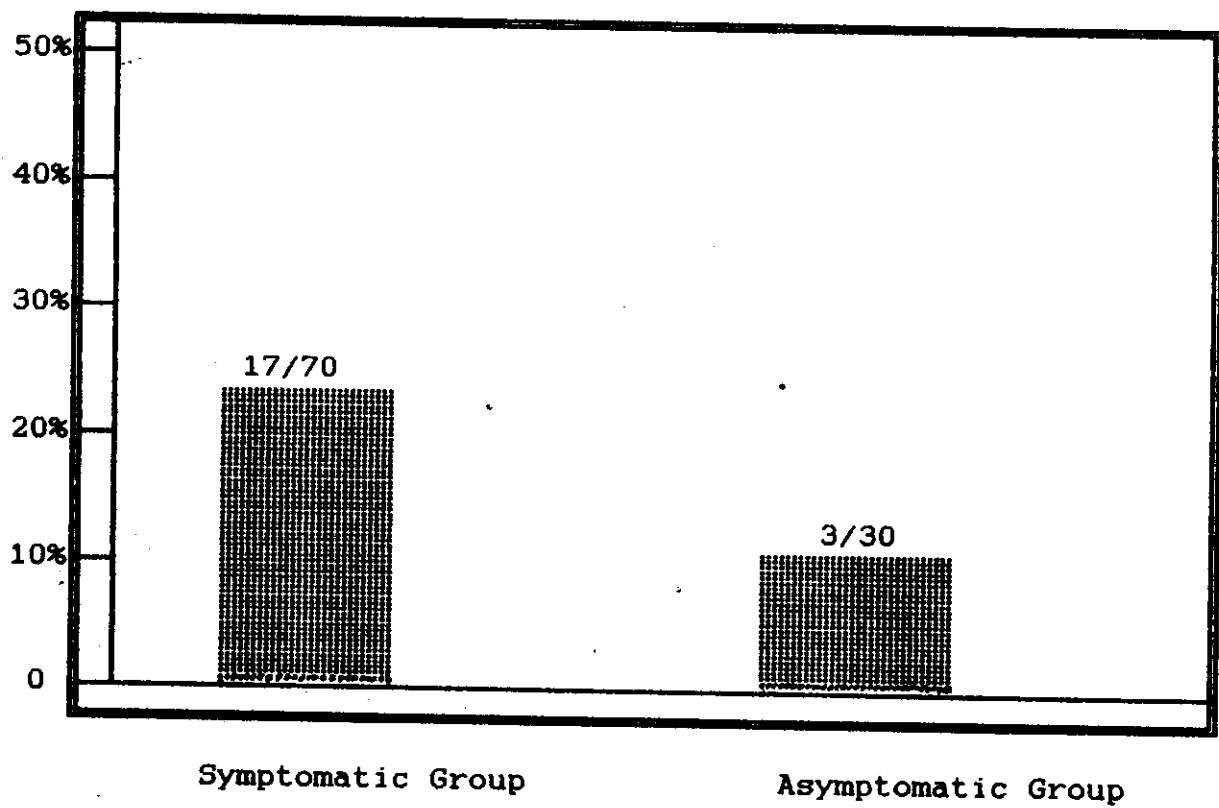
72

Figure (1)

Incidence of Chlamydia Trachomatis in
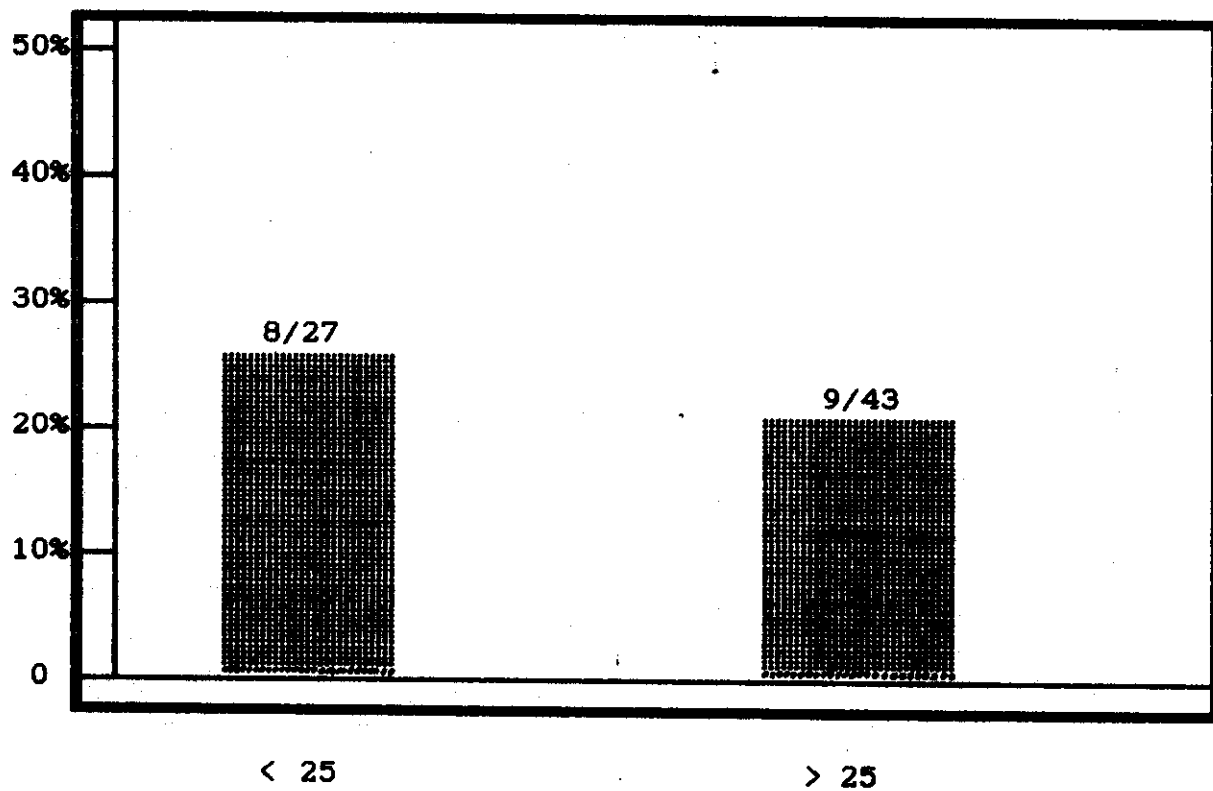the Symptomatic and Asymptomatic Groups

Table (4) : Incidence of Chlamydia Trachomatis According to Age As Detected by Direct Immunofluorescence Test (DIF).

Age	DIF Results		Total
	Positive (%)	Negative (%)	
< 25	8 (29.6)	19 (70.4)	27
> 25	9 (20.9)	34 (79.1)	43
Total	17 (24.3)	53 (75.7)	70

$x^2 = 0.291$ P> 0.05 insignificant

This table was illustrated by Figure (2) and showed that the incidence of Chlamydia trachomatis was higher in the younger age group (<25 years) than that in the older age group (> 25 years) but this difference was statistically insignificant.

Figure (2)

**Incidence of Chlamydia Trachomatis
According to Age**

Table (5) : Incidence of Chlamydia Trachomatis
According to Parity As Detected by Direct
Immunofluorescence Test (DIF).

Parity	DIF Results		Total
	Positive (%)	Negative (%)	
0	9 (31)	20 (69)	29
1	5 (25)	15 (75)	20
2	2 (16.7)	10 (83.3)	12
3	1 (14.3)	6 (85.7)	7
>3	—	2 (100)	2
Total	17 (24.3)	53 (75.7)	70

X^2 (Test for Trends)= 2.12   D.F.= 4   P> 0.05 insignificant

This table was illustrated by Figure (3) and showed that the incidence of Chlamydia trachomatis was inversely related to parity but this relation was not significant.
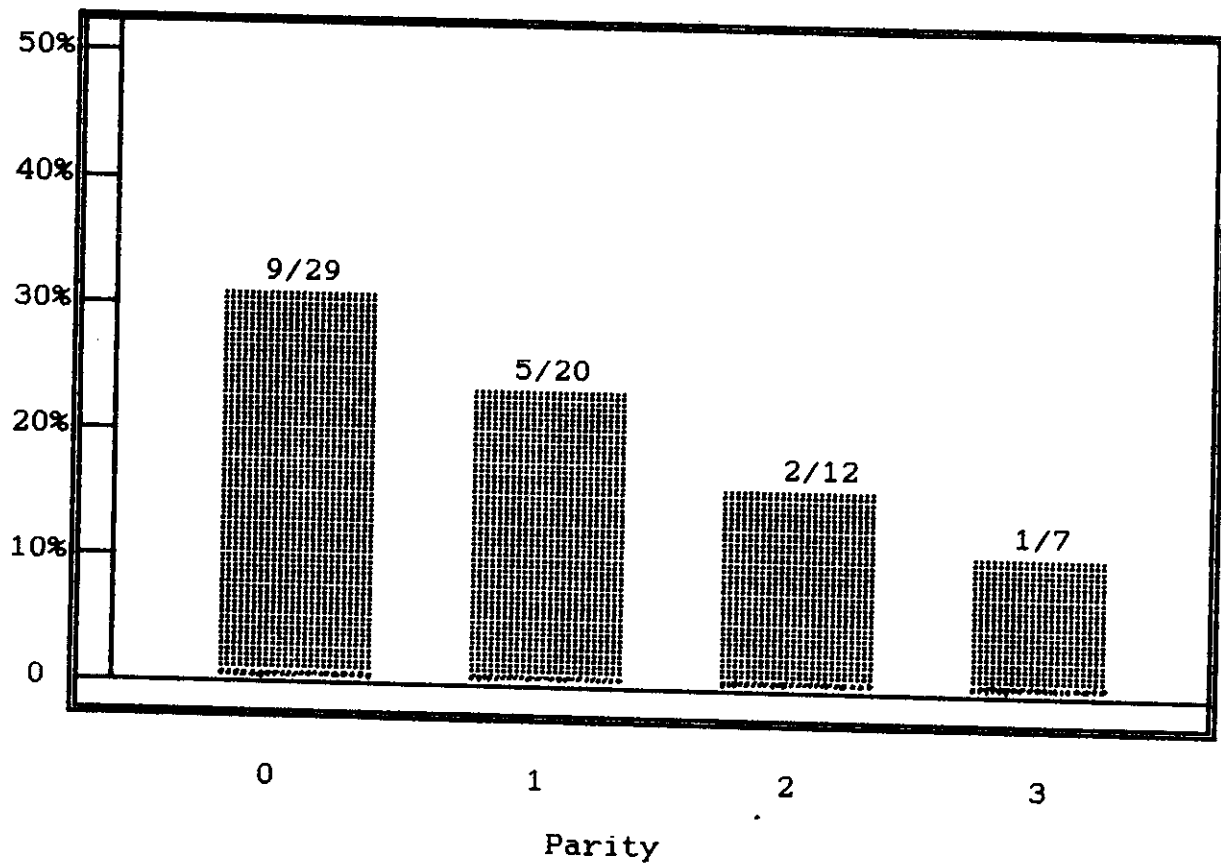
Figure (3)

Incidence of Chlamydia Trachomatis
According to Parity

Table (6): Incidence of Chlamydia Trachomatis According to Symptoms As Detected by Direct Immunofluorescence Test (DIF).

Symptoms	Total No.	Incidence of Chlamy.Infect. n	(%)	x^2	P
1) Dysuria	12	1	(8.3)	1.09	> 0.05
2) Vaginal discharge	41	7	(17.1)	2.83	> 0.05
3) Combined dysuria & vaginal discharge	17	9	(52.9)	10.02	< 0.01
Total	70	17	(24.3)	2.67	> 0.05

This table which was also illustrated by Figure (4) showed that the incidence of Chlamydia trachomatis was related significantly to the presence of dysuria and vaginal discharge together but this significant relation was not present in those women complaining of dysuria alone or vaginal discharge alone or in that group of women as a whole.
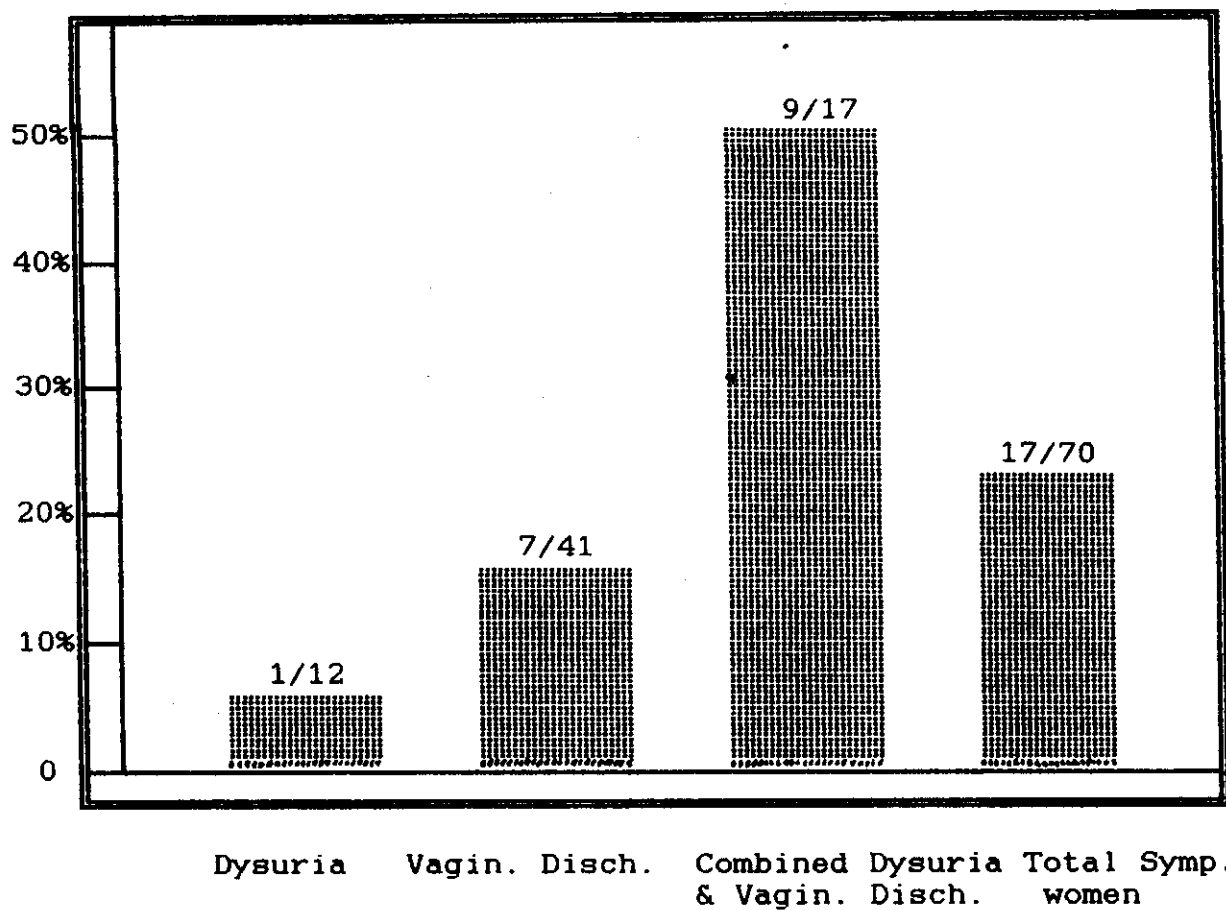
50%
40%
30%
20%
10%
0

9/17

17/70

7/41

1/12

Dysuria   Vagin. Disch.   Combined Dysuria Total Symp.
                             & Vagin. Disch.   women

Figure (4)

**Incidence of Chlamydia Trachomatis
According to Symptoms**

Table (8): Duration of Dysuria in Chlamydia Positive Group Compared to Negative Group

	DIF Results	
	Positive gp n= 10	Negative gp n= 19
Mean duration of dysuria in week ± S.D.	3 ± 2.1	1.5 ± 0.5

t = 2.22   P < 0.05 significant
n = number   DIF = Direct Immunofluorescence Test
S.D.= Standard Deviation

This table shows that among the Chlamydia positive group the duration of dysuria was longer than that of the chlamydia negative group and this difference was statistically significant.

Table (9): Incidence of Chlamydia Trachomatis According to Signs As Detected by Direct Immunofluorescence Test (DIF).

Signs	Total No.	Incidence of Chlamy.Infect. n	(%)	x^2	P
1) Urethritis and urethral discharge	4	1	(25)	0.06	> 0.05
2) Cervical discharge	34	12	(35.3)	3.92	< 0.05
3) Cervicitis and ectopy	8	6	(75)	12.91	< 0.01

This table which was illustrated by Figure (5) showed that there is no significant relation between incidence of Chlamydia trachomatis and the presence of urethritis and urethral discharge but there is significant relation between incidence of Chlamydia trachomatis and presence of cervical discharge and highly significant relation between incidence of chlamydial infection and presence of cervicitis and ectopy.
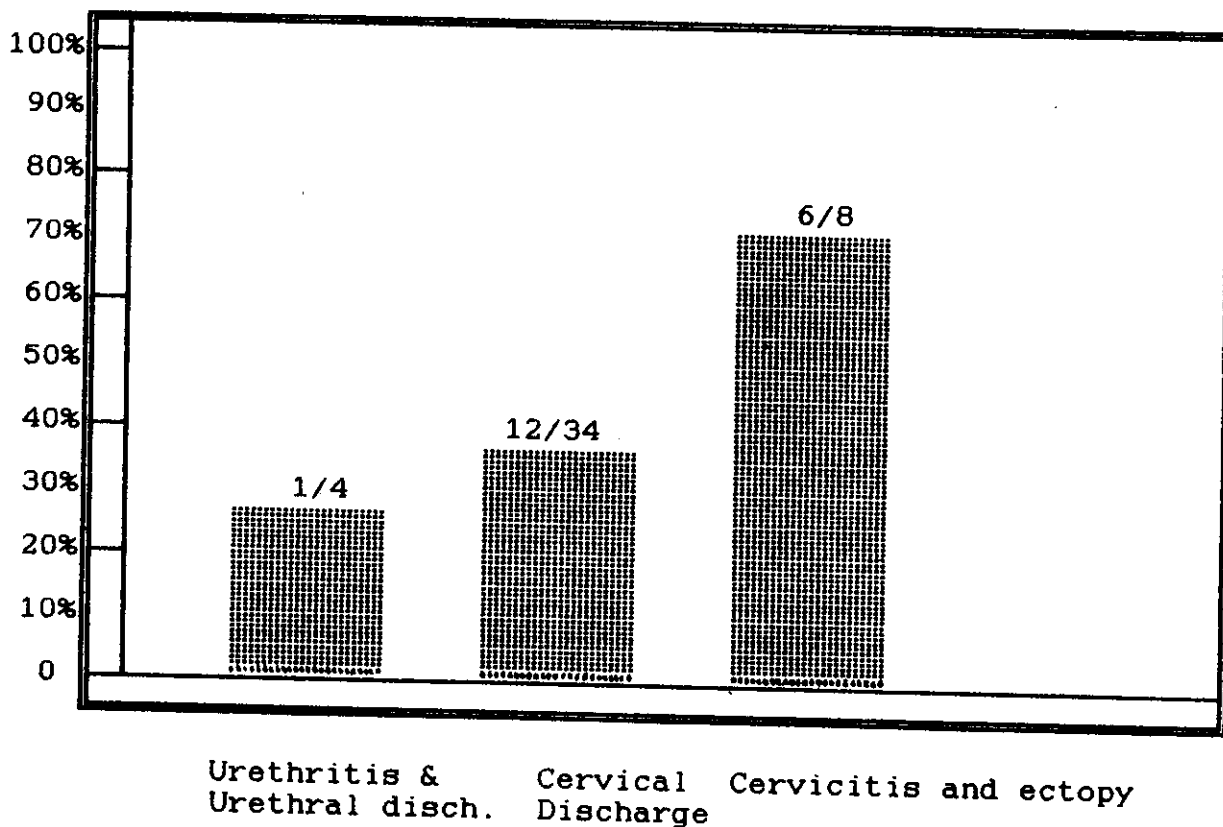
84

Figure (5)

Incidence of Chlamydia Trachomatis
According to Different Signs

Table (10): Incidence of Chlamydia Trachomatis According to Presence of Signs As Detected by Direct Immunofluorescence Test (DIF).

Signs	DIF Result		Total
	Positive (%)	Negative (%)	
Normal	2 (6.1)	31 (93.9)	33
Abnormal	18 (26.9)	49 (73.1)	67
Total	20 (20)	80 (80)	100

$x^2 = 4.075$ $P < 0.05$ significant

This table was illustrated by Figure (6). It showed that incidence of Chlamydia trachomatis was higher (26.9%) in women with any abnormal signs related to chlamydial infection than those women appear normal by clinical examination (6.1%) and this difference was statistically significant.
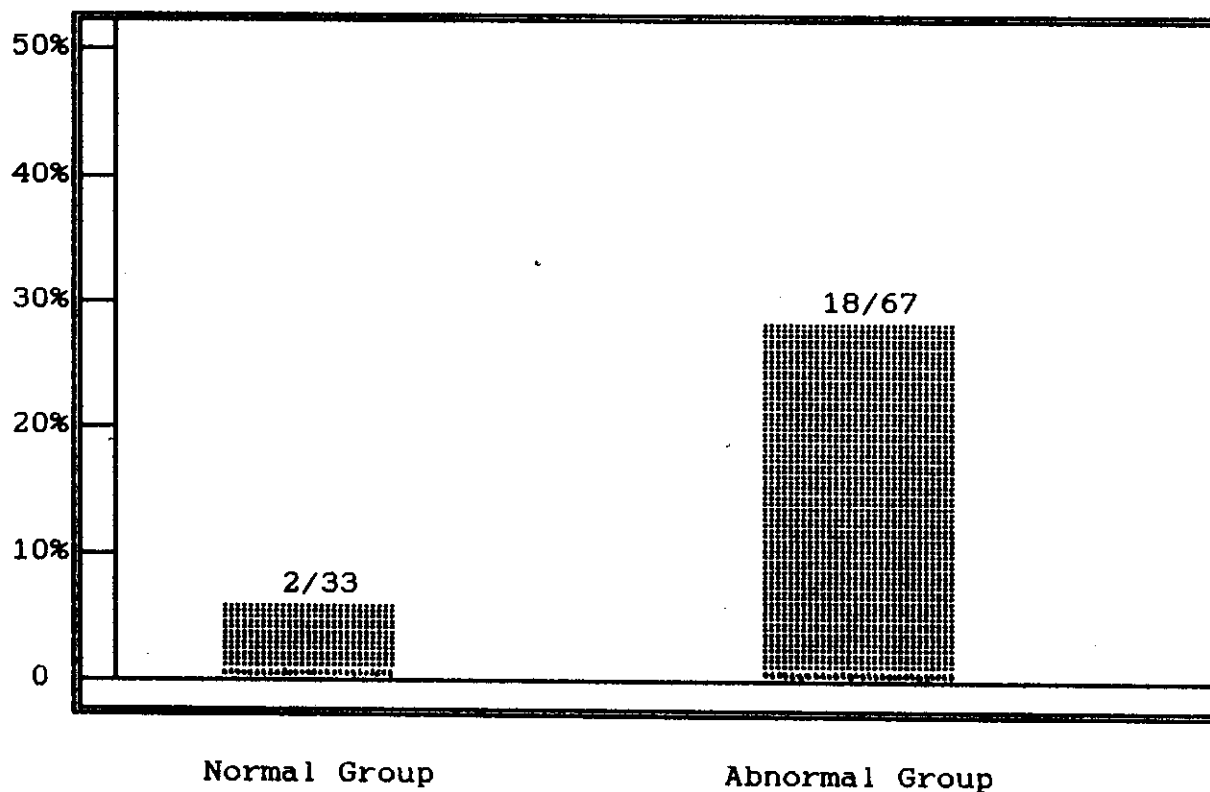
Figure (6)

Incidence of Chlamydia Trachomatis in
Normal Women and Women with Abnormal Signs

Table (11): Incidence of Chlamydia Trachomatis
According to The Site of Samples Taken As
Detected by Direct Immunofluorescence Test
(DIF).

Site of Sample	DIF Result		Total
	Positive (%)	Negative (%)	
Cervical	13 (28.9)	32 (71.1)	45
Urethral	7 (12.7)	48 (87.3)	55
Total	20 (20)	80 (80)	100

x^2 = 4.04   P< 0.05   significant

This table was illustrated by Figure (7). It showed that
incidence of Chlamydia trachomatis was higher (28.9%) in cervical
samples than that of the urethral samples (12.7%) and this
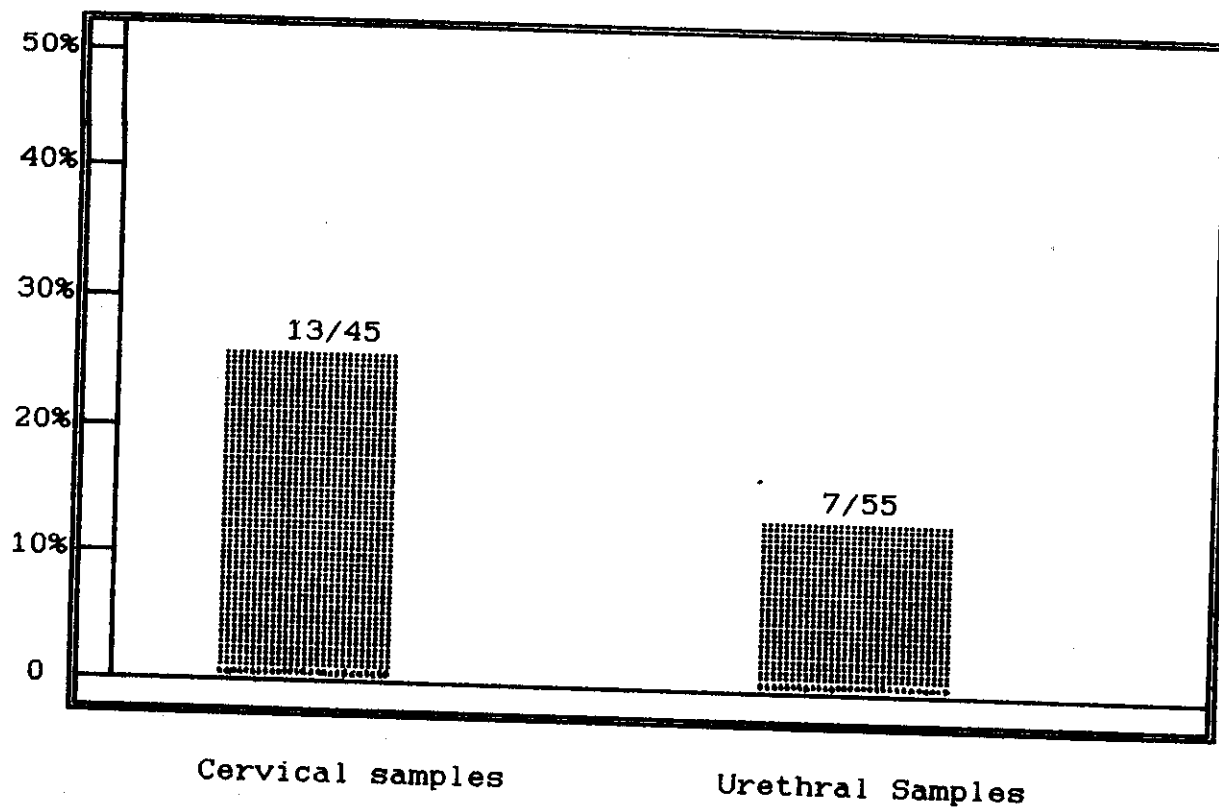difference was statistically significant.

Figure (7)

Incidence of Chlamydia Trachomatis
According to Site of Samples

DISCUSSION

DISCUSSION

Chlamydia trachomatis is the most prevalent of the sexually transmitted organisms (Ryan et al., 1990). Chlamydial infections of the female urethra and cervix are often asymptomatic and therefore undetected. The organism can evade host immune defense mechanisms, persist for long periods of time, and ascend to the uterus and fallopian tubes in the absence of clinical symptoms (Witkin and Ledger, 1992). Chlamydial infection during pregnancy is associated with risks to both women and their infants (Ryan et al., 1990).

This study included 2 groups of pregnant women. The first group was symptomatic pregnant women complaining mainly of vaginal discharge and/or dysuria and the second group was asymptomatic pregnant women. The two groups were matched groups with no significant differences between them as regards the clinical data which included: age, gravity parity, abortion, duration of marriage and gestational age (Tables 1,2).

Our results showed that the prevalence of Chlamydia trachomatis among the total pregnant women examined was 20% and that was similar to the prevalence of 21.1% reported by Ryan et al. (1990). However, Hammerschlag and Colleagues (1979) in their prospective study reported that the prevalence of Chlamydia

trachomatis among pregnant women was 2%, while Hardly, et al. (1984) recorded a prevalence rate of 37%. Also, Frommel et al., (1979); Heggie et al., (1981); Martin et al., (1982) and Harrison et al., (1983) recorded that the prevalence of chlamydial cervical infection in pregnant women ranged from 2% to 30%.

This difference in the prevalence of Chlamydia trachomatis may be attributed to varying sensitivity of the isolation technique, difference in the areas at different times of the year and the possible association of Chlamydia trachomatis with other sexually transmitted diseases.

The relationship between clinical signs and symptoms, and chlamydial infection is not well established (Thewessen et al., 1990). Chacko and Lovchik (1984) found significantly more chlamydial infections in symptomatic nonpregnant female adolescents than in those without genitourinary symptoms. The presence of genital symptoms was a poor predictor of chlamydial infections in an isolated Alaskan population studied by Toomey et al. (1987); this is in agreement with Leclerc et al. (1988) who found that screening of asymptomatic women showed a prevalence of C.trachomatis almost as high as that observed in symptomatic women which indicates that most women with chlamydial infections have no or very mild symptoms and do not seek medical attention. Paavonen and Vesterinen (1982) and Levallois et al. (1987) found a high prevalence of chlamydial infections among asymptomatic

females. Also, Weiland et al. (1988) recorded that the majority of chlamydial infections in women are asymptomatic with a carrier rate of over 20%.

Our results correlates with the previous investigators where the incidence of C. trachomatis in symptomatic women was 24.3% while in asymptomatic women it was 10% but this difference was statistically insignificant (x^2 = 2.67; P> 0.05, Table 3). This finding stresses the importance of screening women with and without genito-urinary symptoms.

Regarding age, Louv et al. (1989) recorded that patients under 25 years old are more likely to have a chlamydial infection. Thewessen et al. (1990), in their study, confirmed that younger women are more likely than older women to have Chlamydia trachomatis infections. Also, Ryan et al. (1990) reported that the prevalence of chlamydia was inversely related to age. This may be due to more exposure to sexual intercourse in young age or due to protective immune state in older women given by chronic Chlamydia trachomatis infection or consistent reinfection over a period of years.

In our study there was an insignificant difference between incidence of chlamydial infection in women < 25 years old (29.6%) and in women > 25 years old (20.9%) as the number of our cases was small.

Ryan et al.(1990) found that the incidence of chlamydial infection was inversely related to parity but in our study this relation was insignificant (X^2 = 2.12; P> 0.05) as the number of our cases was small.

Regarding symptoms and signs of urethritis, Stamm and co-workers (1980) have identified a causative role for Chlamydia trachomatis in up to 25% of women presenting with acute urethral syndrome (dysuria, frequency and pyuria). Moller et al. (1985) found that 30% of women with dysuria harbourd C. trachomatis. In Egypt, Abdel Rahim et al. (1989) reported that 50% of females complaining of symptoms of lower urinary tract infection with no growth on conventional culture media and with low grade pyuria found to be positive for C. trachomatis. Also, Rein (1990) recorded that urinary tract symptoms were described by 53% of women from whom Chlamydia trachomatis was isolated from the urethra.

In our study, we looked for symptoms of urethritis as dysuria and its relation to prevalence of C. trachomatis. We could not take frequency of micturition as a symptom of urethritis as most pregnant women were complaining of frequency even without any urethral infection.

Our results revealed that there was no significant association between symptoms and signs of urethritis and

prevalence of chlamydial infection ($X^2 = 1.09$; $P > 0.05$, $\chi^2 = 0.06$, $P > 0.05$, respectively. (Tables 6 and 9).

The incidence of Chlamydia trachomatis among the group complaining of dysuria only was 8.3% and among the group with signs of urethritis (meatal redness, swelling or urethral discharge in the form of menimal mucoid or mucopurulent discharge) was 25% but this was statistically insignificant. This was in agreement with Arya et al. (1981) and Ryan et al. (1990) who recorded that there was no statistically significant association between positive culture for chlamydia and lower urinary tract infection. However, among the group complaining of dysuria, the duration of dysuria was longer in the chlamydia positive group (mean = 3 weeks ± SD 2.1) than that of the chlamydia negative group (mean = 1.5 weeks ± SD 0.5) and the difference between both groups was significant (t = 2.22; $P < 0.05$). This means that the longer the duration of symptoms the more suggestion of chlamydial infection. This observation agrees with Stamm et al. (1980).

Regarding vaginal discharge as a symptom, Bump et al. (1986) noted an independent, significant association between cervical chlamydial infection and abnormal vaginal discharge in agreement with Thewessen et al. (1990) who found this correlation in their study only in women visiting a sexually transmitted disease clinic but they did not find such a significant correlation in

women visiting abortion clinic. Moreover, Tait et al. (1980) and Leclerc et al. (1988) confirmed that no significant relationship was found between the presence of chlamydial infection and vaginal discharge as a symptom.

Our result correlate with them where we did not find a significant relation between vaginal discharge and chlamydial isolation rate. But when we examined our patients we found significant correlation between mucopurulent endocervical discharge and isolation of C.trachomatis in agreement with Tait et al. (1980), Arya et al. (1981) and Thewessen et al. (1990).

Also, our results revealed that the incidence of C. trachomatis among women complaining of dysuria and vaginal discharge together was 52.9% and there was a highly significant relation between the chlamydial isolation rate and the presence of dysuria and vaginal discharge together (X^2 = 10.02, P < 0.01). This in agreement with Jones et al. (1986) who confirmed that chlamydial infection of the urethra in women was often associated with endocervical infection. Moreover, Stamm and Holmes (1989) recorded that the presence of mucopurulent cervicitis in women with dysuria and frequency should suggest chlamydial infection.

As regard to the signs of cervicitis (congested cervix and hypertrophic ectopy usually associated with mucopus) in our study, there was a highly significant relation between incidence

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of chlamydial infection and the presence of cervicitis and ectopy (x^2 = 12.91; P<0.001) where the chlamydial isolation rate in women with cervicitis was 75% and this was in agreement with Tait et al. (1980), Ary et al. (1981), Moscicki et al (1987) and Thewessen et al (1990).

In Egypt the same result obtained by Badawy (1992) who found a highly significant relation between cervical affection and Chlamydial affection.

Sweet and Gibbs (1985) recorded that the infected cervix may range from a clinically normal examination to a severely eroded cervix with a hypertrophic cervical erosion and a mucopurulent endocervical discharge.

In this study there was a significantly higher incidence of C.trachomatis in women with signs related to chlamydial infection (26.9%) than in normal women (6.1%) (x^2 = 4.08; P< 0.05); this result agrees with the results reported by Tait et al. (1980).

Stamm and coworkers (1980) recorded that the longer the duration of presenting symptoms (more than 2 weeks) the more suggestion of chlamydial infection and this correlates with our results where the mean duration of vaginal discharge among the chlamydia positive group was 5.5 weeks ± S.D. 3.2 while in the chlamydia negative group the mean duration of vaginal discharge

was 3.6 weeks ± S.D . 2.1. The difference between the two groups was significant (t = 2.20; P < 0.05).

Tait et al. (1980) recorded that the commonest site of the chlamydial infection is the cervix which is the site of greatest coital contact, but C. trachomatis may also be isolated — although less frequently — from the urethra.

Our results correlates with them where the chlamydial isolation rate from the cervix was 28.9% but from the urethra, the isolation rate was 12.7% and the difference between both sites was significant (X^2 = 4.04; P < 0.05).

This work evaluated that the prevalence of C. trachomatis was significantly higher in women complaining of dysuria and vaginal discharge together for long duration (more than two weeks), in women with endocervical mucopurulent discharge in women with cervicitis and ectopy and in cervical samples.

Several investigators have evaluated the direct immunofluorescence staining as a relatively rapid screening means of diagnosing Chlamydia trachomatis infections. Stamm et al. (1984) used a direct immunofluorescence staining for diagnosis of chlamydial infections and compared its results with cell culture results. The sensitivity of the direct smear test compared with

cell culture was 92% for men and 89% for women. The specificity in both groups was 96%.

Uyeda et al. (1984) tested 401 asymptomatic females using the Micro Trak Direct Specimen Test and reported an overall sensitivity of 96.3% and specificity of 99.5%. Thomas and Colleagues (1984) evaluated specimens from 100 men with non-gonococcal urethritis and 100 men with gonorrhoea and found that 34 and 21 specimens from each group, respectively, were both smear and culture positive for chlamydial inclusions. Corresponding sensitivity values were 100% and 91%.

Teare et al. (1985) recorded that there was no significant difference between direct immunofluorescence techniques and tissue culture in detecting Chlamydia trachomatis. In Egypt Mamdooh (1990) compared the results of Direct Immunofluorescence Test with tissue culture results and recorded a sensitivity of 71.4%, specificity of 92.3% positive predictive value of 83.3% and negative predictive value of 85.7%.

In this study, the direct visualization of elementary bodies in urogenital smears by the Direct Immunofluorescence Test was compared with the isolation of Chlamydia trachomatis in DEAE-treated Hela cells. In general the Direct Immunofluorescence Test had a sensitivity of 88.9%, specificity of 95.1%, positive

predictive value of 80% and negative predictive value of 97.5%, a finding that previous workers have shown.

In our study 4 cases were positive by Direct Immunofluorescence Test but negative by culture techniques. This may be accounted by detecting non-viable organisms by immunofluorescence technique (Teare et al., 1985) or elementary bodies may not survive transport or storage for long period or inhibitors and neutralizing antibody present in patient secretions may cause false +ve results (Mardh et al., 1981). Any how, a reasonable level of false +ve results is accepted for a screening test.

Furthermore, in this study 2 cases were negative by Immunofluorescence Test but positive by culture technique and this may be due to the presence of artifacts and mucus on slides which made it difficult to identify elementary bodies with their characteristic size, shape, and color (Coudron et al. 1986).

The conventional cell culture method for detection of C. trachomatis requires two to six days and is technically difficult to perform. Our study revealed that the Direct Immunofluorescence Test is relatively simple, rapid and accurate technique in diagnosing Chlamydial infections.