

**Short Communication****ANTIFUNGAL STEWARDSHIP: MITIGATING INAPPROPRIATE PRESCRIPTIONS IN VULVOVAGINAL CANDIDIASIS IN TERTIARY CARE HOSPITAL, CENTRAL INDIA**NARLAPATI VIGNAN<sup>1</sup>, VIKALP TIWARI<sup>1</sup>, AVINA KHARAT<sup>1\*</sup>, RUCHI KUMARI<sup>1</sup>

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**ABSTRACT**

This study aims to reduce the inappropriate prescriptions of antifungal medications for vulvovaginitis candidiasis in a tertiary care hospital in central India. An ambispective, observational study was conducted in the Department of Pharmacology of MGM Medical College and Maharaja Yashwantrao Hospital in Indore, MP, over three months (i.e., 12 w from August to October 2023). The study encompassed a retrospective analysis of prescriptions for vaginal candidiasis over a period of five weeks in August-September 2023, followed by a prospective analysis over the subsequent five weeks of September-October 2023 post-implementation of interactive training sessions, discussions, and antifungal guidelines for two weeks. From a total of 130 randomly selected prescriptions, 69 prescriptions were perused retrospectively, while 61 prescriptions received prospective analysis. The post-implemented audit showed a marked reduction in antifungal prescriptions with a difference of 12.4%. An increase in the documentation of examination findings was also observed, from 46.7% to 69.7%. This implementation successfully mitigated inappropriate prescriptions of antifungals, with sustained reductions demonstrated over the 3 mo of the study period, emphasizing the effectiveness of educational interventions.

**Keywords:** Vaginal candidiasis, Antifungal stewardship, Inappropriate prescriptions, Tertiary care hospital, Ambispective study, Educational interventions

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Vaginal Candidiasis is a commonly encountered fungal infection with a global prevalence estimated at around 75% of women experiencing at least one episode during their lifetime [1, 2]. It is also known as vaginal yeast infection and is characterized by an overgrowth of *Candida*. According to reports from the World Health Organization, around 75% of women are affected by *Candida albicans*, leading to vaginal candidiasis [3]. Despite residing harmlessly in the body sites, including the skin, mouth, throat, and vagina, often due to the rampant use of antimicrobials which disrupts the balance of natural vaginal flora leading to an overgrowth of *Candida* and resulting in an infection [4]. Globally, recurrent vulvovaginal candidiasis affects about 138 million women annually, with an annual prevalence of 3871 per 100,000 women [5]. With varying prevalence across the globe, about 45% being reported in Germany [5] and ranging between 10% to 35% in India [7], which is significantly high, effectively placing a substantial burden on the healthcare system. In a study done by Kumar S *et al.*, it was found that in India the cases of candidiasis are more prevalent in rural areas (65.51%) compared to urban populations (34.48%) [8]. The primary line of treatment for this condition involves antifungal medications, which can be in the form of creams, ointments, tablets, and suppositories; however, the effectiveness of these formulations, when applied vaginally, is often limited and inadequate, leading to the need for recurrent treatment in many cases [9]. Commonly used drugs include miconazole and terconazole, as well as fluconazole in the oral form. In some cases, intravaginal azole therapy for at least 1 w may be recommended [10]. However, there is a growing worldwide concern about antifungal resistance arising from the misuse and overuse of these drugs. Some of the species of fungi are naturally resistant to certain types of antifungal drugs, and secondary resistance can develop among previously susceptible strains after exposure to the drug, usually dependent on altered gene expression [11, 12]. The inappropriate use of antifungals in cases of vaginal discharge, itching, bad odour, and non-specific vaginal infections does not improve outcomes; in fact, patients reported an increased incidence of adverse events after usage of these drugs compared with placebo [13, 14]. Thus, the majority of patients with vaginal infections do not require antifungals. Such insistent use of these drugs contributes to

the emergence of antifungal resistance [15]. Despite these risks to individual and population health, inappropriate antifungal drug usage is widespread in our country.

Antifungal stewardship programs have received less attention compared to antimicrobial stewardship program, but the emergence of resistant fungi has increased the focus on antifungal stewardship. These programs aim to elevate standards in antifungal prescribing, ensuring patient safety and improving clinical outcomes [16, 17], emphasizing the importance of improved administration of antifungal therapy, including drug selection, dose, duration, and source control. Rapid diagnostic tests are crucial for timely treatment, but the lack of sensitive tests has led to the overuse of antifungal agents. The integration of rapid diagnostic tests for invasive candidiasis, along with real-time decision support, can show promising results in terms of decreased mortality, optimal use of antifungals, and reduced healthcare costs [18]. Echinocandin antifungals are recommended for the prevention and treatment of invasive candidiasis, but the increase in echinocandin-resistant *Candida glabrata* is a concern. Antifungal stewardship teams can play a role in promoting appropriate antifungal use to improve clinical outcomes and reduce unnecessary expenses [19].

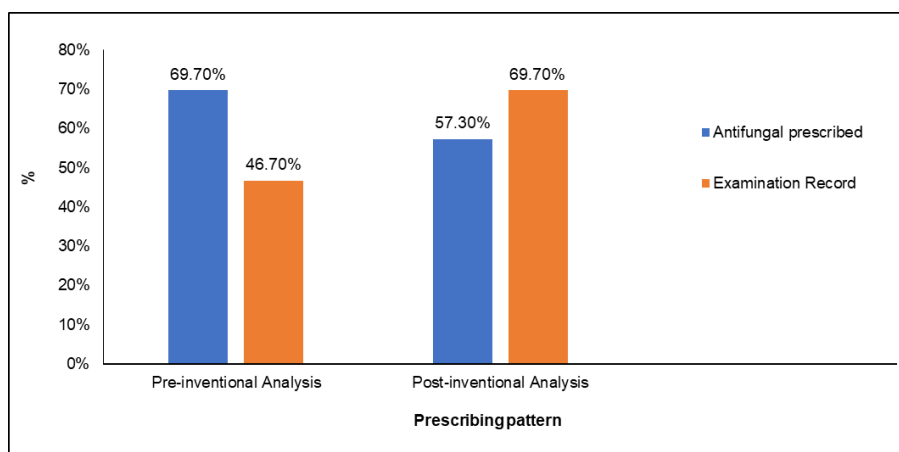
Our study employed an ambispective approach to analyze prescriptions in a tertiary care hospital to reduce inappropriate antifungal use for vulvovaginal candidiasis. This study also sheds light on the need for an antifungal stewardship program to curb inappropriate prescribing practices and combat the rising issue of antifungal resistance.

A comprehensive strategy was devised to address the practice of inappropriate antifungal prescribing over three months from August to October 2023. After taking consultations with the members of the institutional ethics committee, the current study was deemed eligible for exemption from further review. The strategy for this study was infolded in three phases. In the initial phase, a retrospective analysis of antifungal prescription over 5 w on women prescribed with antifungal for vagina infections were included and patients receiving antifungal for any other disease conditions were excluded from the study. The second phase involved the educational

intervention comprising various components: audit prescribing, conducting educational seminars, engaging individual case-based discussions, and developing and modifying guidelines. Weekly medical staff meetings, overseen by the seniors and faculties, facilitated collective feedback to sustain engagement and foster collaboration among doctors. Three weeks of hour-long seminars, combining presentations and interactive discussions, were conducted to present evidence on antifungal use and encourage open debate. In the final phase, a prospective analysis of antifungal prescriptions for women with vaginal infection over the next 5 w was done. All these analyses and discussions, held in the Department of Pharmacology, MGM Medical College, and M. Y. Hospital of Indore

as needed, aimed to identify inappropriate prescribing patterns and propose alternative management approaches. The developed antifungal guidelines received approval from both management and frontline medical professionals, ensuring a standardized approach to best practices.

The primary outcome measure assessed was the rate of antifungal prescriptions. The pre-post-intervention analysis demonstrated a substantial decline in antifungal prescribing, decreasing from 69.7% to 57.3%, resulting in a 12.4% difference following a two-week educational intervention. Concurrently, the documentation of examinations of vaginal infections increased from 46.7% to 69.7% (fig. 1).



**Fig. 1: Comparative pre-postintervention in prescribing pattern**

In the retrospective phase of the study, 69 prescriptions were received, and we found five different antifungals. The most common drugs in monotherapy were fluconazole (28.5%), Miconazole (14.6%), co-trimoxazole (12.6%), metronidazole (10.8%), caspofungin and micafungin 5% each. A combination therapy of Amphotericin+fluconazole and Amphotericin+flucytosine was also observed. Concomitant medications for symptomatic relief (antibiotic, paracetamol, diclofenac, antihistamines, and steroid cream) were present in 78.2% of the prescriptions.

The prospective post-interventional phase showed a marked reduction in antifungal prescribing with a difference of 12.4% along with an increase in the documentation of prescriptions from 46.7% to 69.7%. For patients with non-specific vaginal infections, a reduction in the prescription of fluconazole, miconazole, and co-trimoxazole was observed due to an increase in investigation for the type of infection that occurred. Medications for symptomatic relief were present in 72.9% of the prescriptions, showing minimal change.

In our study, we assessed the rate of prescription for antifungals after educational intervention where we found a decline in antifungal prescribing patterns and an increase in documentation of examinations done. The pre-post-intervention analysis demonstrated a substantial decline in antifungal prescribing. Similarly, in a study by Gamarra F *et al.*, on the first audit, there was approximately 80.2% reduction in inappropriate prescribing patterns followed by 64.6% in the second audit [20].

In our study, fluconazole was the most common antifungal used in monotherapy which was similar to a study done by Balushi KA *et al.*, [21].

A decrease in the prescription of fluconazole, miconazole, and co-trimoxazole was noted for patients with non-specific vaginal infections, attributed to an increase in investigations done to determine the specific type of infection present. However, in another study done on anti-microbial stewardship programs it was found that educational intervention alone is probably not enough to sustain improvements in the optimal use of antimicrobials by healthcare providers [22].

Retrospective analysis, educational seminars, case-based discussions, and guideline development, as part of a comprehensive intervention strategy, proved effective in decreasing the practice of irrational antifungal prescribing. However, the diverse approach makes it difficult to measure the result of each specific part. Although weekly meetings with interprofessional feedback were employed, more data on long-term effects is required. Only documental improvement is evident, while more attention should be paid to qualitative aspects. There is a remarkable decrease in antifungal prescribing which indicates the efficiency of this effort in reducing unnecessary prescriptions. A multidisciplinary approach comprising ambispective analysis, education programs, and guidelines writing showed a remarkable decline in inappropriate antifungal prescriptions. In the end, the importance of collaborative efforts, along with educational initiatives focused on improving prescribing habits, is emphasized. Nevertheless, it is quite problematic to distinguish separate effects produced by the multi-dimensional program. There is a need for future research on the long-term sustainability of documentation and the qualitative aspects of the interventions. The study provides essential perspectives on the evolution of antifungal stewardship, emphasizing the need for optimization of prescribing patterns and a robust framework for sustained vigilance and adherence to evidence-based practices.

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Dr. Avina K. (AK), Dr. Ruchi K. (RK), Dr. Vikalp Tiwari (VT), and Dr. Vignan N. (VN) substantially contributed to the development of this study and the elaboration of the article. Their roles are outlined as follows:

1. Project Conception or Analysis and Interpretation of Data: VT, AK, RK, and VN actively participated in the conception of the project. They were involved in the analysis and interpretation of the data gathered during the study.
2. Article Writing or Critical Review Relevant to Intellectual Content: AK, RK, and VN were integral to the writing process, contributing significantly to the intellectual content of the article. They conducted critical reviews, providing valuable insights to enhance the quality of the manuscript.

All authors, AK, RK, and VN, have reviewed and approved the final version for publication. They collectively take responsibility for all the information presented in the paper, ensuring its accuracy and integrity.

#### CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding this article.

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