DISSERTATION SUBMITTED FOR THE MASTER'S DEGREE IN MEDICAL MICROBIOLOGY

TITLE

BACTERIOLOGICAL PROFILE AND THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERN OF ISOLATES FROM BURN WOUNDS – A SYSTEMATIC REVIEW

SUBMITTED

BY

SHILPA BIND

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DEPARTMENT OF MICROBIOLOGY

INTEGRAL INSTITUTE OF MEDICAL SCIENCES & RESEARCH

INTEGRAL UNIVERSITY

DASAULI, KURSI ROAD, LUCKNOW-226026, U. P.

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A

DISSERTATION

Submitted to

INTEGRAL UNIVERSITY

In partial fulfillment of the requirements for the award of degree of

Masters of sciences

In

Medical Microbiology

By

SHILPA BIND

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DECLARATION OF CANDIDATE

I hereby declare that this dissertation entitle d **"BACTERIOLOGICAL PROFILE AND THEIR ANTIBIOTIC SUSCEPTIBILITY OF ISOLATES FROM BURN WOUNDS" – A SYSTEMATIC REVIEW"** is bonafide and genuine research work carried out by me under the guidance of **Dr. NOOR JAHAN** Assistant Professor, Department of Microbiology and Co- guide **Dr. AUSAF AHAMAD** Statistician & Associate Professor, Department of Community Medicine, Integral Institute of Medical Sciences and Research, Lucknow.

DATE: 15/07/2022

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The research methods and procedures described are done by the candidate and results are observed by the guide periodically.

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CERTIFICATE

This is to certify that research work entitled **"Bacteriological profile and their antibiotic susceptibility pattern of Isolates from burn wounds - Systematic review"** submitted by **Shilpa Bind, Dr.Noor Jahan, Dr.Siraj Ahmad Dr.Ausaf Ahmad** for ethical approval before the Institutional Ethics Committee IIMS&R.

The above mentioned research work has been approved by Institutional Ethics Committee, IIMS&R with consensus in the meeting held on **19 May 2022**.

Dr.Deepak Chopra
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(Member Secretary)
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DATE: 15/07/2022 **SHILPA BIND**

DEDICATED TO

"TEACHERS"

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&

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INTRODUCTION

INTRODUCTION

One of the most frequent and harmful types of trauma is burns. Patients with burns become excellent hosts for opportunistic infections. Instantaneous coagulative necrosis brought on by thermal damage quickly turns into a favourable environment for bacterial colonisation and growth. The scar creates a devitalized, protein-rich environment that, by being cut off from the body's circulation and impairing the local immune system, promotes bacterial growth. The burn site is relatively sterile for the first 24 hours; beyond that, gram-negative bacteria frequently colonise the wound. [1]

The primary cause of mortality and immobility is a burn wound, which serves as a susceptibility site for nosocomial and opportunistic pathogenic infection. The main pathogens that cause burn wound infection are B-homolytic streptococci Group A, pseudomonas aeruginosa, and staphylococcus aureus. [2]

Acinetobacter spp., staphylococcus aureus, and pseudomonas aeruginosa were the three bacteria that were most frequently isolated from burn patients. Acinetobacter spp. became known for being an organism that quickly developed antibiotic resistance in response to being challenged with new antibiotics. [3]

In the early part of the century, beta haemolytic streptococci and staphylococci were the most frequent microorganisms inflicting burn wound infections. [4]

Because the heat kills the microorganisms in and around the burned skin, burn wounds are first regarded as sterile. Normal skin flora begins to colonise the burn wound 48 hours after the burn injury. [5]

Complexes of antibacterial drugs, including those that break down bacterial DNA and inactivate cellular proteins in addition to bacterial enzymes, are contained in silver nanoparticles. [6]

Burn unit overcrowding is an indestructible source of cross infection, thus continuous monitoring of bacterial species and their antibiotic susceptibility is necessary for optimal treatment. [7]

The prevalence of burn injuries varies according to various cultural and societal conditions as well as the accessibility of medical facilities. Chemicals are the most frequent reason for burns. [8]

Burn infections should be continuously monitored, and measures for reducing antibiotic resistance and treating infection consequences should be strengthened. Therefore, the current study was conducted to identify the bacterial profile of burn wound infection and to develop empirical therapy recommendations for these patients in order to reduce mortality. [9]

The chance of monomicrobial infection in burn patients is increased by factors like the nature of the burn damage itself, the patients' immunocompromised status, invasive diagnostic and therapeutic treatments, and lengthy ICU stays. [10]

Over the past few decades, burn wounds have been among the most severe types of injuries. Morbidity and fatality rates from severe heat injuries are considerable. Globally, 300,000 people die from burns each year, and 11 million people need medical attention. Amazingly, bacterial wound infection accounts for nearly 75% of burn-related mortality. Due to the loss of their natural barrier, lengthy hospital stays, and therapeutic and diagnostic treatments, burn victims are extremely vulnerable to infections. Additionally, it appears that the depth and size of the wound are connected to the likelihood of burn wound infection. Additionally, the likelihood of infection increases the longer the wound is left uncovered. [11]

Burn wounds are so dissimilar from other wounds that a separate branch of medicine has been established to treat them. Burns induce localised skin

damage as well as systemic consequences on the body due to heat. How life-threatening the scenario is greatly depends on the extent of the burn. Extensive burns have systemic repercussions, and acute burn wounds are complicated, developing injuries. Any burn in an adult that is over 15% and any burn in a child that is over 10% will result in a hypovolemic shock because the increased capillary permeability causes significant plasma and whole blood loss. Burns can affect the entire epidermis as well as subcutaneous tissues like muscle, bone, blood vessels, nerves, and hair follicles. Eschar development is detected in the deep reticular dermis of second-degree severe burns. Eschar is a byproduct of third-degree burns or full-thickness burns. Eschar typically appears as a dry, black scab or flaking of dead skin. Compared to other traumatic wounds, burn wounds require more medical attention from doctors and other healthcare professionals. [12]

Compared to other traumatic wounds, burn wounds require more medical attention from doctors and other healthcare professionals. edge of the wound that causes a host reaction. Approximately 50% of infections associated to burns are brought on by gram-negative bacteria. When burns happen, the wounds are initially sterile but eventually become colonised. Burns generally result in the creation of wounds and a delay in epidermal maturation, which increases the risk of sepsis in people who have infected wounds. Sepsis has been observed to be a factor in about 73% of post-burn fatalities that occur within 5 days. The need to evaluate bacteria pathogens in each burn centre results from the high occurrence of infection and shifting bacteriological profiles of isolates.

Despite significant advancements in antimicrobial therapy over the past 60 years, infection nevertheless remains to be the biggest threat to burn patients. Sepsis has been demonstrated to be responsible for almost 73% of all burn-related deaths within the first five days. [14]

Burns are a significant public health concern around the world, Resulting in an estimated 265 000 deaths and 19 million years of life lost due to disability each year. Low and middle income countries (LMICs), which are least able to deliver prompt and thorough care, bear a disproportionate share of this burden. [15]

Combinations of human characteristics (Microorganism virulence traits (such as enzymes, toxins, etc.) and host factors (such as age, burn depth, and immune system) significantly influenced the infection of the burn site. Staphylococcus aureus, coagulase-negative staphylococci (CoNS), Enterococcus spp., Pseudomonas aeruginosa, E. coli, K. pneumonia, and Enterobacter spp. are the most common Gram-positive and Gram-negative pathogens detected in burn victims. [16]

The capacity of these bacteria to form biofilms is a key factor in their pathogenic success and greatly exacerbates the care of burn wounds. This has a detrimental effect on the survival rate of burn victims. [17]

Due to developments in contemporary medical care provided in specialist burn clinics, the survival rates for burn patients have significantly increased in recent years. Medical advancements in fluid resuscitation, assistance, respiratory careburn wound care, infection prevention, and procedures have all been linked to better outcomes for severely burnt patients. According to the severity of the damage, burn-related mortality have decreased by half over the past 40 years. Currently, sepsis from burn wound infection or other infection complications 75% of all deaths in patients with severe burns over > 40% of total body surface area (TBSA)[18]. Antibiotic prophylaxis is frequently used with burn victims. 13 Drug-resistant bacteria's inherent resistance to medicines, capacity to endure longer in a hospital setting, and hand-to-hand transmission of bacteria show how easily they can spread and point to potential epidemic reasons. [19,20] The bacterial infections that burn victims develop change across time and space. [21,22] Therefore, accurate antibiotic treatment for burn patients as well as ongoing observation and updating of microorganism antibiotic resistance patterns are essential for infection control strategies. With the aforementioned context in mind, the current Study was conducted to determine the bacteriological profile of infected burn wounds and their antibiotic sensitivity pattern among the patients hospitalised in an Uttarakhand tertiary care hospital. The results of this study will assist identify the main bacterial species that cause burn wound infections in our healthcare system, and their antimicrobial profiles will help

modify the current recommendations for improved patient management and care. [23]

In both full-thickness burns and profound partial-thickness burns, the burn wound surface is a protein-rich environment made up of avascular necrotic tissue (eschar), which creates an ideal setting for bacteria colonisation and growth. The eschar's avascularity prevents host immune cells from migrating properly and limits the the systemic delivery supplied antimicrobial drugs to the region, while toxins generated by the Eschar tissue impede Host immune responses locally. Following thermal injury, burn wound surfaces are initially sterile; but, over time, bacteria begin to colonise these wounds. [24] I

If topical antimicrobial treatments are not applied, gram-positive bacteria that survive the heat insult, like staphylococci that are deeply embedded in sweat ducts and hair follicles, heavily populate the wound surface within the first 48 hours. [25]

Other microbes, such as G-positive bacteria, G-negative bacteria, and yeasts, that are generated from the host's regular upper respiratory and gastrointestinal flora as well as from a medical setting or who are transmitted via a healthcare employee's hands then colonise these wounds [25,26,27].

Surface burn wounds and the lungs are where nosocomial infections most frequently occur in burn patients. [28]

Wound infections are the consequence of active interactions b/w a host, a possible pathogen, as well as the external variables in The environment. Damage infections can range in severity from minor, self- satisfaction infection via serious,leathal illness [29]. The location of the wound affects how quickly bacterial infections invade tissue [30]. Staph Aureus, Staphylococcus crust , Staphylococcus pyogenes, coagulase neg- staphylococci , Acinetobacter species, pseu. species, Esch. coli species, Klebsiella species, Prot. species, Entero. species, Citrobacter species, & the anaerobes Clostridium species &

Both monomicrobial and polymicrobial wound infections are possible [33]. Although bacterial pathogens are frequently present in wound infections, not all wounds support the same variety and number of species [34].

Due to the accompanying morbidity, mortality, and financial burn wound infection is still a problem. medical problem on a global scale. Bacteria or yeast can infect wounds, and the hospital environment or the normal flora of the person are the common sources. Since the most frequent gram-negative, non-fermenter opportunistic bacteria linked to nosocomial infections is Pseudomonas aeroginosa. The goal of the current investigation was to determine this pathogen's patterns of antibiotic susceptibility. [35] Among the pathogens that are frequently identified from infected wounds are Escherichia coli and Acinetobacter spp. [36,37].

The source of wound bacteria or yeast infections is typically the host's normal flora and/or the hospital environment[38].

Numerous nosocomial outbreaks of infection in burn units and colonisation of burn patients' wounds have been linked to multidrug resistant bacteria[39].

. Taking into account all of these information, the current study was conducted to identify the aerobic bacterial burn wound isolates in our hospital setting and describe their patterns of resistance, allowing the evolution of empiric antimicrobial techniques for the early oversight of impending septic events. [40]

Burns are among the most frequent emergencies and public health issues on the planet. Burn victims may not be as resistant to infection-related problems due to the destruction of mechanical epithelial integrity. 2 Lipov et al.'s3 investigation into the frequency of infection-related problems in burn patients revealed that 92 out of the 134 patients had such complications. Abbasi-Montazeri et al.2's prevalence study on Staphylococcus aureus infection in a burn hospital brought attention to the necessity of monitoring methicillin-resistant S aureus's resistance to antibiotics. [41]

Antimicrobial resistance is one of the greatest problems and particular worries with bacterial illnesses. Microorganisms with resistance can fend off antibacterial substances. This results in inadequate treatment and persistent infection spread [42]

In clinical and non clinical setting all over the world , bacteria are increasingly becoming resistant to MDR isolates are growing in our clinical centres and infection control programmes, despite the fact that the resistance rate in hospital acquired illnesses is not particularly high compared to other developing nations, but the same as global statistics. [43]

Pseudomonas aeruginosa (PA), which ranks second behind Escherichia coli among gram-negative organisms reported to the National Nosocomial Infection Surveillance System, is one of the major factors contributing to nosocomial infections. The notorious capability due to organism, which makes it challenging to manage the organism with antibiotic or disinfectants, is a significant aspect [44]. typically prescribed antibiotics. Gram positive bacteria were originally the main concern in burns units, especially methicillin-resistant staphylococcus aureus and vancomycin-resistant Enterobacter species. [45]

The skin serves as a barrier that stops microorganisms from entering our bodies unless an accident, trauma, or surgical procedure compromises the process. Thus, bacterial pathogens cause the wounds to get infected. [46]

Due to extended hospital stays, wound infection in surgery has become a worldwide issue. Gross patient mutilation results from high treatment costs and the rise of antibiotic resistant microorganisms. [47]

All surgeons deal with infection, and because of the nature of their work, they inevitably weaken the cutaneous or mucosal barrier, the first line of the host's defences.

[48]

The second most typical reason for nosocomial infection is surgical site infections. Although incomplete post-discharge data make this estimate likely too low, other data show that surgical site infections occur after 3–20 percent of some procedures. It has been estimated that at least 2 percent of hospitalised patients undergoing operative procedures develop surgical site infections. [49]

Conclusions G. neg- bacteria, in particular Esch. coli, klebsilla spp., prot. species., and pse. spp., are the principal causes of wound infection. G positive cocci, in particular S.aureus, are among the gramme positive cocci that have been implicated as a pathogen. Multi-antimicrobial resistance is prevalent in both gramme positive and gramme negative bacteria.[50]

The potential for bacterial medication resistance to transfer from one person to another both inside and outside of a healthcare setting has been shown.

Unrestricted access to medications and poor stewardship are two common causes that have been linked to the global spread of antimicrobial resistance. [51]

Therapeutic failure as a result of the spread of resistant clones and the capacity to develop antimicrobial tolerance and resistance has increased mortality and morbidity [52].

REVIEW OF LITRATURE

REVIEW OF LITRATURE

Baguma A, Musinguzi B et al (2020) :- A little background Antimicrobial resistance and bacterial wound infection continue to be problems for public health. Nosocomial bacterial infections, which are frequently characterised by multidrug resistance, continue to make the problem worse. Infected wounds frequently cause delayed epidermal development, which lengthens hospital stays. There is still a lack of information on the profile of clinically relevant microbes and their corresponding antiseptic treatment Ugandan resistance. In this research, focused on characterising the phenotypes of the organisms that infect wounds at Hospital (KRRH) and figuring out their individual antibiotic susceptibility profiles. 276 Pus samples from KRRH patients in total were collected between June 2016 and June 2017 and examined for bacterial infection using conventional bacterial culture methods. All of the pus samples came from injuries (surgical and non-surgical). According to CLSI recommendations, AST was completed & results were tell of. Results Following bacterial culture, 145 specimens were found to be positive (70.7 percent). The two bacteria that were most often isolated were Staphylococcus aureus and Escherichia coli. Sixty-eight percent of S. aureus isolates were positive for Methicillin resistance, according to tests for antibiotic drug resistance. While imipenem resistance was widespread in Klebsiella species, ciprofloxacin and levofloxacin resistance was present in 73% of Escherichia coli isolates. Conclusions G. neg- bacteria, in particular Esch. coli, Kleb. spp., Prot. spp., &

Pseu. spp., are the principal causes of wound infection. G positive cocci, in particular S. aureus, are among the gramme positive cocci that have been implicated as a pathogen. Both G neg- and G po+ .bacteria exhibit multi-antimicrobial resistance at high levels.

Sajitha k et al (2019) . One of the most prevalent and harmful types of trauma are burns. To reduce morbidity and death, patients with serious heat injury require urgent expert care. A little over 2 million fires are reported annually in the United States, according to the National Center for Injury Prevention and Control's data,and 1.2 million people sustain burn injuries as a result. The current study, "Bacteriological profile of burn wound infections," was conducted from Janu 2016 - Dec 2016 in a tertiary care hospital's Dept of Microbiology. For this study, 50 patients from our Burn Care Unit were chosen, representing all age groups andboth sexes.

Rami H , Al – Rifai , Majeed M . et al (2019):- . 48 research reports out of the 10,010 citations that were screened qualified. There were included 46 and 24 research studies, from 14 and 10 different countries, on estimations of the pre-DM and T2DM predominance, respectively. Overall, there were 14 MENA nations with a weighted T2DM prevalence of 7.5 percent (95 % 6.1–9.0 (confidence interval [CI], and 10 MENA countries with a 7.6 %weighted prevalence of pre-DM (95 percent CI, 5.2-10.4). Prevalence of T2DM ranged from 0.0 to 35.2 percent (pooled, 7.7 percent; 95 % CI, 6.1-9.4 %)
pre-DM was between 0.0 to 40.0 percent. (Combined, 7.9percent; 95 percent CI, 5.3- 11.0 percent) in female drawn from a sample of general populations. In T2DM, more prevalent in the nations of the Fertile Crescent (11.7 percent 95.5% CI, 5.2- 17.7%), obey by those of Arabian Peninsula (7.6%, 95.5% Con.Interwal, 5.9-9.5%),

N. African nations, & Iran (6.5 %, 95.5% CI, 4.3to9.1%). The highest Prevalence of pre-DM was in.

Khurram Fahud M , Maurya S , et al (2018) . There is a significant disparity between the number of burn patients and management resources in the developing world in terms of bacterial profile and antibiotic sensitivity pattern of burn wounds. Patients arrive at the tertiary centre after hours. Therefore, in our investigation, we evaluated the late-presenting burn cases, their epidemiological data, bacterial profiles, and patterns of burn wound antibiotic susceptibility. From December 2015 to November 2017, a prospective study was conducted at Jawaharlal Nehru Medical College and its affiliated hospital at Aligarh Muslim University. All burn cases that presented after a delay of more than five days and involved 20 percent to 60 percent of the body's surface area, had no other comorbid conditions, and were between the ages of five and sixty were included. 104 patients in total were enrolled in the study. Total 281

Saeed S , Ghorbanalizadgan M et al (2018) . : Despite significant advancements in anti-microbial therapy over the past 60 years with constant attention provided by a healthcare an infectious system illnesses, particularly infection of burn wound, remain significant issue & among the leading reasons of burn victims' morbidity and mortality. Undoubtedly, a proper control, prevention, & care for burn victims depend on a detection, for burn victims The This study's objective was to determine burn injuries & antibiotics. For three years, patients who were referred to a burn centre in Qom, Iran, were the subject of a cross-sectional study (from May 2012 - Nov 2014). Following the isolates, & sampling were identified using common biochemical techniques. Disk diffusion methodology was used.

In a study by Qayoom S, Jeer M et al (2018) :- Burn wound infection clinicomicrobiological profile and antibiogram of the isolates: Using conventional techniques, samples from the burn sites were obtained & cultured.

to see if any bacteria would grow there. The isolated organisms were identified using conventional microbiological techniques, and then a Kirby-Baeur diffuse discs test was employed to ascertain their sensitivity to various antibiotics. Pseudomonas aeruginosa (23%) predominated among the bacteria isolated from swab cultures, followed by Staphylococus aureus (22%), E. coli (14%), K. oxytoca (8%), CONS (7%) ,
(3%), others (3%), and sterile culture (3%). (3 percent). Pseudomonas aeruginosa's antibiogram revealed strong susceptibility to Imipenem (81%), Piperacillin/Tazobactam (78%), Amikacin (76%), & low
susceptibility to Gentamicin (57%). Ciprofloxacin, Cotrimoxazole, and Ampicillin allshowed a complete resistance pattern.

In a study by Upreti N, Rayamajhee B et al (2018). Methicillin-resistant, multidrug-resistant staphylococcus aureus prevalence Pus samples were handled using customary microbiological techniques. The modified The disc diffusion method of Kirby Bauer was employed for the antimicrobial susceptibility test. Patients' clinical data was gathered from their hospital records and completed questionnaires. 138 pus samples from wounds on various body areas, including the leg, hand, back, abdomen, The areas of the foot, breast, & head & neck were gathered. and examined. 113 isolates of bacteria found, with a bacterial growth rate of 62 percent overall; patients under the age of 10 had the greatestrate (82.1 percent). Bacterial isolates from patients made up a larger percentage(68.5%) (p 0.05). S . aureus was the most prevalent bacteria among the 116 bacterial isolates E. coli came in second (56.9%), then.

In a study by Shao F, Ren JW et al (2018);- : Patients' results for burn wounds' bacteriological profiles. Between January 2009 and December 2016, 318 patients with gas explosion-related deep second-degree burns were in Xinxiang, , China, for treatment as part of a prospective, observational study. Analysis was done on the patient's demographic information, the results of the culture & sensitivity to antibiotics tests, & the outcome variables (resuscitation fluid of, shock symptoms, body heat, heart rate, & healing period for wounds). Patients who underwent early burn excision (7 days after the

burn) had their outcomes compared. For 314 of the 318 people with burns that covered more than 10% of their total body surface area, bacterial culture and medication sensitivity data were available (TBSA). 330 (67.9%) of the 486 bacterial isolates were gram-neg, whereas 156 (32.1%) were Gram -pos. A quantity isolations & third-generation cephalosporin fight .

In a study by Banu A , Mathew P et al (2017) . Biological characteristics of burn wound infection with regard to the development of biofilm By inoculating onto MacConkey and Chocolate medium, sample swabs were processed. Three techniques—the Tissue culture plate, Tube.method, and Congo red agar (TCP)—were used to find the presence of biofilms. Pseudomonas aeruginosa was the most frequently isolated organism among the 100 burns patients investigated, with 90 (90%) of the samples yielding positive bacterial cultures. 42 isolates (46.6%) were positive for biofilm.

In a study by Richacane A, CK Samuel T, et al (2017).- To ascertain the isolates from Burn wounds' bacteriological profiles and antimicrobial susceptibility patterns. From December 2014 to November 2015, pus had obtained from the burn wounds of victims hospitalised to Ward D2C & the (BICU). The Microbiology Laboratory prepared samples for identification and sensitivity testing. Gram staining reactions, biochemical assays, and morphological traits were used to identify the bacteria that were extracted. The KirbyBauer diffuse discs method utilised for the AST. Additionally, surveys were given to research participants to gather data on demographics, the type of first aid provided, antibiotic use previous to culture, and sensitivity. 86 patients in all, including 45 41 from BICU & Ward D2C, took part while studying. Males made up 51 (59.3%) while women made up 35. (40.7 percent).

In a study by Pibonyeh N, Zardosht M et al (2016) :- Bacteriological characteristics of a burn patient-isolated strain of pseudomonas aeruginosa. 253 hospitalised burn patients in Ghotbeddin Shirazi between September 2013 and November 2014 were examined for P. aeruginosa as part of this cross-sectional study. Confirmed isolates were examined for the alterations in the OprD gene,

efflux pump activity, and the genes blaIMPI, II, blaSPM, blaKHM, and blaVIM that produce metallo—lactamases (MBLs). 32 (57.14 percent) of the 56 P. aeruginosa isolates (22% of the total) were MBLs, and only the blaIMPII, blaKHM, and blaVIM genes were found during genetic analysis. While 44 (78.6%) of the isolates displayed efflux pump activity, 52 (92.8%) of the isolates expressed the MexAB-OprM gene. It has been established using OprD sequencing analysis that the majority of imipenem resistance isolates have mutations in this linked gene. The findings have demonstrated that the circulating

AIM & OBJECTIVE

AIMS AND OBJECTIVES

AIM :- To research the bacterial profile & their Antibiotic Susceptibility Pattern of isolates from burn wounds.

OBJECTIVES :- 1. To evaluate the nature of bacterial isolates from burn wound.

2. To ascertain Gram's pattern of antibiotic susceptibility Negative & Gram Positive bacterial isolates.

STUDY DESIGN :- A SYSTEMATIC REVIEW

PLACE OF STUDY :- Department of microbiology , integral institute of medical science and research .

SAMPLE SOURCE :- PubMed , Google scholar

METHEDOLOGY

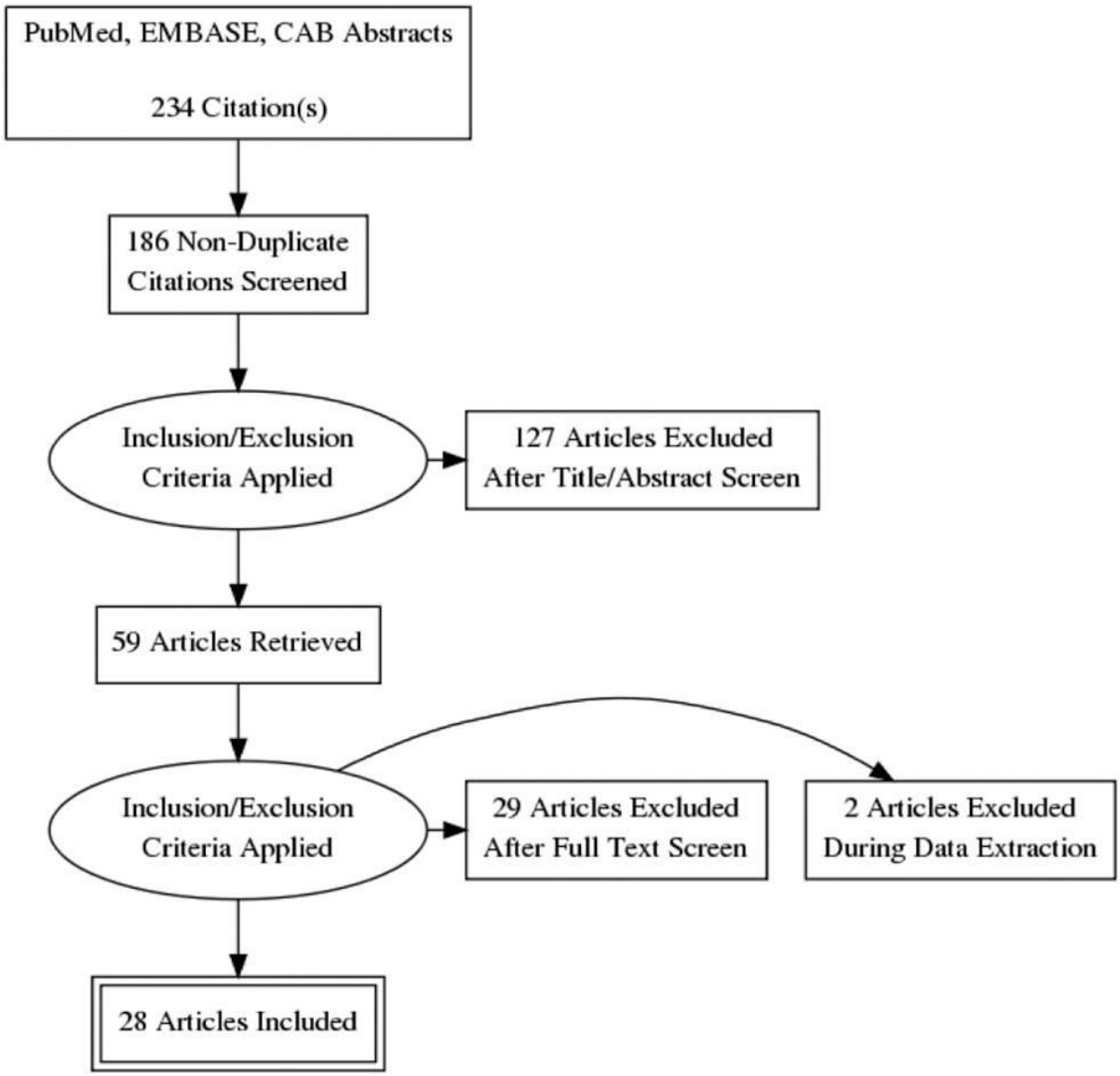
&

FLOW CHART

METHODOLOGY

- This study will be conducted following PRISMA strategies
- Various steps will be adopted for preceding the research .
- The method of study involves doing search of various articles using the Boolean operators on various websites such as Pubmed , Google scholar database will search for English paper using keyword such as Bacteriological profile and their Antibiotic susceptibility pattern of isolates from burn wound .
- Boolean operators include use of words AND,OR,NOT or AND , NOT as conjunctions to combine or exclude keywords in a search .
- This help in obtaining more precise and accurate articles ideal for the analysis .

TIMELINE :- October 2021 to July 2022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127 Articles Excluded After Title/Abstract Screen
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Inclusion/Exclusion Criteria Applied
29 Articles Excluded After Full Text Screen
2 Articles Excluded During Data Extraction
28 Articles Included

RESULT

RESULT

S.N	AUTHOR	YEAR	COUNTRY	STUDY FINDING
1.	BAYRAM Y. et al	2012	Turkey	250 different microorganisms were found in 179 individuals' burn wounds. Our findings showed that Acinetobacter baumanni (23.6 percent) was the most common isolate. Multidrug-resistant bacteria, such as p. aeruginosa (12%), staphylococcus aureus (11.2%), and E. coli (10%) have become a major concern in our burn unit.
2.	Muhammad N. et al	2012	Pakistan	In 57.85 percent of cases, only one isolate was found, whereas numerous isolates were found in 34.65 percent of cases. Gram-negative organisms were seen often. Paeruginosa predominated as the most common isolate, then comes s. aereus (21.0%), klebsilla spp. (8.88%), Acinetobacter spp. (4.63%), staphepidermidis (5.79%), proteus spp.(2.70%), and E. coli 1.54 percent.
3.	AL -Ibran et al	2013	Pakistan	382 burn patients were evaluated in this study. was a man (53.4 percent) The patients' average age was 28-7+13.3 years. The

				majority of the patients were between the ages of 16 and 30. The most frequently isolated bacteria, Pseudomonas aeruginosa, was discovered in 140 cases (36.6 percent).
4.	Das M. et al.	2013	India	The patients' median from 2 to 75 y. old, the average age was 26.7 and 95 percent confidence intervals of 24.4 to 28.9. the female to male ratio was 1:1, with 101 females and 86 men.
5.	Jain k et al	2014	India	100 patients were enrolled in this trial. Gram positive and gramme negative bacteria made up 47 (67.14 percent) and 23 (32.85 percent) of all isolated organisms, respectively. S. aureus was the most frequently isolated bacterium with 20 (48.78 percent).
6.	Mohammad S. et al	2014	Pakistan	95 positive microbial growths in total were found throughout this

7.	Ghai S. et al 2015	India	examination. Pseudomonas aeruginosa, which was found in 36 instances, was the most widespread isolate (or 35,29 percent). KLEBSILA 21 Pneumoniae (20.58 percent). 19 staphylococci aureus (18.62 percent). The susceptibility to antibiotics varied among the developing bacteria in different ways. 50 burn patients who visited or were admitted to the burn centre throughout the data collecting period were included in the study. Blood and wound swab samples from each trial participant were collected. The average and median ages were 36–48 and 28–40 years, respectively, with a range of 17–70 years. Males made up 20 of the study participants, while females made up 25 (or 40%). (or 60 percent). There were 50 burn patients in the study.

Pirbonyeh N et al	2016	Iran	32 (57.14 percent) of the 56 p. aeruginosa isolates in this investigation that were being genetically evaluated were MBLs. It has been established that the majority of imipenem resistance isolated have mutations in this associated gene, as 52 (92.8 percent) isolated had MexAB - OprM gene but 44 (78.6 percent) isolates exhibited efflux pump activity in OprD seqvencing evaluation.
Mehta S et al.	2017	India	There were single organisms in 161 (67.1%) of the 240 samples, mixed organisms in 22, and no growth in 57. (23.7 percent). P. aeruginosa predominated among the single isolates (20.8%), and A. baumanii came in second (15.4 percent). While patients were hospitalised, the bacterial isolation from burn wounds altered over time..
Banu A , et al	2017	India	Ninety (90%) of the 100 burns patients that were investigated had positive bacterial cultures. The most prevalent organism was p. aeruginosa, which was recovered in 42 isolates (46.6 percent)..

Richcane ,A et al.	2017	Ghana	The trial involves 86 patients in total, including 45 from ward D2C and 41 from the BICU. Males made up 51.3% of participants, while females made up 40.7%, with participants' ages ranging from 0-56. The most prevalent pathogen found in 26 (or 30.2 percent) isolates was pseudomonas aeruginosa, followed by pseudomonas spp.
Sukumar et al .	2017	India	In our investigation, a pus sample from nearly 1836 people (or 75 percent) exhibited bacterial growth. The most prevalent age range affected is between 21 and 40 years, with 1303 (71%) male patients and just 533 (29%) female patients infected. Gram negative bacteria were identified at a higher rate than gramme positive bacteria, with klebsiella species accounting for 35% of all isolates (635) and staphylococcus aureus accounting for 18% of all isolates.
Marshall H. et al .	2017	Tennessee	Comparing Serratia marscescens to the 0% control, reduced tubidity was seen. However, growth was observed in every concentration of AGC tested (0–10 percent), hence the MIC could not be established. E. cloacae (4%), Escherichia coli (6%), Klebsiella

			pneumoniae (6%), and P. aeruginosa (5%), all of which had different MICs.
Naser I et al.	2018	2018	The most effective antibiotics against Acinetobacter baumanni were the membrane-active peptide colistine and polymyxin B, with sentivities of 42 (93.4%) and (84.4%), respectively. The most resistant antibiotics were cephalosporins and fluroquinolones, with sensivities of 38 (84.5%) and 35 (77.8%), respectively.
Khurram M. et al	2018	India	104 patients in all were contained in our study.in sumof 281 swabs were discovered to be culture positive, and 243 of those were dominated by one type of bacteria. Pseudomonas aeruginosa was discovered in 29.22% of cases, followed by E. coli in 23%, klebsiella pneumoniae in 20.16%, Citrobacter in 9.88% of cases, and MRSA in 04.53 percent. 5.35 percent of cases involved MSSA.
Qayoom S. et al.	2018	India	Pseudomonas aeruginosa (23 percent) and staphylococcus aureus (22 percent) were the two most common organisms found in swab cultures. E. coli (14%) and k.

			pneumoniae (9%) are both common. P. auregunosa's antibiogram revealed a high susceptibility to imipenem (81%) piperacillin/Tazobactam (78%), Amikacin (76%), and ceftazidime (60%) are the most common combinations.
Upreti N. et al.	2018	Nepal	82 pus samples from wounds, totaling 138 on various body parts, including the foot, hand, back, abdomen, head and neck, foot, and breast were collected and evaluated;113 bacterial isolates , with patients under 10 years ofage having the highest rate of bacterial growth (82.1%).
Shams S. et al.	2018	Iran	P. auregunosa most common prevalentmicrobe in patients (66%) comes to coagulate-neg staphylococci (16%) and s. aureus (12%). Out of a total of 793 patients, 45 patients (19.82) had positive cultures. P. a displayed the highest levelof ciprofloxacin resistance in the evaluation of antibiotic resistance (93 percent).
Shao F. et al.	2018	China	For 314 of the 318 people with burns that covered more than 10% of their total body surface area, medication sensitivity and bacterial culture data

			were available. 330 (67.9 percent) of the 486 bacterial isolates were gram-negative, while 156 (32.1 percent) were.
Kaur Gill. M. et al	2019	India	The person study consisted of 101 isolates of P. aeruginosa and included a total of 1566 wound swab samples from patients with infected wounds that were processed for culture and sensitivity testing. The age range of 20 to 40 years had the highest rate of isolation, followed by those over 60. The nearly all acquired isolates were multi-drug resistant.
Sajitha k. et al .	2019	India	Pseudomonas aeruginosa (44 instances) and coagulase-negative staphylococci (37 cases) were the most prevalent isolates out of a total of 128 organisms (29 cases) Klebsilla pneumonia, E. coli, and proteus mirabilis are among the additional isolates. 9 of the 44 s. aureus isolates tested positive for methicillin resistance and were found to be cefroxin-resistant.
Emami A. et al.	2020	Iran	Flame injuries (35.4 percent) were to blame for the majority of burns that were sustained. P. aurigunosa was the most prevalent pathogen (49.9%),

			followed by klebsiella sp. (9.7%), Acinetobacter sp. (7.2%), and S. aureus (6.5%) based on the variety of bacterial isolates. In p. aeruginosa isolates, the meropenem resistance trend was waning.
Shukla V. et al .	2020	India	P. aeruginosa had the highest prevalence, which was found to be 37.5 percent, followed by S. aureus, whose prevalence was found to be 18.75 percent. Acinetobacter was the organism that was least frequently cultured. MRSA prevalence was found to be 57.14 percent, methicillin resistance prevalence to be 42.8 percent, and methicillin resistance overall to be 51.72 percent in patients with S. epidermidis.
Baguma A. et al.	2020	Uganda	S. aureus were the typically isolated bacterium in this study, with 100 and 95 specimens, respectively, demonstrating positiveresults after bacterial culture (70.7 percent). Sixty-eight percent of S. aureus isolates were positive for Methicillin resistance.

Jaiswal B. et al .	2020	Nepal	27 isolates of Acinetobacter spp. were found in 155 culture-positive samples. All isolates were susceptible to polymyxin B for tigecycline, but AST revealed that 24 isolates were resistant to ceftriaxone and ceftazidime. Additionally, 20 isolates exceeded the minimum inhibitory concentration value from the E test, while 19 isolates were resistant through the dis diffusion test.
Jauhari S. , pal S. et al .	2020	India	P. aeruginosa, A. baumanii, and proteus mirabilis were the most prevalent gram-positive isolates, whereas Coagulase-negative S. aureus staphylococcus, & str. pyogenes being the most frequently isolated gram-positive organisms. A all of 160 pus were collected to burn wound victims . Of these,113 (70.6 percent) were culture positive.
Maslova E. et al.	2021	Sweden	Infection is the main factor in burn wound patients' deaths. Infections can be notoriously difficult to treat, can result in enduring harm, delayed healing, and extended hospital stays—even in patients who survive.

Kulkarni V. et al	2022	India	From 91 burns wound infection swabs obtained from burn ward patients, 83 were found to be positive. As the sole etiological agents, seudomonas ps (33.73%) and. aureus (27.71%) accounted for 61.44 percent of the positive cases. E. coli and Lebsiella sp. made up 22.88 percent of the cases. the remaining 15.65% of cases had a combination of etiological factors. The outcome showed that gramme negative microbes predominated.

DISCUSSION

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CONCLUSION

DISCUSSION

Human mortality is primarily caused by infectious diseases. Today, drug-resistant bacteria have been identified as a significant hazard to global health systems . The identification of the resistant bacteria is the result of improper first-line antibacterial treatment. If therapy doesn't work, patients may be given more harmful, ineffective, and frequently expensive options. Studies have indicated that people with resistant illnesses have an increasing risk of hospitalisation and mortality . The goals of this experiment were to quantify the incidence of bacterial pathogens that cause burn wound infections and to identify isolated species that exhibit antibacterial resistance. In the 793 individuals who were investigated, Pseudomonas aeruginosa predominated, followed by coagulase-negative staphylococci, & Klebsiella spp. & Klebsiella were the most prevalent G- neg bacteria, whereas S. aureus was most prevalent Gram-positive bacterium from burn victims retrieved, according to a study done by Rezaei et al). In another study conducted in Ghana, Pseudomonas spp. (30.2%) were the most common G-positive and G -negative organisms isolated . Studies have demonstrated that P. aeruginosa is a well-known opportunistic pathogen with few needs for survival and the ability to adapt to a variety of environments. structural variation are just a few of the several mechanisms underlying antibiotic resistance in bacteria. P. aeruginosa might leverage the complexity of these processes to combat antibiotics (). As a result, research indicate that some antibiotics have trouble controlling P. aeruginosa . Ciprofloxacin and ceftriaxonewere the drugs against which isolated P. aeruginosa showed the highest resistance, with 93.3 percent and 86.6 percent, respectively. Pseudomonas aeruginosa strains isolated from burn victims were 60% and 65% resistant to ceftriaxone and ciprofloxacin, respectively, according to research by Ranjbar et al. in Tehran (28). Sorkh discovered Pseudomonas aeruginosa among the burn victims being treated in hospitals that was resistant to ceftriaxone (94.66) and ciprofloxacin (84 percent)). Meropenem and cephalexin likewise had the lowestresistance rates. Bayram et alresearch .'s supported by ours demonstrated .

No appreciable differences in the findings were found between the statistic of prevalent infection agents drawn from this investigation and the other studies carried out in the Ghotbeddin Shirazi Burn Center . The most common infectious agents are Pseudomonas aeruginosa and Staphylococcus aureus, with a relative prevalence rate of 21% for both of them, according to an analysis of the most common infections. Acinetobacter and other Pseudomonas species have a prevalence rate of 3%, whereas other bacteria like Klebsiella sp. are either present but at very low levels. E. coli prevalence is also quite low, at less than 2%. The findings of this method for bacterial infection over the previous three years are The agents utilised vary greatly. According to the findings of several research, main causes of insufficient control of infections, specially in Gram negative bacteria, is their capacity to use a variety of methods to combat the antibacterial activity. The findings of this study on the processes underlying resistance to the primary infectious agent in burn centres may be useful in developing an effective treatment. Burn injuries are a significant public health issue in many emerging and underdeveloped nations worldwide . This category of patients needs rapid, specialised care in order to reduce morbidity and death due to the severity of their injuries. According to several studies, up to 75% of all fatalities are thought to result from burn injuries.

CONCLUSION

According to the current study, MDR strains of Gram-negative bacteria, particularly pseudomonas spp. and S. aureus, have become the main etiological agents in burn wound infections in the hospital setting. Antibiogram and resistance pattern observations necessitate a revision of antibiotic treatment guidelines and the use of combination medications to treat burn site infections. The observations about the development of ESBL and MBL strains are equally important and indicate the root of the pattern of antibiotic resistance. The outcomes were contrasted with the reports that were on hand.

Compared to gramme positive bacteria, gramme negative bacteria are more common as the cause of burn wound infections. Pseudomonas species are the most frequent germs that result in burn wound sepsis and biofilm formation. Therefore, managing burn wounds requires appropriate wound care. The gathered information supports the need to outline a management strategy that includes debridement, irrigation, and antibiotic therapy.

S. aureus was the most typical isolate in this study, found in pus samples. Sixty-six percent of the S. aureus isolates , compared to 40 percent of K. pne & 33 percent of C. fre, which also produced ESBLs. E. coli came in second with E. coli taking the lead (25 percent). MDR strains madeup 80 percent of the E. coli, , & 68.2 percent of the populations. the need for health care facilities to prescribe antibiotics cautiously. , routinely monitor their AST. Upreti et almedicine .'s wasreported early.

Burn wound infections are primarily caused by Pseudomonas, then S. aureus. Overcrowding is a major factor in cross infection in burn units, which must be prevented to keep hospital acquired infections under control. In order to prevent and treat MDR isolates in burn units and lower overall infection-related morbidity and mortality, rigorous antibiotic policies, careful microbiological surveillance, in vitro testing prior to the start of antibiotic therapy, and other measures are recommended.

In conclusion, T2DM and preDM significantly impact ladies who are pregnant age . In comparison to the other MENA nations found with prevalence estimates in this research, the T2DM burden estimates were higher in the countries of the . Although a overall estimated prevalence , public health authorities must pay more attention to early detection and control to prevent . Early DM identification and control strategies at the national level should take into account the major causes of DM, particularly the rising incidence of obesity andbody fat. Additionally, it is important to facilitate high-quality research and monitoring programmes in nations with little information on the incidence of DM and to provide the prevalence estimates among women who are fertile.

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