

# Isolation and Assessment of Bacterial Pathogen to Determine Microbial Contamination from Different Sections of Educational Institute of North India

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**Abstract – Introduction-** Pathogenic microbes are transmissible via air, skin, food, water and other interpersonal contacts, and in most cases, they cause diseases and infections. Transmission of these infectious agents typically involves their escape from the host and entry into a new host. Infections of hospital origin have been gaining importance in recent years due to their progressive increase and their high rates of morbidity and mortality. This study shows to identify the bacterial pathogen and microbial contamination in the isolated areas.

**Methods and Materials -**In order to test sterility of the prepared media, the Petri dishes containing the different sterilized agar media were further incubated without any inoculation in the incubator for 24 hours at 37°C temperature. Sample collection was performed using the passive sedimentation method in 150 mm diameter Petri dishes containing Nutrient agar, MacConkey Agar media. The plates were (exposed open plate) in each of the environments for one hour in each period, positioned 2 meter high.

**Results -** A total of 6 Bacterial pathogens comprising of *Staphylococcus Spp*, *Enterobacteriaceae*, *Bacillus Spp*, *Salmonella Spp*, *Klebsiella Spp* and *Pseudomonas* was Isolated and identified by microbiologically and biochemically.

**Conclusion-** Owing to the ubiquitous presence of airborne microbes in nature, they are essentially present in most enclosed environments. The isolation pathogens (*Staphylococcus Spp*, *Bacillus Spp*, *Enterobacteriaceae*, *Pseudomonas Spp*, *Salmonella Spp*, *Klebsiella Spp*, and *Pseudomonas Spp*) from health care associated to

institution constitute a great concern to the health of the inhabitants residing in institution because these bacterial pathogens could be life threatening both in students and staffs if not diagnose on time and appropriate antibiotic administered to treat these infections associated with these pathogens.

**Index Terms -** Microbes, Pathogens, Infections, Bacterial.

## INTRODUCTION

Microorganisms are ubiquitous, and mixtures of microbes are often transferred to everyday objects from the environment and infected individuals. Pathogenic microbes are transmissible via air, skin, food, water and other interpersonal contacts, and in most cases, they cause diseases and infections<sup>[1, 2]</sup>. Transmission of these infectious agents typically involves their escape from the host and entry into a new host<sup>[3, 4]</sup>. The importance of bioaerosols has been emphasized in recent decades due to their effect on human health. They can enter indoor areas by passive ventilation or by ventilation systems as well. Many genera are also emitted by indoor sources like animals, flowerpots and wastebaskets. This normal flora is in most cases not harmful. But more and more frequently growth conditions like excessive humidity and or a high-water content of building materials are encountered, which are in most cases the limiting

factor for microbial growth. They have been implicated in conditions ranging from allergies to disseminated infections in susceptible patients [5].

Different authors have reported the importance of these particles as transmitters of hospital infections [6, 7], especially those caused by fungal isolates, as they act as epidemiologic markers of microbial contamination [8]. Fungal infections of hospital origin have been gaining importance in recent years due to their progressive increase and their high rates of morbidity and mortality [9,10,11]. Despite the need to monitor bio-aerosol levels in evaluating health risks, differences between automatic techniques and passive sedimentation techniques hamper results comparison [12]. This study shows to identify the bacterial pathogen and microbial contamination in the isolated areas.

### METHODS AND MATERIALS

#### Study design

This is a prospective observational study done at the microbiology laboratory of B. N. Patel Institute of Paramedical and Science (Paramedical Division), Anand, Gujarat, India

#### Samples area

Sr.no	Area-1	Area -2	Area -3
1.	Dialysis unit -1	Administrator room-1	First year class room-1
2.	X-ray room - 1	Front office - 2	Second year class room -1
3.	Pathology lab-1	Account office -1	Staff room -1
4.	Dialysis unit -2	Library -1	

#### Preparation of media

Nutrient agar and MacConkey agar were prepared based on (Hi-media) manufacturer instruction. In order to test sterility of the prepared media, the Petri dishes containing the different sterilized agar media were further incubated without any inoculation in the incubator for 24 hours at 37°C temperature. Petri dishes having no growth of microorganisms (Contamination) were used for sample collection.

### METHOD OF SAMPLE COLLECTION

Sample collection was performed using the passive sedimentation method in 150 mm diameter Petri dishes containing Nutrient agar, MacConkey Agar media. The plates were (exposed open plate) in each of the environments for one hour in each period, positioned 2 m high.

### RESULTS

A total of 6 Bacterial pathogens comprising of *Staphylococcus Spp*, *Enterobacteriaceae*, *Bacillus Spp*, *Salmonella Spp*, *Klebsiella Spp* and, *Pseudomonas* was Isolated and identified by microbiologically and biochemically.

TABLE: 1 ISOLATION OF ORGANISMS FROM SAMPLE AREA-1

Sample Area	Organisms
Dialysis unit - 1 (patient area)	<i>Staphylococcus Spp</i> , <i>Enterobacteriaceae</i>
Dialysis unit-2 (Washing area)	<i>Staphylococcus Spp</i> , <i>Enterobacteriaceae</i> , <i>Klebsiella Spp</i>
X-ray room	<i>Pseudomonas Spp</i> , <i>Staphylococcus Spp</i>
Pathology lab	<i>Enterobacteriaceae</i> , <i>Staphylococcus Spp</i> <i>Salmonella Spp</i>

TABLE: 2 ISOLATION OF ORGANISMS FROM SAMPLE AREA- 2

Sample Area	Organisms
Director office	<i>Staphylococcus Spp</i> , <i>Bacillus Spp</i> ,
Front office	<i>Bacillus Spp</i> , <i>Enterobacteriaceae</i> , <i>Staphylococcus Spp</i> , <i>Klebsiella Spp</i>
Reception office	<i>Bacillus Spp</i> , <i>Enterobacteriaceae</i> , <i>Staphylococcus Spp</i> , <i>Klebsiella Spp</i>
Accounts office	<i>Enterobacteriaceae</i> , <i>Staphylococcus Spp</i>

TABLE: 3 ISOLATION OF ORGANISMS FROM SAMPLE AREA-3

Sample Area	Organisms
First year class room	<i>Staphylococcus Spp</i> , <i>Enterobacteriaceae</i>
Second year class room	<i>Staphylococcus Spp</i> , <i>Pseudomonas Spp</i> , <i>Enterobacteriaceae</i>
Library	<i>Bacillus Spp</i> , <i>Staphylococcus Spp</i> , <i>Enterobacteriaceae</i>
Staff room	<i>Staphylococcus Spp</i> , <i>Enterobacteriaceae</i>

TABLE: 4 PERCENTAGES OF ISOLATED BACTERIA IN SAMPLES COLLECTED

Isolated organisms	Percentage
<i>Staphylococcus Spp</i>	90%
<i>Enterobacteriaceae</i>	60%
<i>Bacillus Spp</i>	75%
<i>Salmonella Spp</i>	5%
<i>Klebsiella Spp</i>	10%
<i>Pseudomonas Spp</i>	25%

TABLE: 5 THE GROWTH OF BACTERIA ON THE MEDIA

Sample area	Nutrient agar	MacConkey agar
Dialysis unit :1	++	+
Dialysis unit :2	+++	++
X-ray room	++	+
Pathology lab	+++	++
Director office	++	+
Front office	+++	++
Reception office	+++	++
Accounts office	++	+
First year class room	++	+
Second year class room	++	+
Library	+++	++
Staff room	+	+

(+++) - High growth, (++) - medium growth, (+) - low growth

### DISCUSSION

This result shows that , a total of six bacteria pathogens were isolated comprising of *Staphylococcus Spp*, *Bacillus Spp*, *Enterobacteriaceae*, *Pseudomonas Spp*, *Salmonella Spp*, and *Klebsiella Spp*, *Staphylococcus Spp* has the highest percentage of 95%, followed by *Bacillus Spp* 75%, *Enterobacteriaceae* recorded a percentage of 60%, and *Pseudomonas Spp* has 25%, while *Salmonella Spp* and *Klebsiella Spp* Recorded 5% and 10%. From the result of research conducted, it is observed that *Staphylococcus Spp* and *Bacillus Spp* have the highest percentage in each of the sampling zones. However the fact that these bacterial pathogens are commonly associated with hospital acquired infections but *Enterobacteriaceae* and *Salmonella Spp*, isolated are of concern because these bacteria pathogens are the causative agent of diarrhea in most developing countries today. Finally, this research focus on the isolation of bacterial pathogens alone, but there is the need to carried out further research with

the view to find out the possibilities of isolating bacterial pathogens and also to evaluate these microbes (bacteria) against some of the commonly used antimicrobial agents used in the treatment of infections associated with these pathogens. During this study it was also observed there were some signs and symptoms of bacterial infections to the working staff of B. N. Patel institute of Paramedical and science.

### CONCLUSION

Exposure to bioaerosols has already been associated with a wide range of health effects such as e.g. infectious disease, acute toxic effects or allergies. Owing to the ubiquitous presence of airborne microbes in nature, they are essentially present in most enclosed environments. The isolation pathogens (*Staphylococcus Spp*, *Bacillus Spp*, *Enterobacteriaceae*, *Pseudomonas Spp*, *Salmonella Spp*, *Klebsiella Spp*, and *Pseudomonas Spp*) from health care associated to institution constitute a great concern to the health of the inhabitants residing in institution because these bacterial pathogens could be life threatening both in students and staffs if not diagnose on time and appropriate antibiotic administered to treat these infections associated with these pathogens.

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