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PHARMACOTHERAPY OF SEXUALLY TRANSMITTED DISEASES IN PATIENTS VISITING A TERTIARY CARE HOSPITAL – AN OBSERVATIONAL STUDY

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ABSTRACT: Introduction: Sexually transmitted diseases (STDs) are a broad modern category referring to a variety of pathogens, including viruses, bacteria, fungi, and protozoa, which manifest themselves in an equally wide variety of clinical symptoms. More than one million STDs are acquired every day worldwide. **Objective:** To evaluate the drugs prescribed to patients diagnosed with sexually transmitted disease/s using the WHO prescribing indicators. **Methodology:** It was a prospective observational study, carried out in OPDs of hospitals attached to BMCRI, Bengaluru. The prescription pattern of 100 outpatients diagnosed with STDs was analysed from February 2021 to August 2022 and was evaluated using the WHO prescribing indicators. **Results:** Out of 100 prescriptions analysed, 73% were males and 27% were females. The most common age group was 25-30 years. Anogenital warts (19%) were the most common diagnosis, followed by syphilis (17%) and genital scabies (18%). Diagnosis was mostly clinical (54%). Tablet was the most common dosage form (41%). Podophyllotoxin resin (18%) was the most prescribed drug, followed by benzathine penicillin (17%). WHO prescribing indicators used for evaluating the drugs showed that the average number of drugs prescribed per encounter was 1.19, the percentage of drugs prescribed in generic name was 67.22%, the percentage of drugs prescribed from essential medicine list was 90.75%, the percentage of encounters with antibiotic prescribed was 50% and the percentage of injection prescribed 19%. **Conclusion:** In our study, anogenital warts and syphilis were the most common diseases to be diagnosed. Podophyllotoxin and benzathine penicillin were the most common drugs prescribed. Only one out of five parameters under the WHO prescribing indicators was within the recommended range.

INTRODUCTION: The etiology of sexually transmitted diseases (STDs) is remarkably diverse, encompassing viral, bacterial, fungal, and protozoal pathogens. This wide array of causative agents results in a broad and varied spectrum of clinical presentations¹.

Their incidence and prevalence across populations are fundamentally influenced by evolving socioeconomic forces, demographic shifts, behavioural patterns, and the quality of the public health response.

The daily global incidence of sexually transmitted infections (STIs) surpasses the one million mark, highlighting a considerable ongoing public health burden². Data from a 2002-2003 Indian Council of Medical Research (ICMR) community-based prevalence study indicated an STI prevalence rate of 6% in the surveyed population³. Effective management of STDs is fundamentally dependent

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upon accurate diagnosis and successful treatment. To mitigate the potential for complications and control disease transmission, treatment must achieve both clinical and microbiological cure. This is typically accomplished using a range of parenteral and oral antimicrobial agents, including Azithromycin, Ceftriaxone, Erythromycin, Doxycycline, Acyclovir, and Metronidazole. The consequence of untreated or suboptimally managed STDs presents a considerable burden on reproductive health. Potential complications include pelvic inflammatory disease (PID), which can lead to infertility, ectopic pregnancy, adverse outcomes during gestation, and the development of certain carcinomas⁴. While standard therapeutic regimens for STDs are established, significant regional and national variability exists in drug prescription practices. Analyzing these prescription patterns is therefore essential to assess the efficiency and reliability of current drug use and to formulate recommendations for improving prescribing habits. Consequently, the primary objective of this study was to evaluate the medications prescribed to patients with sexually transmitted diseases using the WHO prescribing indicators.

MATERIALS AND METHODS:

Study Design: Prospective observational study

Study Duration: February 2021 to August 2022

Study Place: Hospitals attached to Bangalore Medical College and Research Institute, Bengaluru

Study Population: 100 patients who were visiting the OPDs and diagnosed with STDs

Sample Size: The sample size was calculated based on the pilot study in which 40% of the patients diagnosed with STDs received multi-drug regimen. Assuming absolute precision of 10% and a Confidence Interval of 95%, the sample size is

with missing data of about 10%, the sample size was calculated to be 101, rounded off to 100.

Inclusion and Exclusion Criteria: The following patients were included – patients of either sex aged above 18 years, patients willing to give written informed consent, clinically or laboratory confirmed and newly diagnosed patients of Sexually transmitted diseases in the outpatient departments of hospitals attached to Bangalore Medical College and Research Institute, Bengaluru. The exclusion criteria were psychiatric or emotionally disturbed patients, STD cases admitted in the inpatient ward, HIV, and all types of Hepatitis and Non genital scabies.

Statistical Analysis: Data was analysed using descriptive statistics viz. numbers and percentages wherever applicable.

Methodology: After obtaining approval from the institutional ethics committee, patients fulfilling the inclusion and exclusion criteria were enrolled in the study after obtaining informed consent. Ethical committee approval was from the Institutional Ethics Committee attached to Bangalore Medical College and Research Institute, and the approval number was BMCRI/PG/131/2020-21. Patient's demographic data, history, clinical examination findings, and lab investigations, drugs prescribed for the patient along with dose, dosage form, duration, and frequency were recorded in case record form. Prescription was analysed using the WHO prescribing indicators, which included Average number of drugs per encounter, Percentage of drugs prescribed by generic name, Percentage of encounters with an antibiotic prescribed, Percentage of encounters with an injection prescribed, and Percentage of drugs prescribed from essential medicine list.

RESULTS: The data was analysed using descriptive statistics.

TABLE 1: DEMOGRAPHIC CHARACTERISTICS (AGE AND SEX DISTRIBUTION) OF PARTICIPANTS (N=100)

Parameters	Category	Number	Percentage
Age in years	18-24	30	30
	25-30	43	43
	31-36	14	14
	37-42	07	07
	43-48	02	02
	49-54	04	04
Sex	Male	73	73
	Female	27	27

Table 1 shows that most of the participants belonged to age group of 25 to 30 years n = 43 (43%) and 18 to 24 years n = 30 (30%).

Males n = 73 (73%) were more commonly diagnosed with STDs compared to females (27%).

TABLE 2: DISEASE PROFILE OF STUDY PARTICIPANTS (N=100)

S. no.	Diagnosis	Number of patients	Percentage
1	Anogenital Warts	19	19
2	Syphilis	17	17
3	Genital Scabies	15	15
4	Genital Herpes	10	10
5	Non-Gonococcal Urethritis	08	08
6	Chlamydial Infection	05	05
7	Gonorrhoea	04	04
8	Bacterial Vaginosis	04	04
9	Vulvovaginal Candidiasis	04	04
10	Cervicitis	03	03
11	Trichomoniasis	03	03
12	Pelvic inflammatory disease	03	03
13	Pediculosis pubis	02	02
14	Others	03	03

Table 2 shows that the most common diagnosis among the participants were Anogenital Warts n =

19 (19%), followed by syphilis n = 17(17%) and scabies n = 15(15%).

TABLE 3: DRUGS PRESCRIBED AMONG THE PARTICIPANTS

Name of the drug	Number of prescriptions
Podophyllotoxin resin	18
Benzathine Penicillin G	17
Azithromycin	13
Permethrin	12
Valacyclovir	08
Metronidazole	07
Ivermectin + Permethrin	05
Azithromycin with cefixime	05
Metronidazole + Doxycycline	03
Fluconazole + Miconazole	02
Fluconazole + Clotrimazole	02
Azithromycin with ceftriaxone	02
Cefixime	02
Acyclovir	02
Imiquimod	01
Doxycycline	01

Table 3 shows that the most commonly prescribed drug among the participants was Podophyllotoxin

resin (n = 18) followed by Benzathine Penicillin G (n = 17) and Azithromycin (n = 13).

TABLE 4: EVALUATION OF DRUGS PRESCRIBED AMONG THE PARTICIPANTS AS PER WHO PRESCRIBING INDICATORS

Parameter	Observed Value	Optimal Value
Average no. of drugs prescribed per patient encounter	1.19	1.60-1.80
Percentage of drugs prescribed by generic name	67.22	100.00
Percentage of encounters with an antibiotic prescribed	50.00	20.0-26.8
Percentage of encounters with an injection prescribed	19.00	13.4-24.1
Percentage of drugs prescribed from essential medicine list	90.75	100.00

Table 4 shows that the average number of drugs prescribed per patient encounter was 1.19 which was below the optimal range of WHO prescribing indicators along with Percentage of drugs

prescribed by generic name (67.22) and Percentage of drugs prescribed from essential medicine list (90.75). Percentage of encounters with an antibiotic prescribed (50.00) were above the optimal range of

WHO prescribing indicators and Percentage of encounters with an injection prescribed (19.00) was within the optimal range of WHO prescribing indicators.

DISCUSSION: Sexually transmitted diseases (STDs), including common infections like chlamydia, gonorrhea, and syphilis, pose a global public health threat, leading to long-term health sequelae and significant social consequences if untreated⁵. In the context of scarce literature regarding the pharmacotherapy of STDs in India, a study to evaluate prescribing habits is warranted. The disease profile **Table 2** indicated that anogenital warts were the most frequently diagnosed condition, affecting 19% of the participants. Other prevalent diagnoses included herpes, syphilis, and genital scabies. This high percentage for anogenital warts mirrors the results reported by Kumar et al.⁶ and is likely influenced by its status as a highly contagious, recurrent viral infection with limited population-level vaccination. Syphilis (17%), genital scabies (15%), and genital herpes (10%) were each diagnosed in under a quarter of the study participants. The least common infections found were chancroid, granuloma inguinale, and lymphogranuloma venereum, with each representing a prevalence of only 1%. The overall distribution of these STIs aligns with data from previous research^{7, 8, 9}.

WHO Prescribing Indicators¹⁰:

Average Number of Drugs per Encounter: The average number of drugs prescribed per encounter was 1.19, a value below the WHO recommended optimal lower limit of 1.6. This low average suggests high physician adherence to standard treatment guidelines and the syndromic approach for STDs, where single-drug therapy is typically sufficient.

Percentage of Drugs Prescribed by Generic Name: The calculated generic prescribing rate in our study was 67.22%, a figure that unfortunately falls significantly short of the ideal WHO optimal target of 100%. This reliance on brand-name prescribing substantially escalates the cost of therapy for patients. Conversely, prioritizing generic drug names is a cornerstone of rational use, offering substantial advantages such as reduced treatment costs and minimized dispensing errors¹¹.

Percentage of Encounters with an Injection Prescribed: Only 19% of encounters included an injected drug, a rate that is consistent with the WHO optimal prescribing indicator. This low figure where injections were limited to benzathine penicillin G and ceftriaxone is largely attributed to two factors: physician adherence to standard treatment guidelines favoring oral therapy, and the exclusion of inpatients from the study, thereby mitigating the known influence of patient and socio-cultural preferences for injections

Percentage of Encounters with an Antibiotic Prescribed: The current study reports that 50% of patient encounters included an antibiotic prescription, a figure that exceeds the WHO optimal reference value, suggesting high antibiotic usage. However, this high rate may not be considered irrational, as the majority of prescriptions adhered to standard treatment guidelines, particularly when diagnoses were confirmed via laboratory investigation. For clinically diagnosed cases, the syndromic management approach was employed.

Percentage of Drugs Prescribed from the Essential Medicine List: Our study demonstrated near-optimal adherence to national standards, with 90.75% of all prescribed medications sourced from the National List of Essential Medicines (NLEM) 2022.¹² Although this rate is excellent, it slightly misses the WHO's aspirational 100% optimal target. This discrepancy is likely rooted in contextual factors, including the study's commencement date preceding the NLEM 2022 release and potential prescriber unawareness. Furthermore, the use of similar, non-NLEM alternatives (like miconazole and valacyclovir, which resemble the listed clotrimazole and acyclovir) contributes to this small gap, as new essential drug listings require time to be fully adopted.

Strengths and Limitations: This investigation represents the initial assessment of STD prescription patterns in India, offering critical data on prescribers' adherence to the rational use of antibiotics and the Essential Medicines concept (*via* WHO indicators). The findings also hold practical utility for hospital drug procurement. However, the study's single-center, observational design restricts

the generalizability of the results. Additional limitations include the exclusion of inpatients, which may have affected the recorded injection rate, the omission of sexually transmitted HIV and hepatitis infections, and the lack of treatment outcome assessment.

Recommendations: Revisions to the National List of Essential Medicines should be conducted more frequently by policymakers. Simultaneously, ensuring the ready availability of essential drugs across all healthcare levels is critical for reducing patient out-of-pocket expenditure. Prescribers, in turn, must be encouraged to transition fully to generic name prescribing, practice strict evidence-based medicine to maintain prescribing rationality, and maximize the utilization of medications included in the NLEM.

CONCLUSION: The evaluation of sexually transmitted disease (STD) pharmacotherapy using WHO prescribing indicators revealed several areas for improvement. Specifically, the study found that the average number of drugs per encounter, the rate of generic prescribing, and the percentage of drugs from the Essential Medicines List all fell below their respective WHO optimal ranges. Conversely, the percentage of encounters with an antibiotic prescribed exceeded the optimal threshold, while the rate of injection prescription aligned with the WHO-recommended range.

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CONFLICTS OF INTEREST: Nil

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