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Original Research Article

Clinical outcome among women with sexually transmitted infections: a prospective observational cohort study

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ABSTRACT

Background: Sexually transmitted infections (STIs) are major global health challenges, particularly for women of reproductive age. The World Health Organization (WHO) estimates that more than 1 million new cases of STIs are acquired worldwide, amounting to approximately 376 million new infections annually. In India 79 million new cases yearly .Targeted approach to treat infections will reduce the recurrence and complications. To evaluate the clinical outcomes of women diagnosed with STIs following an etiological diagnosis. To assess the impact of targeted treatment on symptom resolution.
Methods: The present prospective observational cohort study was conducted in ESIC Medical college ,Bengaluru from September 2023 to 2024. Total 337 women aged 18–45 years presenting with STI symptoms were included in the study. Participants diagnosed using PCR, NAATs, Gram staining , culture and treated .Outcomes were tracked for three months focusing on symptom resolution, recurrence. Data was compiled in Microsoft excel sheet and analysed using SPSS, Chi square and fisher exact test. p value <0.05 was statistically significant.
Results: Among 337 women enrolled in the study, majority belonged to 31-40 years of age with basic level of education and low socio economic status. Women treated with pathogen-specific therapies had better clinical outcomes. The most common pathogens identified were candida albicans (13.4%), *Trichomonas vaginalis* (3.6%) and *Chlamydia trachomatis* (1.5%).
Conclusions: Targeting specific pathogens through laboratory diagnostics, healthcare providers can offer effective treatments. Rural population can be motivated for routine gynaecological checkups to prevent STIs.

Keywords: Antibiotic resistance, Sexually transmitted infections, Targeted therapy

INTRODUCTION

Sexually transmitted infections (STIs) are the most common global health challenge with millions of people affected every year. The WHO estimates that more than 1 million new cases of STIs are acquired each day worldwide, amounting to approximately 376 million new infections annually. In India, an estimated 79 million new cases of STIs occur each year and the prevalence of these infections continues to rise, exacerbating public health concerns.[1] STIs are caused by a range of pathogens, including bacteria, viruses and parasites. India with its large population and diverse healthcare landscape, faces a significant burden from STIs and RTIs. The low and middle income group are affected more where access to healthcare, education and preventive measures are limited. While existing strategies like syndromic management have contributed to reducing the burden of these infections,

there is a need for a more targeted approach that addresses the root causes of these infections, reduces recurrence and prevents complications. This study aims to contribute to this evolving field by evaluating the effectiveness of evidence-based treatment for STIs and focuses on improving long-term health outcomes for women in India."

Aims and objectives

To evaluate the clinical outcomes of women diagnosed with STIs following an etiological diagnosis. To assess the impact of targeted treatment on symptom resolution.

METHODS

The present study is a hospital based prospective observational cohort study conducted at ESIC Medical College from 2023 to 2024 in Bengaluru, Karnataka for a period of 1 year. The study was initiated after obtaining approval from IEC.

Inclusion and exclusion criteria

Participants included in the study were, Women aged 18–45 years, women presenting with symptoms such as vaginal discharge, genital ulcers, pelvic pain or dysuria and women who consented to participate in the study. Exclusion criteria included pregnant women or those in the postpartum period, women with pre-existing gynecological conditions (e.g., fibroids, ovarian tumors, genital malignancies, Immunocompromised women, women previously treated for STIs/RTIs in the last three months.

Sample size calculation

The required sample size of 336 participants was calculated using OpenEpi software (version 3). A prevalence rate of 32.2% for STIs, reported by Otieno et al, (2014), was used, along with a 5% significance level and 5% allowable error.

Study procedure

Eligible participants were evaluated using structured proforma (Annexure IV) including demographics, clinical history, presenting symptoms, sexual history, risk factors. A detailed clinical examination was done including per speculum and bimanual pelvic examinations. Swabs were collected from vaginal, cervical and urethral sites for microbiological analysis. Microbiological diagnosis was done by wet mount, PCR-NAAT and antibiotic sensitivity testing.

Treatment was administered according to specific diagnoses. Patients managed syndromically were treated per NACO guidelines. Follow-up and Outcome was assessed three months post-treatment based on symptom resolution, recurrence of symptoms, development of Complications.

Statistical analysis

Data was compiled into Microsoft Excel and analyzed using SPSS or Stata. Descriptive Statistics for Frequencies, percentages, means and standard deviations, Chi-square/Fisher's Exact Test for Comparing categorical variables between syndromic and etiological treatment groups were used. Odds Ratio for Evaluating the association between treatment type and outcomes was used. P value<0.05 was considered statistically significant.

RESULTS

Among 337 women enrolled in the study, the higher proportion belonged to the 31–40 year age group, accounting for 52.5% of the cases, followed by 41–50 years (27.9%).

The majority of the women (54.3%) had school-level education. This highlights that many participants had only a primary level of education. Regarding socioeconomic status, most women belonged to lower and lower-middle socioeconomic class (32.08% and 28.67%, respectively).

Among the symptoms, genital itching and lower abdominal pain were common. The characteristics of vaginal discharge: Amount of discharge was predominantly moderate (54.3%), while 45.7% had normal amount of discharge. 42.1% of the people reported heavy, foul-smelling discharge. Colour of discharge showed white homogeneous discharge in the majority (36.5%), followed by white discharge (30.3%) and yellow to white curdy discharge with 19.3 and 13.9% respectively.

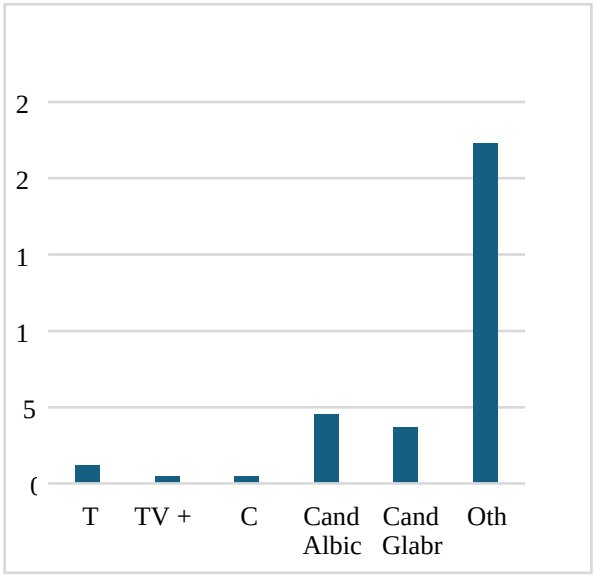


Figure 1: Microorganisms detected distribution.

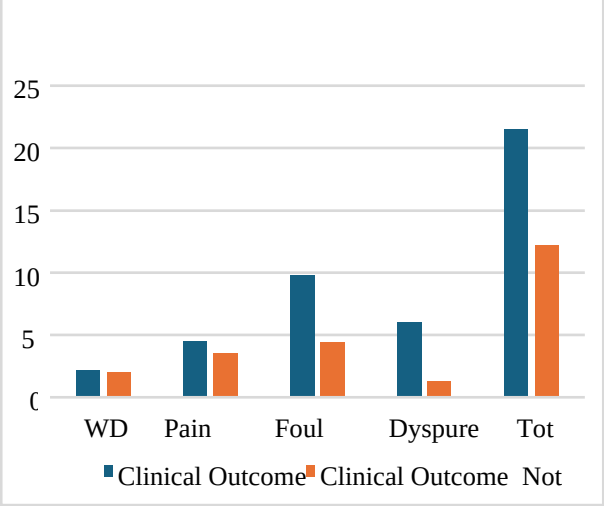


Figure 2: Clinical outcome distribution.

The data presents the distribution of different microorganisms detected among 337 cases. The most common infection is "Others," which accounts for 66.2% of the cases, followed by *Candida albicans* (13.4%) and *Candida glabrata* (11.0%). *Trichomonas vaginalis* (TV) and a combination of TV+HPV 16 each represent a small portion of the cases, with 3.0%, 3.6% and 1.5%, respectively. Chlamydia (CT) also contributes 1.5% to the total cases. This indicates that while certain infections like *Candida albicans* and *Glabrata* are more prevalent, a significant number of cases involve other unclassified STIs. The diagnosis of these infections likely involved a combination of clinical examination and laboratory testing methods, including microscopy, PCR (Polymerase Chain Reaction) assays, culture and serological tests. For fungal infections like Candida, culture and microscopy are often used to identify the species, while for STIs such as *Trichomonas vaginalis* and *Chlamydia*, PCR or antigen-based tests are commonly employed for accurate identification. HPV testing is typically performed through PCR or DNA hybridization methods. The large percentage of "Others" suggests the presence of infections that may not have been classified or diagnosed with the available methods, indicating a need for further investigation and more advanced diagnostic techniques.

The data shows the relationship between various symptoms and clinical outcomes (C/NC). For WDPV, 22 out of 42 cases were C, with a chi-square value of 12.403 and a p-value of 0.021, indicating a significant association between WDPV and the outcome. For pain abdomen, 45 out of 80 cases were C, while foul smelling had 98 C out of 142 cases. Dyspareunia showed 60 C and 13 NC from 73 total cases. The chi-square values and p values for pain abdomen, foul smelling and dyspareunia are not specified here, but the overall trend suggests a higher proportion of patients were C, with some symptoms showing significant statistical associations with the clinical outcome.

Table 1: Socio demographic distribution.

S. No.	Variables	Category	Frequency	(%)	Mean±SD	P value
1	**Age (in years)**	<20	2	0.6	36.26+/-6.27	0.895
		21-30	64	19		
		31- 40	177	52.5		
		41- 50	94	27.9		
2	**Education**	primary	183	54.3		0.050
		secondary	102	30.3		
		others	52	15.4		
3	**Socio economic status**	lower	108	32.05		0.084
		Upper lower	92	27.3		
		Lower upper	100	29.67		
		upper	37	10.98		

Table 2: Distribution of symptoms of STI.

Category	Frequency	%	P value
Pain abdomen	42	12.46	0.023
WDPV	80	23.73	
Primary infertility	9	2.7	
Lower abdominal pain	250	74.2	
dysuria	124	36.8	
Genital itching	276	81.9	
dyspareunia	73	21.66	
pharyngitis	76	22.6	

Table 3: Characteristics of vaginal discharge.

Characteristics	Category	Frequency	%	P value
Amount of discharge	normal	154	45.7	0.034
	moderate	183	54.3	
Colour	White and curdy	47	13.9	0.054
	white	102	30.3	
	yellow	65	19.3	
	White and homogenous	123	36.5	
Odour	No smell	192	58.9	0.000
	Foul smell	142	42.1	

Table 4: Micro-organisms detected distribution.

Micro organisms	No of cases	%	P value
TV	12	3.6	0.019
TV+HPV 16	5	1.5	
CT	5	1.5	
Candida Albicans	45	13.4	
Candida Glabrata	37	11.0	
Others	223	66.2	
Total	337	100.0	

Table 5: Clinical outcome distribution.

Symptoms	Clinical outcomes			Chi Square value	P value
	Cured (disappearance of symptoms)	Not cured (persistence of symptoms)	Total		
WDPV	22	20	42	12.403	.021
Pain Abdomen	45	35	80		
Foul Smelling	98	44	142		
Dyspurenia	60	13	73		
Total	215	122	337		

DISCUSSION

The study aimed to evaluate the clinical outcome of women with sexually transmitted infections. The present study shows symptoms like genital itching (81.9%) and lower abdominal pain (74.4%) were common. The microorganisms involved such as *Candida albicans* (13.4%) and *E. coli* (11%) had a higher proportion. The latter group of others suggest the presence of infection that is unusual.

The finding of the present study observed that syndromic management often leads to the overuse of antibiotics. Microbiological diagnostics such as PCR and NAATs led to better treatment outcomes with a higher cure rate and fewer recurrences compared to syndromic management, confirming benefits of etiological diagnosis as suggested by Mihut et al.[2] The present study found that the WDPV showed a significant relationship with treatment outcomes (chi-square value of 12.403 and p value 0.021 supporting the idea that better pathogen identification can lead to more targeted and effective treatments. Furthermore, Kaliannan et al and Mihu et al noted that the integration of laboratory-based diagnosis reduces relapse rates and complications, aligning with outcomes seen in the present study.[2,3] A higher proportion of "other" infections (66.2%) in the present study, however, suggests a gap in the diagnostic capabilities of the existing methods as some infections remain unclassified or undiagnosed by Zeltner et al.[4] Earlier studies have often highlighted the role of socio-economic factors in the prevalence and treatment of STIs. Thapar et al and Sharma et al, found that women from lower socio-economic backgrounds were more likely to present with STIs, a finding that resonates with the present study's demographic data.[5,6,10,12]

The women from underserved backgrounds, who may face barriers in accessing healthcare and diagnostic services, as observed in Gupta et al found that education levels and awareness were significant factors influencing the treatment-seeking behavior for STIs.[6] The present study shows that 54.3% of participants had only school-level education, indicating the need for enhanced sexual health education, which could improve early diagnosis and

treatment. Sonkar et al emphasized the need for longer follow-up to fully assess the effectiveness of treatments, particularly in chronic conditions.[7] The high cost of diagnostic tests, along with a lack of trained healthcare professionals to administer these tests, limits its adoption. Peña advocated for the use of POCTs and NAATs, which offer promising solutions for rapid, on-site diagnosis.[8] Future research should explore the feasibility, cost-effectiveness and long-term outcomes of integrating these diagnostic tools in routine clinical practice, especially in low-resource environments.[16] Addressing antibiotic resistance in STIs requires a multi-faceted approach.[15] Promoting safe sex practices including condom use is essential in reducing transmission. Regular screening, especially among high-risk groups, ensures early detection and treatment. Surveillance systems must monitor resistance patterns to guide effective treatment guidelines.

Further studies with larger sample size and longer follow up are recommended to evaluate recurrence, reinfection and microbial resistance.

CONCLUSION

By targeting specific pathogens through laboratory-based diagnostics, healthcare providers can offer more effective treatments, reducing the risk of complications. Bacterial biofilm is a multicellular structure playing a vital role in acquiring antibiotic resistance. This resistance is due to restricted drug penetration, altered microenvironment and genetic adaptations within the biofilm. Health workers in rural areas should motivate women under low socioeconomic groups for routine gynaecological check-up for early diagnosis and specific treatment. This could lead to more effective and targeted treatments, improving patient outcomes and reducing the emergence of antimicrobial resistance.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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