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ISOLATION AND IDENTIFICATION OF POTENTIAL PATHOGENS FROM USED AND UNUSED PANTY LINERS: A COMPARATIVE STUDY

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ABSTRACT: Available statistical data about panty liners has evidenced for presence of potential pathogens which could trigger serious vulvovaginal infections and urinary tract infections (UTIs). Present study has involved used and unused panty liners and their comparative study about isolated microflora. The study has witnessed for hetrogenous population of bacteria from used panty liners and XDR (Extensively Drug Resistance) pathogens from unused panty liners. The study is aimed to sensitize government regulatory authorities, scientists, academicians with potential risk of dissemination of pathogens. The substantial diversity of harmful organisms found on both used and unused panty liners highlights the possible health hazards especially of urinary tract infections (UTIs).

Keywords: Used and unused panty linear, Vulvovaginal infections, MALDI-TOF, XDR.

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1. INTRODUCTION

A wide variety of microorganisms, such as bacteria, fungi, and viruses, naturally colonize human skin and mucosal surfaces. The vaginal microbiome is particularly dynamic and influenced by a number of factors, such as hormonal fluctuations, personal hygiene practices, and the use of feminine hygiene products [6]. Lactobacillus species dominate the vaginal microbiome, a diverse and dynamic ecology that is crucial to maintaining vaginal health. Normal flora produces lactic acid, which stops opportunistic infections from growing. Panty liners may provide a warm, humid

environment that is conducive to the growth of microorganisms [5]. However, antibiotic use, hormonal shifts, and poor cleanliness habits can all lead to vaginal microbiota imbalances, which are commonly referred to as bacterial vaginosis (BV) or yeast infections. By changing the vaginal microenvironment, long-term usage of panty liners especially when not replaced frequently may exacerbate these imbalances [1]. A common clinical problem among women of reproductive age is abnormal vaginal discharge, which can have a number of causes based on the kind of epithelium and other factors in the microenvironment, different pathogens can impact the vagina, ectocervix, and endocervix. Abnormal vaginal discharge is usually associated with one of the three disorders, such as Trichomoniasis, Vulvovaginal candidiasis, or Bacterial vaginosis (BV) [11]. Panty liners are often used feminine hygiene products to manage both normal and abnormal vaginal discharge. It is intended to absorb minor body fluids such as light menstrual flow, urine incontinence, and vaginal discharge in addition to providing everyday freshness [7]. Women of all ages have widely adopted them due in part to their accessibility and ease of use [7]. Possibility of microbiological hazards is always connected to the use and disposal of panty liners, despite of their advantages. The disposal of used panty liners presents a significant environmental concern, as they are typically discarded in landfills or incinerated. Since used panty liners are usually disposed of in landfills or burned, their disposal poses a serious environmental risk. The possibility of environmental contamination and the spread of infectious diseases are raised by the presence of potentially harmful microbes on discarded panty liners [12]. Additionally, the danger of pathogen transmission is increased by the near proximity of panty liners to the urogenital area, which may result in infections such Vulvovaginitis, Urinary tract infections (UTIs), and other related diseases [3]. The purpose of this study was to explore the microbial diversity found on unused and used panty liners. The results of this study may be useful for designing guidelines for encouraging safe practices and reducing environmental contamination by offering important insights into the possible health concerns due to related use of panty liners. Our specific goals were to separate and characterize the bacteria and fungi found in both kinds of liners, as well as to compare their frequency and any health effects on women.

2. MATERIALS AND METHODS

Ten female volunteers between the ages of 18 and 45 provided used panty liners. All volunteers gave their informed consent before beginning the study after being fully briefed about its goals and methods. The date, time, and length of use were marked on sterile, airtight containers, and volunteers were told to put the used panty liners in them. Unused panty liners were selected at random from commercially available, unopened packages that were bought from nearby pharmacies. Within two hours of being collected, every sample was brought to the lab and processed right away. After being aseptically trimmed into tiny pieces, each panty liner sample was submerged in 10 milliliters of sterile nutrient broth (NB). Sterile nutrient broth was used to prepare serial dilutions (10^1–10^4) of

the resultant suspension. 100 µL aliquots from each dilution were transferred 'Muller Hinton Agar' (MHA), 'Cystine Lactose Electrolyte Deficient Agar' (CLED) for bacteria and 'Sabouraud's Dextrose Agar' (SDA) for fungi. All plates were incubated at 37°C for 48- 72 hours for bacterial growth and at 25°C for 3-5 days for fungal growth. After incubation, distinct colonies representing different morphotypes were selected for further analysis. Pure cultures of the selected colonies were prepared by repeated streaking on the appropriate agar media. Isolates were identified using Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS).

3. RESULTS AND DISCUSSION

The microbial analysis of used and unused panty liners revealed a diverse range of microorganisms. *Acinetobacter indicus* was the most frequently isolated organism from both used and unused panty liners. Several potential pathogens, including *Escherichia coli, Klebsiella pneumoniae, and Proteus spp*. *Staphylococcus arlettae* was exclusively found in used panty liners. The fungal species *Candida metapsilosis* was found in unused panty liners. Flores-Mireles A.L., Walker J.N., Caparon M., and Hultgren S.J. (2015) stated that urinary tract infections can be caused by a number of pathogens, including both Gram-positive and Gram-negative bacteria and fungi. Uropathogenic *E. coli* (UPEC) is the primary cause of UTIs, accounting for approximately 75% of uncomplicated UTI cases, according to the epidemiology of UTIs [2][5]. The current investigation demonstrates that the panty liners used by female volunteers included organisms that cause urinary tract infections. *Lactobacilli* are the most common microbes present in the vagina [9]. According to Farage MA, Enane NA, Baldwin S, and Berg RW (1997), the labial microflora had a lower frequency of *Gardnerella vaginalis* and a much higher frequency of *Staphylococcus, coliforms*, other gram-negative rods, and *Enterococci* than the vaginal microbiota [3]. A present study revealed changes in the microbial flora by the use of panty liners. *Aceinetobacter indicus, Escherichia coli, Staphylococcus arlettae, Candida metapsilosis, Klebsiella pneumonia and proteus spp.* were isolated and identified using MALDI-TOF. The present study also may claims that presence of *E. coli*, *Klebsiella pneumoniae*, *Candida metapsilosis*, and *Proteus* species on panty liners can increase the risk of UTIs by facilitating the introduction of these pathogens into the urinary tract. The findings of this study have important implications for public health and hygiene practices. Firstly, the presence of potential pathogens on panty liners highlights the importance of proper hand hygiene before and after handling these products. Secondly, the study underscores the need for safe disposal practices to prevent environmental contamination and reduce the risk of pathogen transmission.

4. CONCLUSION

This study provides valuable insights into the microbial diversity present on both used and unused panty liners. The isolation of potential pathogens, including *Acinetobacter indicus, Escherichia coli, Klebsiella pneumoniae, Proteus spp., Staphylococcus arlettae*, and *Candida metapsilosis* from these products underscores the potential health risks associated with their use and disposal. The findings

emphasize the importance of promoting safe hygiene practices and developing effective guidelines for panty liner disposal to protect public health and minimize environmental contamination. Further research is warranted to explore the long-term impacts of panty liner disposal on microbial populations in various ecosystems and to develop innovative solutions for sustainable waste management.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

No animals or humans were used for the studies that are based on this research.

CONSENT FOR PUBLICATION

Not applicable.

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CONFLICT OF INTEREST

Authors do not claim for conflict of interest.

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