"Comparative evaluation of Sexually Transmitted and Non Sexually Transmitted, Reproductive tract infection at tertiary care centre in western Rajasthan, India"

Priyanka Soni[1,*], Smita Kulsrestha[2], R.S. Parihar[3], P.K. Khatri[4]

[1]PG Student, [2]Associate Professor, [3]Professor, [4]Professor & Head, Dept. of Microbiology, Dr. S.N. Medical College, Jodhpur

*Corresponding Author:
Email: priyanka.soni88@gmail.com

Abstract

Introduction: Reproductive Tract infections among women of reproductive age group {including both sexually Transmitted Infection (STI) & Non STI} are responsible for major ill health and have important concern as these are associated with risk of HIV Transmission & complications like Pelvic inflammatory Disease (PID), Infertility etc. This study was conducted to determine prevalence of microorganism & their antibiogram & their association with socio demographic profile & menstrual hygiene.

Methods: This was a cross sectional study included 200 women with discharge of 15-44 year age. Detail history was taken about their socio demographic data, Symptoms & menstrual hygiene; vaginal or endo cervical swab & blood sample (for serological diagnosis of syphilis) were collected.

Results: Among STI most common infection is Candidiasis (45.6%) & Bacterial Vaginosis (27.8%) whereas among Non STI Esch. coli (27.3%) & Staph. aureus (26.4%). Among STI most common symptom was lower abdominal Pain & Lower backache whereas in Non-STI Vulvular itching & fever. Both STI & Non STI shows statically significant positive association with Labourer population & who uses cloth during their menstrual period whereas STI also shows statically significant positive association with younger, lower education & lower socio economic status population. Staph. aureus highly sensitive to linezolid, vancomycin whereas Esch.coli was most common gram negative bacteria & highly sensitive to imipenem & piperacillin-tazobactum.

Conclusions: To conclude, by proper assessment of Prevalence & risk factor of STI and Non STI & by health education, we can reduce these infection & antibiotic resistance by prudent use of antibiotics.

Key Words: Reproductive tract infection, STI, Non-STI

Introduction

Reproductive tract infections (RTI) are a global health problem among women, living in South East Asian Region (SEAR) countries. Studies have found the prevalence of RTI in India, Bangladesh, Egypt, and Kenya is in the range of 52–90 per cent. More than a million women and infants die of the complications of RTI every year.[1]

The vaginal flora is a complicated environment, containing dozens of microbiological species in variable quantities and relative proportions. A complex and intricate balance of microorganisms maintains the normal vaginal flora. It is mainly dominated by members of the genus Lactobacillus, which maintains the generally acidic vaginal ph.[2] The frequent cause of vaginal discharge is an infection or colonization with different microorganisms.[3] Vaginitis, whether infectious or not, poses one of the most common problems in gynecology, and is one of the main reasons leading the females to seek advice from a physician approximately 10 million office visits annually.[4-7] However, diagnosis and treatment can be elusive, if based on clinical symptoms and the characterization of vaginal discharge alone, leading to a lack of relief from the symptoms.[8-9]

A variety of factors that put women at risk of reproductive tract infection as well as consequences for women arising from such morbidity, such as socio-economic, demographic, sexual, medical, behavioral practices, personal hygiene behavior have not been adequately explored in India. Concerted efforts are needed to provide useful information to health planners and policymakers so that appropriate strategies can be designed to bring about an improvement in reproductive health of women.[10]

This study was conducted to determine Comparative evaluation of STI & Non-STI using following parameters- (1) Prevalence of micro-organism causing STI & Non-STI.[2] Antibiotic sensitivity pattern of aerobic vaginal pathogen (2) Comparative study of frequency of Symptoms (3) Association of RTI with education status, socioeconomic status, Occupation, Rural/Urban & Menstrual hygiene among women of reproductive age group.

Materials and Methods

Study Design: It is a hospital based cross-sectional Study conducted in Department of Microbiology. Dr. S.

N. Medical College and associated group of hospital-Umaid Hospital, Jodhpur from January 2014 to August 2014.

Study Population: 200 women in age group 15-44 year were selected, who had abnormal vaginal discharge both from indoor and outdoor.

Study Tools: A predesigned, pretested, and semi structured questionnaire was used to take the interview of eligible women. The questionnaire had both open and closed ended questions about RTI symptoms, their socio demographic data, occupation and menstrual hygiene.

Ethical Issues: The aims, objectives, and procedure of the study were explained to all the women. Informed consent was taken from all the participants. Complete confidentiality regarding patient information was maintained through all the stages of the study.

Statistical Tests: Data was analysed using SPSS version 17. Percentage and proportions were calculated for prevalence of the symptoms and socio demographic data. Chi square and Fisher Exact test were used as tests of significance in univariate analysis. A *P* value of less than 0.05 was considered significant.

Per speculum examination was carried out and Samples were collected and sent for investigation at Microbiology Laboratory at Umaid Hospital.

- Endocervical swab: gonococcal infection (Gram staining)
- Vaginal swab: 2 vaginal swab from each women, one for wet preparation, KOH mount & pH testing ; and second for Culture & sensitivity and Gram staining
- Blood investigations: RPR (syphilis) and TPHA.

Criteria used for laboratory diagnosis

Reproductive tract infections: Diagnostic criteria for sexually transmitted infections

- **Gonorrhea-** Identification of Gm -ve intracellular diplococci in Gram stained cervical smear
- **Trichomonas vaginitis-** ≥ 1 actively moving trichomonad (saline wet preparation), pH > 5
- **Bacterial vaginosis-** Presence of "Clue" cells (saline wet preparation and in gram stained smear), Vaginal Ph > 5
- **Candidiasis-** Presence of budding yeast cells and pseudohyphae (KOH wet preparation) and vaginal Ph < 5
- **Syphilis-** Nontreponemal test – RPR, Confirmation by TPHA test

Limitation of study: Diagnosing Trichomonas infection by wet mount preparation is approximately 60-98.2% sensitive compared to trichomonas culture.[11-12] The sensitivity of Clue cells as diagnostic criteria for bacterial vaginosis is 80-98% when compared with more elaborative criteria for determining bacterial vaginosis.[13] Detection of intracellular gram-negative diplococci in endocervical mucus is quite specific but $\leq$ 50% sensitive for gonorrhoea.[14] Diagnosis of Chlamydia infection, as a causative agent of STI is not studied due to non-availability of resources.

Reproductive tract infections: Diagnosis of non-sexually transmitted infections: All vaginal discharge sample were collected with the sterile swabs tested for organism causing STI and inoculated on blood agar, Mac Conkey's agar and Chocolate agar for diagnosis of Non-STI. The aerobically incubated organisms were identified with the help of colonial morphology, gram staining and biochemical analysis.[15] Isolated organisms were subjected to sensitivity testing by Kirby-Bauer disc diffusion method, using CLSI Standards criteria, to interpret diameter of inhibition zone.[16]

Results

In this study STI are more common in younger age group {15-24years (50%)(p <0.05)} whereas Non STI found almost equally in all age groups(p-0.54). STI are more frequent in low education status, labourers, rural Population, low socio economic status and in women who uses cloth during their menstrual period (p<0.05). Non-STI infections are significantly more common in Labourers and in women who uses cloth during their menstrual period. (p<0.05) (Table 3)

Majority of women with STI and Non-STI are suffer from abnormal excessive Vaginal discharge (100%); Among STI most common symptom was lower abdominal Pain (71.6%) followed by Lower backache (66.7%) whereas in Non-STI Vulvular iching & burning (65%), fever (60%) & lower abdominal pain (60%) were most common. Lower backache is significantly more in patients of STI (p-0.03) & fever in patient of Non-STI (p-<0.0001) (Table 2)

This study shows that among STI most common infection is Candidiasis (45.6%) followed by Bacterial Vaginosis (27.8%), Trichonomas Vaginalis (22.2%), Syphilis (2.2%) and gonorrhoea (2.2%). Among Non-STI most common infection caused by Esch. coli (27.3%), & Staph. aureus (26.4%), Coagulase neg. Staph. (16.1%) followed by Klebsiella sp. (7.2%), Enterobactor sp. (5.6%), Citrobactor sp. (3.6%), Pseudomonas sp. (3%). (Table 1)

The sensitivity pattern of Staph.aureus -100% sensitive to linezolid, >80% to Vancomycin & imipenam, 72% to amoxyclave, and almost 50% to Ampicillin Cefixime, Cefriaxone & Cefazolin; 72.5% isolates were resistant to methicillin. Fig. 1

Esch.coli was most common gram negative bacteria. GNB found mostly sensitive >80% to imipenem, Piperacillin- Tazobactum, 63-73% sensitive to Amikacin, Gentamicin, Ciprofloxacin & Ofloxacin, 50% to Cefexime & ceftriaxone. (Table 4 and Fig. 2)

Discussion

The highest incidence of STI in this study was noted among young, sexually active females, at the two age groups, i.e., 15-24 years (50%) followed by 25-34

years (35.5%); in non-STI % are 31.8% and 38.2% respectively, these similar to study by Khan et al[2] and Shamim et al.[17]

Prevalence of RTI/STI were more in low education and rural areas patients. This finding is comparable to a study carried out in Rajasthan by Bansal et al.[18] The different pattern of infection (STI & Non-STI) in the present study may be owing to the prevalent conditions like health education, sanitation and medical coverage available in each country.

Escherichia coli and Staphylococcus aureus were commonly isolated vaginal pathogens in my study. According to Shamim et al[17], Staphylococcus aureus was most prevalent followed by Esch. coli. Vigneswaran R et al[22] found E. coli and group B. Streptococci to be the important pathogens associated with mid–trimester pregnancy losses, alongside the classic bacterial vaginosis organisms

The most effective chemotherapeutic agents observed against Staphylococcus aureus in this study were linezolid (100%), imipenem (83%), vancomycin (89.6%), lesser activity has been noted against penicillins & cephalosporins (36.8%). In most cases of Staphylococcus aureus, resistance to penicillin is attributable to ß-lactamase production. Therefore, penicillin in combination with one of the ß lactamase inhibitors gives much better results[23-24] clearly seen from this study (Ampicillin 51% & coamoxiclav 72%).

The most effective chemotherapeutic agents against gram–negative rods (Escherichia coli and Klebsiella sp.) were imipenem (86.7%, 87.5%) and piperacillin/tazobactam (83.4%, 87.5%), whereas the antimicrobials with least affectivity against most of

gram negative bacilli were those belonging to the groups of cephalosporins (50% sensitivity); flouroquinolones and aminoglycosides have moderate activity(62-75%). This in accordance with the study by Tariq *et al[17]*, Shamim et al.[20]

Aerobic vaginitis typically does not respond to antibacterial vaginosis medication so has to be treated by antibiotics according to the culture and sensitivity. An optimal treatment scheme for aerobic vaginitis, which includes antibacterial agents and simultaneously normalizing the vaginal ecosystem, has not been established until today. So, there is need for such type of study which diagnose aerobic vaginal pathogen, their sensitivity profile and causative agent of STI for proper treatment of Reproductive tract infection.

Conclusions

To conclude, the high prevalence of gynaecological infections demands that these patients should be investigated thoroughly for STI and Non-STI simultaneously. As the culture provides the identification of causative microorganisms, it must invariably be done. Currently the antibiotics showing good sensitivity are carbapenems and β–lactams β–lactamase inhibitor combinations, but are very expensive and out of reach of the poor patients, so there is need for an antibiotic policy for its rational use. Proper assessment of prevalence and risk factor of STI and Non STI and their modification by health education & Government policies may help to reduce these infection in near future.
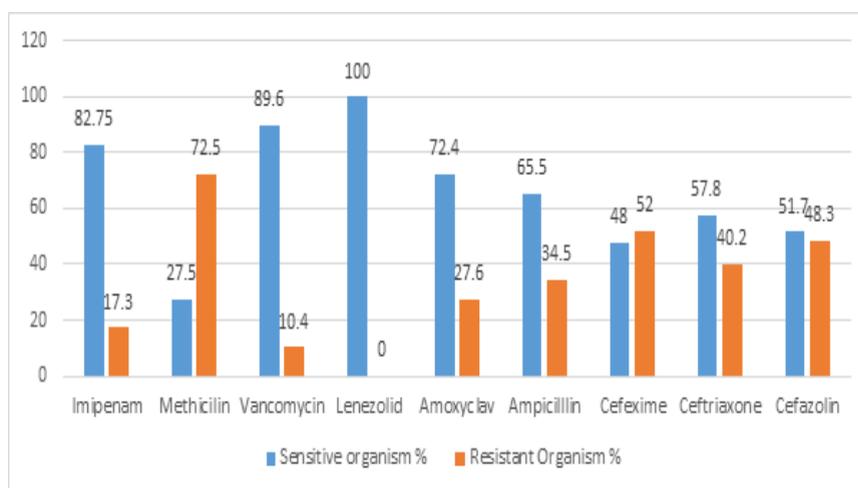
Fig. 1: Staphylococcus aureus - Antibiotic Sensitivity Pattern
Staph. aureus Antibiotic Sensitivity Pattern
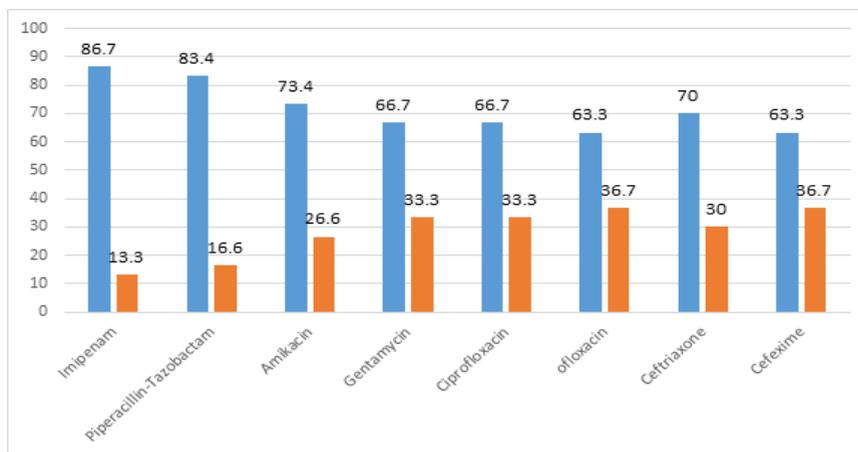
Fig. 2: Esch. coli - Antibiotic Sensitivity Pattern
Esch. Coli Antibiotic Sensitivity Pattern

Table 1: Distribution of Patients According to causative agents of STI and Non-STI

STI		Non STI	
Causative agent	**No (%)**	**Causative agent**	**No (%)**
Trichomonas	20(22.2%)	Esch.coli	30(27.3%)
Syphilis	2(2.2%)	Staph. Aureus	29(26.4%)
Candida sp.	41(45.6%)	Coagulase neg. Staph	18(16.1%)
Bacterial Vaginosis	25(27.8%)	Klebsiella sp.	8(7.2%)
Gonorrhoea	2(2.2%)	Enterobector	6(5.6%)
		Citrobactor	4(3.6%)
		Pseudomonas	3(2.8%)
		Beta haemolytic Streptococci	2(1.8%)
		Organism not grown	10(9.09%)
Total	90		110

Table 2: Comparative evaluation of patients of STI and Non-STI According to symptoms

Symptoms	STI 90		Non STI 110		P value
Abnormal excessive discharge	90	100%	110	100%	0.920
Lower backache	60	66.7%	57	52%	0.03
Lower Abdominal Pain	64	71.1%	66	60%	0.102
Associated Fever	20	22.2%	66	60%	<0.0001
genital ulceration	2	2.2%	8	7.27%	0.123
Vulvar itching & Burning	52	57.8%	71	65%	0.328
Dysmenorrhea	18	20%	31	28.18%	0.182
Menstrual disturbance	37	41.1%	36	32.72%	0.221

Table 3 Comparative evaluation of socio demographic factor among patient of STI and Non-STI

Socio-demographic Factor	STI (90)		Non-STI (110)	
	No.	**P value**	**No.**	**P value**
(A) Age group				
15-24 year	45	**0.0002**	35	0.543
25-34 year	32		42	
35-44 year	13		33	
(B) Education states				
Illiterate	41		30	

Primary	26	**<0.0001**	34	0.1678
Secondary	18		28	
Graduate	5		18	
(C) Occupation				
House wife	30	**<0.0001**	47	**<0.0001**
Labourer	58		58	
Employed	2		5	
(D) Residence				
Rural	56	0.026	63	0.152
Urban	34		47	
(E) Socio-economic class				
Poor	56	**<0.0001**	39	0.392
Middle Class	25		41	
High Class	9		30	
(F) Menstrual Period				
Using Cloth	46	**<0.0001**	71	**<0.0001**
Pad	25		17	
Both	19		22	

Table 4: Antibiotic Sensitivity Pattern of Gram Negative Bacilli (% of Sensitive isolates)

	Imipenem	Pipracillin-Tazobactum	Amikacin	Genta-micin	Cipro-floxacin	Of-loxacin	Cefi-xime	Ceftri-axone
Esch. Coli	86.7	83.4	73.4	66.7	66.7	63.3	50	53
Klebsiella	87.5	87.5	75	75	62.5	62.5	58	50
Enterobector	83.3	83.3	83.3	66.7	66.7	50	50	50
Citrobactor	100	100	75	75	50	50	50	50

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