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Original Research

PREVALENCE OF PSEUDOMONAS SPECIES INFECTION AMONG HOSPITALIZED PATIENTS IN JAN SEWA HOSPITAL

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ABSTRACT

Background: *Pseudomonas spp*. is a rod-shaped, motile, aerobic, non-fermenting, gram-negative bacterium and a major human pathogen belonging to the family Pseudomonadaceae. It causes several nosocomial infections, including pneumonia, urinary tract infections, surgical site infections, otitis externa, and soft tissue infections.

Methods: The study was conducted from the period of November 2024 to April 2025 and involved the prevalence of Pseudomonas spp. isolates among admitted patients' specimens in Jan Sewa Hospital. The collected specimens were examined using different methods and cultured on different media in the hospital. The isolated bacteria were identified according to their morphological and biochemical properties.

Results: Out of 1664 total inpatient samples processed, 78 were positive for Pseudomonas spp., giving an overall prevalence of 4.69%. Pseudomonas isolates were most frequently obtained from pus samples (37.17%), followed by BAL (25.64%) and sputum (15.38%). The majority of infections occurred in adults (67.94%), followed by elderly patients (30.76%). Male patients accounted for 64.10% of infections, while females constituted 35.90%.

Conclusion: Most of the Pseudomonas spp. strains were isolated from pus, BAL, and sputum samples. Adults and male patients were more frequently affected.

Keywords: **Pseudomonas species, patients, healthcare, equipment**.

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INTRODUCTION

PSEUDOMONAS SPP. is an opportunistic infections resulting in UTI and others pose a significant threat in health facilities. This organism is characterized by being rods, motile, aerobic, non-fermentative, and Gram-negative, possessing exceptional capabilities to withstand various common antimicrobial drugs. As a result, they have become one of the most prominent sources of infections acquired within health facilities owing to their natural resistant characteristics.[1-2]

This bacterial genus can produce UTI, respiratory tract infection, gastrointestinal infection, skin infection, blood infection (bacteremia), tissue infection, and bone or joint infection among many others. Being able to endure tough environmental and physiological conditions while requiring minimum amounts of nutrition makes them capable of survival both in hospitals and in the general community.

In the case of health facilities, these pathogens may be transferred either through contact with surfaces or medical equipment or even through the

transmission by healthcare personnel. It is well known that they are one of the most frequent isolates of non-fermentative Gram-negative bacilli in clinical specimens. Moreover, they exhibit high resistance to a number of disinfectants.[3]

High-risk patients are burn patients, immune-compromised patients, patients who have been hospitalized for a long period of time, patients who have had prosthetic surgery performed on them, and patients with chronic diseases. With the rise in infection by Pseudomonas spp., they present a great challenge for the healthcare setting and public health sector. Thus, this research was carried out to identify the incidence rate of Pseudomonas spp. strains in hospitalized patients in various wards in Jan Sewa Hospital, North India.

MATERIALS AND METHODS

The adjacent retrospective study was conducted in the Department of Microbiology of a Jan Sewa hospital situated in a North Indian border area. The study period extended over six months, from November 2024 to April 2025. During this time, only samples received from admitted patients were included. Samples from the outpatient department were deliberately excluded from analysis.

All clinical specimens received in the microbiology laboratory were properly labeled and submitted along with requisition forms. The samples were processed as per routine laboratory procedures followed in the department. The organism was initially evaluated by observing its growth characteristics, colony appearance, Gram staining reaction, and other relevant biochemical properties before reaching the final identification.

Preliminary identification was mainly based on the morphology and characteristics of the colonies obtained on culture media. On MacConkey agar, pale non-lactose-fermenting colonies were noted. Gram staining resulted in Gram-negative bacilli. The isolates were motile, oxidase positive, and did not ferment glucose. Based on these findings, the isolates were further subjected to confirmatory biochemical tests for identification of Pseudomonas species. The test included the indole test, methyl red test, citrate utilization test, urease test, triple sugar iron agar reaction, arginine dihydrolase activity, nitrate reduction test, and the presence of characteristic bluish-green pigment.[4-5]

The clinical samples processed during the study comprised pus, tracheal tips and aspirates, blood cultures, bronchoalveolar lavage, urine, sputum, DJ stents.

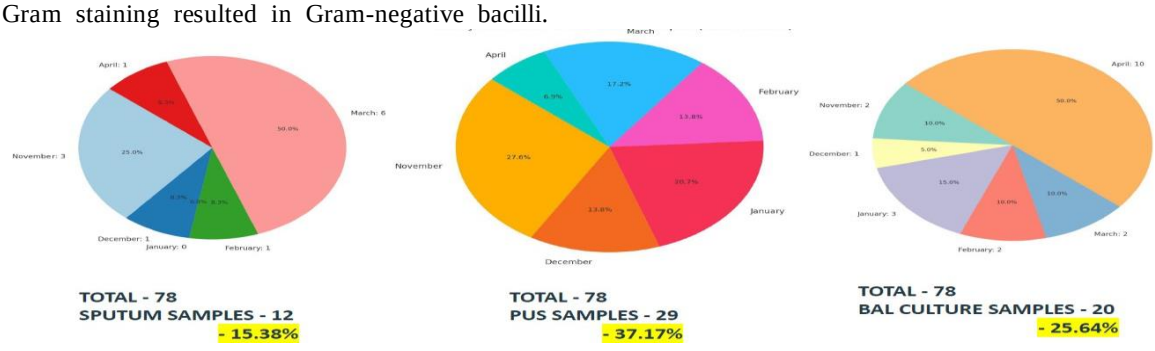
In total, 1,664 samples were received during the study period. Culture-positive samples were analyzed using descriptive statistical methods with the help of various software.

RESULT

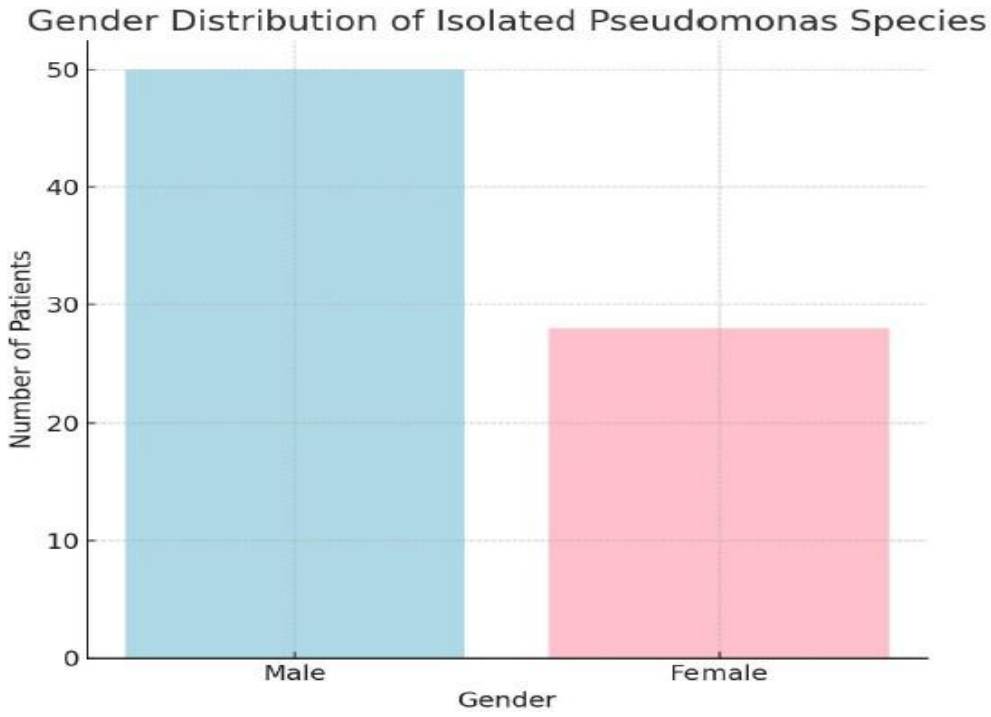
The present study was conducted in a microbiology laboratory of a Jan Sewa hospital in a North India border area for a total of 1664 samples. All these specimens were sent to the bacteriology diagnostic laboratory for culture out of which 78 samples show growth of Pseudomonas species. The samples from which we cultured were

- Pus culture
- Tracheal tube and aspirate
- Blood culture
- BAL culture
- Urine culture
- Sputum
- Dj stent

Out of 1664 samples, pus culture was the most common sample, with a positive growth rate of 37.17%, and monthly distributions of samples are shown in Table 1.\ Among the 78 cases of Pseudomonas species, 50 (64.10%) cases were isolated from male patients and 28 (35.90%) were from female patients, as shown in Table 2.



Graph 1: Monthly distribution of 3 major samples



Graph 2: Gender distribution of isolated pseudomonas species

DISCUSSION

This study reveals Pseudomonas species to be an important cause of HAIs and a significant nosocomial pathogen. The isolation of Pseudomonas species from hospital settings suggests their existence within hospitals and their capacity to infect predisposed individuals within the hospital. In this study the higher frequency of isolates occurrence in adults and males concur with earlier studies done in India. The higher occurrence of Pseudomonas among adults and males can be associated with their higher risk of exposure to hospitalizations, surgeries, and trauma.[6-7]

In the current study, pus specimens showed the highest occurrence of Pseudomonas species, which reinforces the organism to be responsible for the occurrence of wound and surgical site infections. The organism seems to initiate the process of tissue injury and contamination, thus causing the infection.[8] Also, the occurrence of Pseudomonas species in blood specimens can be attributed to the capacity of the organism to cause critical blood-stream infections in already hospitalized and seriously ill individuals.[9-10]

The overall prevalence reported by this study (4.69%) lies within the range documented in the earlier Indian studies (including those of Jan Sewa Hospital). This indicates that Pseudomonas remains to be an important nosocomial pathogen. These differences in the prevalence of Pseudomonas may depend on hospital practices, practices related to the infection control, antibiotic usage patterns. The

increasing prevalence of multidrug resistant Pseudomonas species pose a considerable problem with restricted therapeutic choice and increased demand on health care resources.[11-12] It is essential that effective and stringent infection control strategies, continued laboratory surveillance and appropriate antibiotic policy must be applied to control the prevalence of resistant strains and improve patient management.

CONCLUSION

This study highlights that Pseudomonas species remains an important nosocomial pathogen in tertiary care settings. There is a high prevalence among males and adults who are frequently affected, and the pus sample yields maximum isolates. Most Pseudomonas species isolates were found in the month of April, 2025. The reported cases were 17. Most Pseudomonas species isolates were found from pus samples [29]. The male gender (50 cases) had the most Pseudomonas isolates. Most Pseudomonas species isolates were found in adults (67.94%). The overall finding indicates 4.69% prevalence, which aligns with the previously reported ranges from Jan Sewa Hospital across India.

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