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ASSESSING THE KNOWLEDGE ATTITUDE, PRACTICE AND CLINICAL SCREENINGABOUT NEEDLE STICK INJURY IN OPERATION THEATRE WORKERS AT TERTIARY CARE HOSPITAL

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ABSTRACT

Needle stick injuries (NSIs) are a significant occupational hazard for healthcare workers, posing a serious risk of transmission of blood-borne pathogens such as HIV, hepatitis B, and hepatitis C. Despite various preventive measures, NSIs continue to occur, leading to considerable health, psychological, and economic impacts on healthcare professionals.To identify factors contributing to needle stick injuries among OT workers, enhance prevention through improved knowledge, attitude, and practices, and assess hepatitis B immunization and screening status of exposed workers.A cross-sectional study design was employed, involving the collection of data through structured questionnaires distributed to healthcare workers in National Hospital and Medical Center in Lahore. The study population included various health professionals. Statistical analysis was performed to determine the prevalence of NSIs, identify associated risk factors, and evaluate the implementation and effectiveness of preventive strategies by using Chi-Square in SPSS V-23.The study revealed a significant prevalence of NSIs among healthcare workers, with nurses being the most affected group. The majority of injuries occurred during the recapping of needles or disposal of sharps. Despite awareness of preventive measures, lapses in adherence to safety protocols were common, highlighting a critical gap in the prevention strategies currently in place.Needle stick injuries remain a critical concern in healthcare settings, particularly due to non-compliance with established safety protocols. The study underscores the need for continuous training, stricter enforcement of preventive measures, and the introduction of safer needle devices to reduce the incidence of NSIs among healthcare professionals.

Keywords:*Needle stick injuries, healthcare workers, blood-borne pathogens, prevention, occupational hazard, safety protocols*

INTRODUCTION

A needle stick injuryis a wound caused by a needle that accidentally punctures the skin, and it is a serious occupational hazard for medical professionals including doctors, nurses, and paramedical staff.[27]The source of needle stick injuries is passing intravenous cannulas, blood collection needles, and sharp instruments during procedures.[26].According to a World Health Organization (WHO) study, approximately 2.6% of healthcare workers worldwide are annually exposed to Hepatitis C virus, 5.9% to the Hepatitis B virus, resulting in an estimated 16,000 new Hepatitis C virus infections, and 66,000 new Hepatitis B virus infections among healthcare workers globally each year.[11]

Healthcare workers [22] who are exposed to needlestick injury have significant health hazards, particularly those working in operation theatres where the risk of exposure to bloodborne pathogens is heightened. The needle stick injury (NSIs) not only affect the healthcareprofessional physical health but also have psychological, [6] social, and economic repercussions.

Operation theatre workers, including surgeons, nurses, [6]anesthetists, and support staff, are particularly vulnerable to NSIs due to the nature of their work, which involves the frequent handling of sharp instruments and needles. The high-stress environment, prolonged working hours, and the urgency of surgical procedures further exacerbate the risk. Understanding the knowledge, attitude, and clinical screening of blood after NSIs among those workers is crucial for developing effective prevention strategies and ensuring a safer working environment.

NSIs are a common problem in healthcare settings worldwide. The World Health Organization (WHO) estimates that millions of healthcare professionals sustain non-sexual injuries (NSIs) each year, many of which go unreported. The U.S. Centers for Disease Control and Prevention (CDC) estimates that 385,000 needlestick injuries occur annually among healthcare professionals working in hospitals.[27] Because many cases go unreported, the prevalence is likely to be higher in developing countries. Regular handling of sharp instruments in confined, high-pressure environments puts operating room staff at greater risk. Studies have shown that most non-sterile sutures, injections, and post-operative sharps handling are group-based. Needlestick injuries occur due to a number of factors, including fatigue, staff shortages, lack of training, and failure to adhere to safety procedures. According to WHO's global burden of disease estimates, 37% of hepatitis B virus transmission among healthcare workers is thought to be related to occupational exposures, particularly sharps injuries. Healthcare workers (HCWs) are thought to be four to six times more likely to be infected with hepatitis B virus than the general population. This may be due to the nature of their employment, which involves greater risk of contact with human fluids and sharp injuries, particularly needlestick injuries.[22]

Operation Theatre (OT) workers, including surgeons, anesthesiologists, nurses, surgical technologists, and other healthcare professionals, are at high risk of needle stick injuries (NSIs) due to their frequent exposure to sharp objects and bodily fluids. NSIs can lead to bloodborne pathogen transmission, including Hepatitis B, and Hepatitis C,[10]which can have severe outcomes for healthcare workers' health and comfort.

Despite the availability of preventive measures and guidelines, NSIs remain a persistent problem in healthcare settings. The World Health Organization (WHO) estimates that approximately 3 million healthcare workers worldwide experience NSIs annually, and 16,000 cases of hepatitis C infections[10].Information, demeanor, and practice are urgent in understanding NSIs. However, research has shown that healthcare workers frequently have inadequate knowledge and awareness of NSIs, which increases the likelihood of injuries and subsequent infections. The gamble of NSIs is especially high in OT settings because of the speedy and high-stress climate, where thoughtfulness regarding security conventions might be compromised. The management of NSI relies heavily on clinical testing for blood-borne pathogens, which enables prompt infection detection and treatment. In any case, adherence to screening conventions and rules can be conflicting among OT laborers Knowledge, attitude, and practice (KAP) [5]are crucial in preventing NSIs.[6]

Healthcare workers[22] have a high risk of needle stick injury and pose a risk of bloodborne pathogen transmission. However, many workers may not know the risks, prevention strategies, and post-exposure protocols. There may be inconsistencies in following standard precautions, using personal protective equipment, and reporting NSIs. Evaluating KAP [5]helps identify training needs to enhance knowledge, improve attitudes, and encourage safe practices. Research findings can inform policies and guidelines for NSI[6] prevention, management, and surveillance. By reducing NSIs, healthcare workers can minimize the risk of transmitting bloodborne pathogens to patients. Assessing KAP can help protect healthcare workers from occupational hazards and promote a safer work environment.Clinical screening after a needle stick injury (NSI) is crucial for several reasons:

1. Early detection of infection: Screening helps identify potential bloodborne pathogen transmission, hepatitis B or hepatitis C, at an early stage.
2. Prompt treatment: Early detection enables timely initiation of treatment, reducing the risk of infection transmission.
3. Prevention of chronic infection: Identifying and treating infections early can prevent chronic conditions, such as hepatitis B or C, which can lead to liver disease or cancer.
4. Reducing anxiety and uncertainty: Screening provides reassurance and reduces anxiety for healthcare workers who have experienced an NSI.

After testing positive for Hepatitis B or C following a needlestick injury, timely treatment involves:

Hepatitis B:

1. Hepatitis B insusceptible globulin (HBIG):managed immediately (roughly within 24 hours) to prevent disease.
2. Viral Hepatitis B vaccination: Gotten done or boosted, if essential.

Hepatitis C:[10] Antiviral medication: commenced immediately, ideally within 24 to 48 hours, assuming the diagnosis of the disease. It is critical to take note that therapy decisions should be made in a gathering with clinical benefits proficient, considering individual circumstances and rules. Immune globulin to hepatitis B (HBIG): given right away (within 24 hours) to avoid infection. Managed right away (in something like 24 hours) to prevent disease.[18]

Percutaneous contact with blood and body fluids contaminated with needlesticks and sharp instruments is considered a serious risk factor for infection and death in the clinical setting. Healthcare assistants are at high risk for exposure to and transmission of bloodborne microorganisms through needlestick injuries involving sharp wounds.[6].

The two most important infections spread primarily through needlestick injuries are hepatitis B and the viral infection hepatitis C. In 1990, between 600,000 and 800,000 needlestick injuries were recorded each year, or nearly 2,000 incidents per day. As a result, thousands of healthcare workers were exposed to potentially fatal bloodborne infections, including HBV and HCV. [28] Viral hepatitis is caused by a DNA infection known as the hepatitis B virus (HBV). If left untreated, hepatitis can lead to hepatocellular carcinoma and cirrhosis. Asia, the Middle East, and Africa account for at least three-quarters of the disease. According to WHO estimates, 2 billion people worldwide have serologic evidence of past HBV infection (WHO, 2000).[22] Asians account for 75% of the world's HBV carriers. The incidence of chronic liver disease caused by viral infections, HBV and HCV, is increasing in Pakistan. There is an increased risk of contracting and spreading hepatitis to others among health care workers and patients. Contaminated sharps have been implicated as a factor in 261 deaths and 66,000 cases of HBV infection each year.[21]

The primary concern with NSIs is the potential for transmission of bloodborne pathogens. When a contaminated needle pricks a healthcare worker, the infectious agents present in the blood can be transmitted directly into the bloodstream. The most frequently transmitted pathogens through NSIs are the hepatitis B[21] and hepatitis C viruses. The gamble of transmission changes depending upon the kind of microbe, the volume of blood included, the profundity of the injury, and the viral heap of the source patient. The effect of NSIs reaches out past the quick actual injury. The anxiety of a possible infection confronts healthcare workers with an NSI, which can cause significant psychological distress. The follow-up testing and

the period of uncertainty awaiting results can affect their mental health and job performance. Additionally, NSIs[6] have economic implications, including costs associated with post-exposure prophylaxis, medical care, and potential loss of work.

Understanding the level of awarenessand view of operation theatre workers towards NSIs is essential for effective prevention and management. Knowledge about the risks associated with NSIs, modes of transmission of bloodborne pathogens, and preventive measures is critical for reducing the incidence of these injuries. Studies have indicated varying levels of knowledge among healthcare workers, with gaps often existing in the awareness of proper handling and disposal of sharps and tofollow proper protocols for post-exposure management.

Attitudes towards NSIs, including perceptions of risk, beliefs about the efficacy of preventive measures, and the perceived importance of reporting injuries, significantly influence compliance with safety protocols. A positive attitude towards safety measures and a high perceived risk of NSIs are associated with better adherence to preventive practices. Conversely, a lack of concern about the risks or skepticism about the effectiveness of preventive measures can lead to complacency and increased risk of injury.

Bloodborne pathogens such as hepatitis B and hepatitis C are transmitted through needle stick injury. Operating theatres present unique challenges in healthcare settings due to the nature of surgical procedures and the high frequency of blood sampling. The causes of needlestick injury areinadequate training, a lack of awarenessof infection control standards, and insufficient resources for the use of sharp instruments are additional causes. It is essential to have an understanding of the knowledge, attitudes, and behaviors of workers in operating rooms regarding needle stick injuries in order to implement efficient preventative measures and guarantee workplace safety. The goal of the study is to find out how many NSIs there are now in operation theatre workers' knowledge of preventative measures, attitudes toward safety protocols, and adherence to best practices. Wounds because of sharp edges and IV cannulas can likewise add to blood-borne infection. At the beginning of the 21st century, 16,000 hepatitis C and 66,000 hepatitis B infections occur among healthcare workers per year according to World HealthOrganization. per year among healthcare workers.[8]

Mostly needle stick injuries occur during suturing, administering injections, and handling sharp instruments post-procedure and different kind of needles like blood collection needles,trocers, broken vials and scissors. Factors such as fatigue, inadequate staffing, lack of training, and non-compliance with safety protocols further compound the risk.[27].The majority of NSIs are caused by drug preparation, administration, recapping, and holding syringes without a suitable container, opening needle caps, suturing, and following guidelines and preventative measures; NSIs stay a diligent issue in medical services settings, with an expected 3 million cases happening yearly around the world

The HBV people who are working in a clinical climate are no less than 3-6 times more than everyone in created nations and 6-18 times more than everybody in emerging nations[27]. Not only is NSI a serious and prevalent risk in the healthcare industry, but it is also one of the most easily avoidable risks for healthcare workers (HCWs). More than 2 million occupational exposures occur annually among 35 million HCWs at risk, according to WHO data. Due to a variety of factors, including exhaustion, carelessness, stress, and so on, needle stick injuries account for the global incidence of 36.7% of HBV, 39% of HCV, among healthcare workers. Possibly irresistible examples of NSI are Blood, Semen, and Vaginal Emissions. Fluids[8] from the body, such as CSF, peritoneal fluid, and pleural fluid, amniotic liquids, while Pee, Spit, Stool, Sputum, Tears, Vomitus, Sweat, and Nasal Discharges are not viewed as irresistible except if tainted with blood and body liquids. According to the Centers for Disease Control and Prevention (CDC), between 600,000 and 1,000,000 NSIs occur each year. Several studies have shown that the most common practices that lead to NSIs include infusion, intravenous cannulation, improper needle disposal, and needle recapping.1 Hospital workers suffer more than 385,000 percutaneous injuries (cuts, punctures, needlesticks, and other accidents involving sharp objects) each year [27]Hepatitis B is the 10th cause of death in the world.Annually, 0.5-1.2 million people die because of hepatitis B

infection in the world, of whom 75% are in Asia.Cirrhosis and hepatocellular carcinoma[18] are the leading causes of death in HBV infected patients. Annually more than half a million people are infected with HBV, and if they receive no treatment about 15%-40% of them are at high risk of cirrhosis or hepatocellular carcinoma.[17]

NSIs are associated with several mental health problems. For example, a systematic review found that the primary psychological impacts of NSIs were fear, anxiety, and sadness, and studies have recommended that students in professional fields require more support and counseling services after experiencing harm. [14]In Japan, the estimated annual economic impact of NSIs was $302 million. According to CDC estimates, 600,000 to 800,000 needlestick injuries occur each year[28] in hospitals and other healthcare facilities in the United States, affecting 8 million healthcare workers. Needlestick injuries are common among nursing and dental students but are rarely reported. To reduce the incidence of bloodborne pathogens, sharps injuries, and related diseases, healthcare professionals, staff, and students should attend courses and seminars. Lack of resources, ignorance, inappropriate use of sharps, lack of training, and illiteracy are the main causes of needlestick injuries.[13]

The effects of a needlestick injury on healthcare workers can be comprehensive and far-reaching, impacting their physical, emotional, and professional well-being. Some physical effects include transmitting bloodborne pathogens (HBV, HCV, etc.), Infection and illness, Chronic diseases (liver disease, cirrhosis, liver cancer), and Allergic reactions to medications or substances.

Emotional and Psychological Effects include anxiety and stress, depression and mood disorders, Post-Traumatic Stress Disorder (PTSD), fear of disease transmission, and avoidance behaviors.[14]

Personal effects include strained relationships with family and friends, social isolation and withdrawal, feelings of guilt, shame, or self-blame, difficulty with intimacy and sexual relationships, and Increased use of substances or addictive behaviours.

Financial effects[18]include medical expenses and treatment costs,lost wages and reduced income, legal fees and litigation, and increased health insurance premiums.

Healthcare organizations must prioritize needlestick injury prevention, provide support and resources for affected workers, and foster a culture of safety and well-being.

Due to low resources, staff shortages and not following the proper policies and guidelines of infection control most needlestick injury not reported. Universal precautions, such as appropriate hand washing with an antiseptic solution and barrier precautions, reduce contact with blood and body fluids.[11]

Additionally, NSI[6]may occur during the needle waste treatment procedure.When performing clinical tasks, healthcare professionals are more likely to come into contact with needles and sustain needle-stick injuries, which can result in serious or even fatal infections. During the one-month follow-up consultations, regular retroviral testing and counseling support should be continued in addition to confidential counseling and follow-up. Effective management techniques aremonth critical for avoiding and controlling NSIs and theirrepercussions for medical care professionals, such asadministering the HBV vaccine[8], teaching through training, and supplying dedicated sharp containers to each hospital room to prevent needle recapping [12]

Needle stick wounds do not just threaten the well-beingof experts on contamination but in addition, have a serious and durable close-to-home effect. Health education programs that can change people's knowledge and attitudes about safety measures that prevent the accidental transmission of blood-borne [8]diseases are needed. If healthcare professionals follow proper protocols and guidelines for sharps disposal and passing sharp instruments during procedures NSIs[6] can be avoided. The CDC says that safer needle devices can stop up to 86% of injuries caused by needle stick.

The people who is working in operation theatre including surgeons, anesthesiologists, staff, and paramedical staff have a higher risk of needle stick injury. These injuries involve accidental penetration of the skin by needles or other sharp medical instruments, exposing healthcare workers to potential infections and other health risks. OT technologists, responsible for assisting surgeons during operations, are particularly vulnerable due to their frequent interaction with

sharps and patients in sterile environments. NSIs are a global concern, with incidence rates varying based on healthcare practices, safety protocols, and compliance with guidelines.

Pathogens can be introduced directly into the bloodstream or surrounding tissues when a needle penetrates the skin.[8] Hepatitis B virus (HBV), and hepatitis C virus (HCV), are all common pathogens associated with NSIs. The type of pathogen, the extent of the injury, and the promptness with which post-exposure care is provided all influence the severity of the infection. When a patient sustains an NSI, healthcare professionals should adhere to established protocols:

1. Immediate care: Use soap and water to clean the wound.
2. Report incident: Tell the manager or assigned disease control official.[8]
3. Documentation: Keep track of the details of the incident, including the circumstances and source patient data

Haemodialysis, organ transplants, and contact with blood products and transfusions are the main ways that HCV is spread. Sharp injury и needle stick injury are the primary means of acquiring a hepatitis B or C infection among healthcare professionals. It is believed that 3% to 10% of cases of hepatitis C and 7% to 30% of cases of hepatitis B are transmitted by contaminated blood.[18] Compared to the general population, a liver-related infection is more common among doctors, dentists, dialysis unit employees, and laboratory professionals. Surgeons are most at risk of contracting HBV from their patients since they work directly with blood. [15]

The spread of HBV among healthcare professionals is well known. Of all bodily fluids, blood has the greatest level of HBV. Additionally, it was discovered that the surface antigens of H (HBsAg) was present in bile, saliva, semen, sweat, nasopharyngeal washings, faeces, cerebrospinal fluid, and synovial fluid.

The average rate of occupational contact to blood and bodily fluids from HCV-positive patients is 1.8% (range: 0-7%). In contrast, only hollow-bore needles were shown to transmit HCV. Understanding about how HCV endures in the environment is lacking. The Advisory Commission on Immunisation Practices (ACIP) examined the evidence on the use of iodine (IG) as a post-exposure prophylactic therapy to avoid HCV infection in 1994. The ACIP concluded that they were not in favour of interferon or IG as PEP for HCV.

Vaccination[8] against hepatitis B is very important for healthcare workers, including doctors, technologists, nurses, and technicians.

1. Protection against liver disease: Hepatitis can cause acute and chronic liver disease, leading to end stage liver disease, liver failure, and even liver cancer.[18]
2. Prevention of transmission: Hepatitis viruses (B, and C) can be spread through contaminated food and water, sexual contact, sharing needles, or mother-to-child transmission during childbirth. Vaccination[8] helps prevent transmission.
3. Reduced risk of liver cancer: Hepatitis B and C are given no attention and no treatment for hepatitis can lead to cancer. Vaccination[8] can significantly reduce the risk of developing liver cancer.
4. Herd immunity: Widespread vaccination helps prevent outbreaks and protects those who are not vaccinated, like individuals with weakened immune systems.Vaccine Names:

Engerix-B, Recombivax HB are hepatitis B vaccine.The Hepatitis B vaccine[8] is typically administered in a series of 3 doses, depending on the age and risk factors of the individual. The usual schedule for adults is:

- Dose 1: First time you came for vaccination
- Dose 2: 1 month following the initial dose
- Dose 3: 6 months after the first dose (optional, but recommended for full protection)

For infants and children, the schedule is:

- Dose 1: At birth
- Dose 2: 1-2 months after the first dose
- Dose 3: 6-18 months after the first dose

The healthcare workers who have direct contact with blood and those who have compromised immunity,booster doses may be recommended for these people.

The Hepatitis B vaccine has been shown highly productive in stopping infection and related complications, with a 90-100% success rate. Pain, redness, swelling at the injection site, fatigue, and a headache are all mild and temporary side effects. After a needlestick injury, screening for Hepatitis B and C [8]is essential to quickly identify infections and begin the appropriate treatment.

After all legal requirements have been fulfilled, the researcher makes hard copies of the questionnaire and divides it among the desired populations to fill them out according to the researcher's requirements for gathering data. Additionally, those participants who were willing to sign a consent form and were ready to donate blood for screening will also receive hard copies of the questionnaire. An expert takes venous blood, places it in a yellow top tube , labels the tube with their name, ID, and other information, and stores it in a bag to keep it out of direct sunlight. Finally, the blood tubes were submitted to the laboratory for screening. The Laboratory uses commercially available quick immunochromatographic test (ICT) kits of anti-HCV, and anti-HbsAg that are used to perform screening of HCV, and HbV, respectively. After the test was complete, the information given about hepatitis records and mostparticipantshad negative reports no hard copy was received by the laboratory.

Rapid screening tests, such as strip tests, can detect the presence of antibodies or antigens in a short period, usually within 15-30 minutes.They are simple, rapid, and accurate, making them ideal screening tools for healthcare settings.

Strip tests work by detecting the presence of specific antibodies or antigens in a blood sample. The test strip contains a test line and a control line. If the sample contains the target antibody or antigen, if a colored line appears on the strips, indicating a positive result.

Strip tests offer several advantages, including:

- Rapid results: Strip tests provide quick results, allowing for timely intervention and treatment.
- Ease of use: Strip tests are simple to perform and require minimal training.
- High accuracy: Strip tests have high sensitivity and specificity, reducing the risk of false results.
- Cost-effective: Strip tests are often less expensive than laboratory-based tests.

Medical students are at a significant risk of coming into close contact with sharp instruments and spreading hepatitis B and C to others. In addition, they are more likely to come into contact with sick people. Being well informed about these diseases and forming the right mindset about them is the first step to preventing their spread. This is important to limit the spread of the disease between patients and healthcare workers. [23] The World Health Organization (WHO) defines safe injection as a procedure that does not cause injury to the individual receiving the injection, does not put healthcare workers at risk of avoidable harm, and does not generate hazardous waste to the public. Unsafe and illogical injection practices are dangerous in developing countries like Pakistan. More than 80% of needlestick injuries could be prevented with strong health initiatives and safety measures. Many studies worldwide support the use of “universal procedures” as a safety strategy [28]

Numerous exposures can occur in hospital settings, and these diseases can potentially spread to healthcare workers (HCWs). The risk of bloodborne infections may also be increased by injuries from IV cannulas and other sharp objects, such as knives. The World Health Organization estimates that by the early 21st century, 16,000 new HCV infections and 66,000 new HIV infections will occur annually among healthcare workers due to needlestick injuries. In countries such as India, it is estimated that 1.6%, 4.1%, and 7.8% of healthcare workers (HCWs) sustain injuries from sharp objects contaminated with hepatitis C and hepatitis B viruses each year. As a result, a significant lifetime risk of infection is predicted. HCWs in Southeast Asia are most at risk for occupational blood and other body fluid contamination. Needle-stick injuries can occur during a variety of activities, including uncapping, recapping, handling, surgical or intraoperative injections, inserting and extracting cannulas, impacting with objects or people, cleaning, and disposal. Unintentional punctures or wounds caused by contaminated needles can introduce harmful substances into tissues and are a common way for infections and diseases to spread.

Despite recommendations and preventive measures, needle-stick injuries (NSIs) remain a chronic problem in healthcare settings. OT workers are particularly vulnerable to NSIs, which can lead to the transmission of bloodborne pathogens, particularly hepatitis B and C. It is essential for OT staff to have an understanding, mindset, and practice (KAP)[5] of NSIs to avoid these injuries and subsequent infections.

Clinical screening and reporting practices are vital to an effective NSI prevention program. Prompt reporting and appropriate clinical

screening following an NSI are crucial for the timely administration of post-exposure prophylaxis and other actions that can significantly lessen the risk of infection. However, underreporting of NSIs is a widespread issue in healthcare settings. Factors contributing to underreporting include fear of stigma, lack of awareness about reporting procedures, perceived low risk of infection, and concerns about the consequences for one's career.

An effective NSI prevention strategy requires a robust reporting system that encourages timely and accurate injury reporting. This involves not only creating an accessible and non-punitive reporting system but also ensuring that operation theatre workers are well-informed about the importance of reporting NSIs and the procedures for doing so. Regular training and education programs can enhance knowledge and attitudes, thereby improving compliance with reporting and clinical screening protocols.

Common elements of a comprehensive program to prevent needle stick injuries

Examine blood and body fluid exposures (BBFEs) resulting from needlestick injuries and other occupational accidents involving sharp objects to identify patterns.

1. Vaccinate[8] all healthcare personnel against hepatitis B.
2. Provide appropriate instruction and refresher training to all HCPs on the safe handling and disposal of knives and other sharp objects.
3. Determine priorities and strategies to prevent sharp object injuries.
4. Making safer work practices that could lead to sharps injuries by changing them.
5. Increase awareness of the importance of needle safety in the workplace.
6. Establishing mandatory policies and procedures for reporting all injuries caused by needles and other sharps.
7. Providing feedback on prevention performance and assessing the utilization and efficiency of prevention efforts

1.1. PROBLEM STATEMENT

There are serious health hazards associated with the high rate of needle stick injuries (NSIs) among operating room (OT) personnel. Nonetheless, a thorough grasp of this population's knowledge, attitudes, and practices (KAP) in relation to NSIs is lacking. To identify probable factors contributing to the occurrence of NSIs and to create effective therapies, a thorough clinical assessment is also necessary. Thus, in order to improve workplace safety and reduce the risk of NSIs, this work aims to assess the KAP of NSIs among OT workers and carry out a clinical evaluation.

1.2. RESEARCH GAP

The existing literature on needle stick injuries primarily emphasizes the knowledge, attitude, and practice of needle stick injuries but has limited focus on operation theatre workers, existing literature may primarily focus on healthcare workers in general, with no attention on OR workers.

1.3. RESEARCH OBJECTIVES

- To study various factors responsible for needle stick injury among OT workers.
- To prevent Needle Stick Injury by improving knowledge, attitude, and practice.
- To assess the hepatitis B immunization status and check screening status for those who will exposed to needle stick injury.

LITERATURE REVIEW

More than 20 million dedicated healthcare professionals (HCPs) face mechanical, chemical, and biological hazards. The World Health Organization estimates that 3 million healthcare workers are exposed to body fluids such as blood each year through needle sticks or sharps. Exposure to body fluids and blood led to 57 documented cases of HIV seroconversion among healthcare workers in 2001. Each year, 2,000 workers contract hepatitis C and 400 contract hepatitis B through contact. Needles have been shown to spread 20 different infectious pathogens. More than 80% of needlestick injuries could be prevented by using safe needle devices. Many countries have passed laws to protect HCPs by urging companies to use best practices to reduce these risks. There have been many suggestions for post-exposure management procedures for injuries resulting from needle sticks or exposure to blood or body fluids. Hepatitis B antigen (HBIg) can be administered within the first 7 days. Healthcare organizations should proactively follow these recommendations, provide hepatitis B (HBV)

immunization to all healthcare providers, and develop policies and procedures to reduce needlestick injuries through a holistic needlestick injury prevention program that combines improved engineering controls. This overview first provides the historical context, nature, and scope of the problem, and then looks at the current state of early detection, clinical management, and business accountability today. (Moazzam A et al, 2010)

The study was conducted to assess knowledge, attitude, and practices about needle stick Injuries in health care workers. At the Pakistan Institute of Medical Sciences in Islamabad, a study in a hospital setting was conducted. A self-regulated 19-thing survey was ready, which contained data about needle stick wounds, their mindfulness, the recurrence of the injury, and the conventions trailed behind a physical issue that happened. After obtaining their informed written consent, these questionnaires were distributed to 500 healthcare professionals who worked in various wards and theatres of the hospital. Doctors, nurses, and paramedics made up the healthcare staff. The survey was returned by 500 healthcare workers who completed it. 416 (83.2%) of these people said they had ever been hurt by a needle in their work. Most of the affected HCWs worked in the emergency department (8%), followed by other wards (27%) and then the emergency department (65%). Only 6.4% of the workers were unaware of the possibility of needlestick injuries, while the majority (93.6%) were not. In 51.2% of cases, needlestick injuries were caused by new and unused needles, and in 32.8%, physical problems occurred after the same needle was used for injection. In 5% of cases, the injury was caused by a needle contaminated with blood. The most common causes of needlestick injuries were overwork (36.8%), rushed delivery (33.6%) and needle recapping. Only 13% of HCWs followed international guidelines regarding needlestick injuries, and no incidents were reported to the hospital authorities. 66% of HCWs had previously received the hepatitis B vaccine. HCWs were unaware of the risks associated with needlestick injuries and did not take recommended precautions.(Shahzad Hussain Waqar et al, 2011)

This study aimed to determine the prevalence of needle-related and sharps-related injuries (NSIs) using a questionnaire-based approach. It also assessed and compared the variables that influenced the causes and trends of NSIs experienced by nurses and nursing students, as well as the participants' recall of how they learned about NSI warnings and controls. There was a 78.4% response rate from the 195 surveys that were distributed and the 196 that were returned. Over the 12-month study period, 78% of nursing learners and 38.5% of nurses on staff reported having NSIs. It was most likely that an injury from a needle or other sharp instrument would occur during activities conducted in the procedure rooms. 51 percent of nurses were hurt when they were recapping used needles. For 49% of nursing students, breaking an ampoule resulted in an injury. The most common causes of injuries were overwork, hurrying, and inattention. More staff nurses (96.9%) than nursing students (40%) who were studying the subject understood the guidelines for NSI notice, registration, monitoring, and prevention. Nursing students did not disclose 92.0 percent of the incidents, compared to 45.9% of staff nurses who did not..(RutaLukianskyte et al, 2012)

A questionnaire-based study was conducted among nursing staff and nursing students to check the frequency of needlestick injury to assess and compare the reasons why needlestick injury occurs and describe how they were made aware of the notification and prevention of NSIs. A questionnaire was made and having different variables and distributed among nursing students and nursing staff. During the year concentrate period, NSIs were capable by 38.5% of staff medical caretakers and 78% of nursing understudies. The activities that took place in the procedure rooms were the most likely to result in an injury from a needle or other sharp object. Fifty-one percent of nurses suffered from needle stick injuries due to recapping of the needle. Breaking an ampoule resulted in injury for 49 percent of nursing students. Inattention, rushing, and overwork were the most common causes of injuries. The staff nurses (96.6%) wre more knowledgeable about the guidelines for NSI notification, registration, observation, and prevention as compared to the nursing students (40%) who were studying the subject. 45.9% of the occurrences were not reported by staff nurses, while 92.0% were not reported by

nursing students.(Aradhana Bhargava et al,2013).

The aim of the study was to investigate the behavior of healthcare workers after needlestick and sharp-object injuries in Kashan health facilities. A total of 298 healthcare workers participated in this study that investigated the behavior of healthcare workers after needlestick injuries. The study included a questionnaire divided into several components. The first segment contained questions about demographics and the second section contained 16 questions about sharp-object injuries. Participatory and logistic measures (chi-square, ANOVA, and Pearson link coefficient) were used to assess the information. SPSS version 16.0 programming was used. Of the 298 healthcare workers, 114 (38.3%) experienced needlestick and sharp-object injuries in the past 6 months. Most of the needlestick and sharp-object injuries were inflicted on operating room nurses and midwives. 32.5% of these injuries occurred during the morning shift. Needles were the cause of 46.5% of the injuries. Among the staff with needlestick injuries, 15.8% washed their hands with soap and water, and 44.6% received further treatment according to recommended procedures. Data were analyzed using SPSS 18 software, and p values for sharp device injuries were calculated. (Mohsen Adib et al, 2013)

In tertiary care institutions, needle stick injuries among nurses were studied to see whether they were work-related hazards or a result of staff ignorance. Participating in the cross-sectional study was the nursing staff of Hospital Kangra at Tanda and Dr. RPGMC. Based on the requirements of Universal Work Precaution (UWP), a questionnaire consisting of twenty items was sent to the nursing staff. In addition to procedures for prevention, immunization status, and knowledge of universal work precaution rules, an evaluation was conducted on the prevalence of needle stick injuries, their causes, the most typical workplace, and the department of staff responding to injuries. A simple interviewing technique was used, with the interviewer filling out a semi-open questionnaire for data collection. The healthcare professionals were given a personal explanation of the study's objectives and assurances that their answers would be kept confidential. Informed consent was obtained from each respondent prior to the interview. The lowest of these were among the medical caregivers with less than five years of job experience (13.4%), out of the 164 participants, 35 (21.3%) reported having at least one NSI in their line of work. It was inquired of the responders whether they had received a Hepatitis B vaccination. 164 nurses, or 31.7% of them, were not vaccinated. The vast majority of respondents said that this is a way to dispose of the needle, even though it has been said time and time again that recapping needles should be prevented. The universal labor precautions, which are essential in healthcare settings, were not sufficiently known by eighteen subjects, or 10.9%. One of the common safety measures at work.(Angrup Archana et al,2014) .

To determine trends in needlestick/sharp injury (NSI) among healthcare workers (HCWs) and what they do after a needlestick injury. A hospital-based cross-sectional descriptive study of 116 conveniently selected healthcare workers (HCWs), including physicians, nurses, and paramedics, participated. An unintentional needlestick injury (NSI) was considered to be a patient-prick injury when a patient was pricked by a needle or other sharp object while receiving care. The NSI pattern was characterized by the number of NSIs in the previous year, the cause of the prick injury, and the surgery that resulted in the prick injury. The post-exposure response criteria were post-prick measures and post-exposure examinations. Most HCWs (70.6%) reported at least one unintentional prick in the previous year. The most frequent cause of the prick injury was a needle (80.49%). 41.16% of the respondents reported having been unintentionally pricked during blood collection, and breaking a vial was the least common practice (12.20%). Twenty-seven percent of the respondents did not react to the sting, 33% got dressed, 35% went to the toilet, and 5% got vaccinated. Stabbing is much more common in men than in women. In a tertiary care hospital in Rawalpindi, healthcare workers often suffer serious injuries or needle sticks. The most common procedure was blood collection, and the most common cause was a needle stick that pricked them. Accidental needle stick injuries (NSIs) are those caused by needles or other sharp objects while treating a patient. The cause of the sting injury, the procedure that led to the sting, and the frequency of stings in the past 12

months were all considered criteria for the sting pattern. Post-exposure examinations and post-stab measures were included in the post-exposure response criteria. Housekeepers were among the most at-risk individuals, and men were often stung more frequently than women. (Sultana Abida et al. 2014)

The purpose of this study was to investigate prevention strategies and the psychological impact of NSIs. The target population consisted of medical staff and students at the University Hospital Frankfurt who had suffered non-sexual encephalopathy (NSI) during a 12-month trial period. Data were obtained from occupational follow-up examinations, accident insurance claims, and an anonymous standard questionnaire delivered to the affected HCP. Analysis of 232/370 completed questionnaires showed that 80% of respondents were concerned about the consequences of NSI, with fatigue (36.6%) and stress (48.3%) being the main causes of NSI. Higher levels of anxiety were recorded when the patient's persistent viral infection was confirmed. Poor work routines, inadequate protective medical/technical equipment, and stressful work situations have all been implicated in NSIs. University Hospital accident insurance physicians were alerted to 370 NSIs between 1 July 2012 and 30 June 2013. In the remaining 9.7% of NSIs, the index patient was unknown (e.g., NSIs due to cannulation in an unknown index patient) or no blood test was performed (e.g., because of outpatient treatment). The index patients, i.e., 334 of the 370 NSIs, were tested in serum for HBV, HCV, and HIV. For example, among the tested index patients, 3.3% (1/334) tested positive for HIV, 9.8% (33/334) tested positive by PCR for HCV, and 0.6% (2/334) tested positive for active HBV infection. Of the total index patients tested, 45/334 tested positive for at least one blood-borne disease. Two index patients were co-infected with HCV and HIV. Of the 370 affected healthcare workers, 232 completed the anonymous questionnaire (62.7% of the total). When the index patient was aware that he or she had a persistent infection, 84.4% (38/45) of the healthcare workers completed the questionnaire more often ($p = 0.0065$). Stress was the most important component of the NSI episode in 112.2% of the cases, and fatigue was the second most common (85.2% of the cases). Twelve NSIs were triggered by patient movement, and 31 by third parties. Inadequate training for specific competencies (10/232) and faulty medical equipment (9/232) were more common causes. Regarding the possibility of preventing NSI, 128 out of 232 respondents (55.2%) answered that it could be prevented, 79 out of 232 respondents (34.1%) answered that they did not know, and 25 out of 232 respondents (10.8%) answered that it could not be prevented..(S. Wicker et al,2014)

The aim of the study was to document the frequency and risk factors of NSIs among nurses working in a teaching hospital in China. 463 nurses completed 402 questionnaires. Of the total nurses, 261 (64.9%) reported having been injured by a needle or similar sharp instrument. NSIs were more common among females, younger healthcare workers, cautious healthcare workers, or junior healthcare workers. Logistic regression analysis identified age and job function as separate NSI risk variables. By equipment type, syringe needles accounted for the largest number of NSIs (59%), followed by glass objects (22%) with trocar cores/catheter strands (4%). Analysis showed that 42.5% of the devices causing injuries were contaminated with body fluids such as blood, 37.9% occurred during the planning and organization of pharmaceutical procedures, and 19.6% involved unclear patient status. NSIs remain a major risk issue in the workplace for Chinese nurses. Initiatives should be taken to prevent needlestick and sharp object injuries. The study found that NSI risk was highly correlated with parameters such as gender, age, department, and tenure. Age and department were the most important risk factors. Syringe needles were the most frequently used device causing injuries, and approximately half of non-surgical internal injuries (NSIs) involved devices contaminated with patient fluids such as blood. Ongoing education on safe penetration techniques is needed. Further investigation is expected to facilitate interventions regarding attendees' expectations of NSI (Xujun Zhang et al, 2015).

A cross-sectional study was conducted to compare knowledge of needlestick injuries at Liaquat National Hospitals in Karachi, Pakistan. A 23-item questionnaire administered by them was administered to hospital staff including nurses, physicians, and laboratory technicians in

multiple departments through convenience sampling. The information was split using the SPSS 18 program and the p-value obtained from the comfort assessment across departments. This study collected 198 responses, of which 70 (35.4%) were professionals, 70 (35.4%) were nursing staff, and 58 (29.5%) were laboratory staff. A total of 101 healthcare professionals (51%) knew that needles should generally be discarded without being recapped. 159 (80.3%) of the needles still needed to be recapped. 180 (90.9%) healthcare workers had been vaccinated against hepatitis B and 36 (18.2%) healthcare workers knew that blood could flow over the NSI and that the puncture site should be cleaned with antiseptic. None of the healthcare workers were found to have any knowledge about this issue. To ensure safe procedures and increase awareness, infection control departments should require all healthcare workers to complete relevant pre-employment training courses. (Abdul et al., 2016)

The study was conducted to check the knowledge, attitude, and practice toward needle stick injury among healthcare workers in tertiary Sudanese hospitals. Information assortment was brought out through a questionnaire. Around 47% of participants were nurses, and 70% of respondents were female and 30% were male. Nearly two-thirds of those who responded did not report needle stick injuries. For members who had needle stick wounds from HBV positive, the majority of the specialists were completely immunized, and few had not been inoculated. There were numerous insufficient regions, for example, really looking at the safe status of HBV and HCV, the job of wearing gloves while dealing with needles, and announcing wounds (Mohammad &Dafala*et al.*, 2016).

Nursing students will undoubtedly face this dilemma alongside healthcare professionals. Reducing attitudes toward safety precautions may help implement educational initiatives aimed at increasing nurses' awareness and professionalism. Participants in this study were the incidence, views, opinions, perceptions, and understanding of NSI among nursing students at Al-Hussein Bin Talal University. The sample population consisted of all first-year nurses who consented to participate in the study and were enrolled at the second to fourth academic level of the university. Four parts of a self-organized survey were used in the information collection approach. The main part of the questionnaire presented the social segment complexity of the respondents. The second part of the questionnaire asked about the frequency (number, type, and description) of needlestick injuries in the participants' clinical departments, and whether the incidents were reported to higher authorities. The last part of the questionnaire asked about the students' understanding of needlestick injuries. The last part tested the students' understanding and awareness of the risks associated with needlestick injuries and the various ways to prevent them. The results clearly showed that most students viewed NSI positively. However, two-thirds of new nurses have suffered NSIs and the proportion of nurses injured in second year students is increasing. This is due to lack of awareness about general precautions and acupuncture safety equipment. Nursing students are likely to get sick. It is believed that legal advancement will promote knowledge about NSIs and the risk and excitement surrounding these events(Nawafleh, Hani A. et al. (2017)

The aim of the study was to assess the knowledge, attitudes and behaviour of healthcare professionals towards needlestick injuries in a tertiary care hospital in Assam and the incidence of needlestick injuries among them. A sample size of 90 was selected. These 10 departments received a proportional share of the required sample size and a total of 10 departments were specifically selected on the basis of exposure to risk. The required number of healthcare workers from each of the 10 departments was selected using a basic random sampling method. Data were collected using a previously designed and validated form. It was found that 21.1% of healthcare workers suffered needlestick injuries. With regard to transmission of infection after unintentional needlestick injuries, all participants were aware of HIV, 98.9% were aware of hepatitis B, and 67.8% were aware of hepatitis C. Only 21.1% of those who reported physical problems to their clinician did so. About 58.9% of HCWs regularly used gloves to avoid such incidents. 66.7% of HCWs reported using recaps, which were responsible for 26.3% of needlestick injuries. With regard to proper disposal of sharps, 37.8% of HCWs did

not follow the standards. Only 26.3% of HCWs tested positive for hepatitis B and HIV/AIDS after injuries.(JurimoniGogoi et al,2017)

To determine the frequency of needlestick injuries among healthcare workers. A cross-sectional study was conducted at the district headquarters, Hospital Layyah. The sample consisted of 161 people. A planned pre-trial survey with both open-ended and closed-ended questions was conducted in January and Walk. The cross-sectional study had 161 participants. Selected healthcare workers consisting of 13 waste handlers, 8 physicians, 129 licensed nurses, and dispensers, as required. A pre-tested structured questionnaire with both closed and open-ended questions was used in the study from January to March. Statistical analysis of the data from the 161 participants was performed using SPSS 23.0 data analysis software. Of these, 114 (70.8%) reported having experienced at least one needlestick injury in their clinical practice. The recurrence rate of NSI was significantly higher among physicians (76.7%) compared to specialists (half), research center staff (45.5%), and waste supervisors (70.8%). This study argues that few studies have identified the groups of healthcare workers most at risk for NSIs, without even the simplest hint of typical accurate information about NSIs. (Khan Sehrish, et al., 2020) The objectives of the study were to determine the prevalence of needlestick injuries (NSIs) among healthcare workers (HCWs) employed in government hospitals, to investigate risk factors for NSIs, and to formulate recommendations for a comprehensive prevention program. A review of all NSI cases reported by healthcare workers in government hospitals in the past. Of all members, 8.4% experienced an NSI infrequently for more than 26 months. Nurses (52.5%) were the most affected staff, most often as a result of syringe storage (58.9%). The prevalence of NSIs affecting 8.4% of workers highlights the need to develop strategies to avoid NSIs. Healthcare workers can be vaccinated; post-exposure prophylaxis; ensuring the use of protective equipment or PPE such as gloves, recap protection, and specific containers for sharps; and regular training on safety measures are some of these methods. Statistics show that it is important to carefully evaluate whether aspects of the program should be tailored to specific risk groups or whether a single sharp tool injury prevention program is effective for all workers. Two advantages of personalized targeting are the cost savings of intensive intervention strategies and the strong commitment to using the most appropriate tool for each individual's job. Few programs use tailored techniques. Programs that teach healthcare workers how to use needle safety devices and for other purposes are effective in preventing NSIs. The US Word related Security and Wellbeing Organization (OSHA) proposes that general work practice control and designing control for all HCWs are the essential implies that ought to be utilized to diminish the dangers of NSIs. Physicians had a 24.9% incidence of NSIs, with surgical instruments being the most common cause (40%). The inability to finish all necessary hepatitis B immunizations was normal among exiles of the members of this review. HCWs who took part in the study had a lot of NSIs. It is necessary to implement preventative measures, including adequate hepatitis B vaccination. (Kifah Habib Alfulayw et al, 2021)

For this cross-sectional descriptive study, a sample of 260 healthcare professionals was selected from Ghazi Al Hariri Hospital and Baghdad Teaching Hospital in Iraq. Data were collected between January and June 2020 using a questionnaire. 53.8% of healthcare workers reported having suffered from NSIs, with the highest rates occurring in laboratory professionals (28.5%) and assistants (29.3%), followed by specialists (15.7%), co-worker professionals (13.6%), and dental professionals (12.9%). The most common causes of needlestick injuries were needle re-capping (41.4%), medication tissue (27.9%), hand-to-hand transfer (10.7%), and blood sampling (7.9%). When needlesticks harmed healthcare workers, 65% of these personnel reported incidents. Physicians scored higher than other occupational groups on average ratings of understanding, perspective, and practice. The scores of knowledge, attitudes, and practices of healthcare workers were strongly correlated (p 0.001). Eighty-two of all subjects achieved complete HBV protection. (Z. S. Gurfran et al., 2022). The aim of this study was to assess the incidence of needlestick and sharps-related injuries among healthcare workers (HCWs) in Jazan, Saudi Arabia, and to investigate potential

correlations between hospital level and the incidence of needlestick and sharps injuries. A cross-sectional study of 609 HCWs randomly selected from 11 general emergency clinics was conducted. The overall incidence of sharps and needlestick injuries was 24%. Needlestick and sharps injuries affected 30% of individuals. An anonymous self-administered questionnaire was distributed to collect data. The questionnaire recalled information on the characteristics of the healthcare worker segment, the type and frequency of transparency, and risk factors related to openness to words. The questionnaire included socio-demographic details, profile of safe injections in general hospitals in Jazan, information on safety from healthcare professionals, level of attitudes and behaviors, and beliefs about injection safety. Three trained healthcare professionals handled the data collection process. The team visited the selected emergency clinics before welcoming potential review participants and starting the assessment. They provided a copy of the signed informed consent form for review and recording. Individuals who gave verbal consent to participate in the assessment were considered. However, they were told that they could refuse to participate in the study or not answer the questions in secondary and tertiary hospitals. Healthcare workers working in tertiary hospitals reported a 61% lower incidence of needlestick and sharps injuries than healthcare workers working in secondary hospitals. The main reason for this was more effective and ongoing education. 61.00% of the study participants worked in secondary hospitals, while 237 (39.00%) worked in tertiary institutions. Physicians comprised 21% of the healthcare workers and nurses comprised the remaining 79%. Half of the Saudi sample had worked for an average of 8.5 years. In absolute terms, the average prevalence of NSSI was 24%. When it came to knowledge of the hospital's injection safety policy, healthcare workers working in secondary hospitals were significantly more likely to know it (99% vs. 96%). They were also more likely to have attended CME injection safety training sessions (73% vs. 60%). However, the incidence of NSSI in tertiary hospitals was similar to that in poor-quality hospitals (14% vs. 30%). In addition, workers in tertiary settings used new gloves significantly more frequently for each injection (97% vs. 93%) and were less likely to dispose of needles in addition to general waste (Makeen, Anwar M. et al., 2022).

One of the greatest threats to patients and healthcare workers in hospitals and healthcare settings is needlestick injuries (NSIs) and hospital-acquired infections (NIs). The purpose of this study was to determine how hospital-acquired infections and NIs affect patients and healthcare workers. The data report focused on the expected outcomes of hospital-acquired infections and needlestick injuries, and outcomes related to adverse health outcomes, transmission routes, control and reduction. The study found that there are significant negative impacts due to potential NIS and NSI, and these impacts are associated with risks considered for both patients and healthcare workers. The conclusions of the study suggest that needle recapping, non-standard protective equipment, and antimicrobial resistance all pose a threat to human health and may increase the potential for infectious disease spread between exposed patients and healthcare workers. The main way in which the results of this study can be used is to help political and health system decision makers understand the increased risk of hospital-acquired infections and the injuries sustained from needle sticks among patients and healthcare personnel. The most crucial steps that health department managers can take to lower the frequency of needle sticks are to decrease the number of needle sticks, ensure that personal protective equipment is used properly, and increase awareness of the strategies for preventing nosocomial diseases, especially among vulnerable populations like patients and healthcare workers. Enhancing patient and healthcare worker health may be greatly aided by seminars for training on standard precautions, nosocomial infection avoidance, and needle stick injury prevention..(Suksatan et al,2022)

To evaluate needlestick injuries and hepatitis B and C infections among surgeons, a cross-sectional study was conducted at university hospitals Baqyatallah, Shohada, RasoulAkram, Sina, Taleghani, and Emam Hossein in Tehran, Iran. A total of 318 eligible surgeons participated. Information on demographics, blood and needlestick contacts, sporadic exposures, risk behaviors, and immunizations were collected through anonymous

questionnaires. Similarly, blood tests were used to screen for HCV neutralizing antibodies (HCVAb), anti-hepatitis B surface antigen (anti-HBs), and hepatitis B surface antigen (HBsAg). The mean age of 177 surgeons (or 55.66%) was 47.76±8.95 years. The surgeons used an average of 28.28 x 16.58 needles and sticks during their careers. Of these, 2 (0.66%) tested positive for HCVAb and 5 (1.59%) tested positive for HBsAg. (MehrvarzShaban et al., 2020). A cross-sectional study of 240 healthcare professionals from two tertiary care settings aimed to determine the association between gender and prevalence, understanding, attitudes, and behaviors regarding needlestick injuries. Self-administered questionnaires were administered to participants who had direct contact with patients. The questionnaires were used to assess practice measures, prevalence, work-related factors, knowledge, and attitudes. A total of 240 healthcare workers, including 120 men and 120 women, were included in the study. The lifetime prevalence of needlestick injuries among healthcare workers was 75% for women and 52.5% for men. The risk of needlestick injuries was not associated with marital status, age, education, department, weekly working hours, shift work, or level of professionalism. Nonetheless, employment type, education, attitudes, and practices are important factors. Gender and needle-related injuries are positively correlated. Practices and mindsets play an important role in determining the incidence of needle-stick injuries in women. (Alta Afrasyab et al., 2022).

To assess the problem of sharp objects and needle-stick injuries among healthcare workers in Tikrit city hospitals. Prevent and manage needle-stick injuries to protect healthcare workers from blood-borne infections. A cross-sectional study was conducted on 280 healthcare workers (HCWs) selected from Saladin and Tikrit medical hospitals. The questionnaire had a clear structure. Healthcare workers of all ages and gender identities who interact with patients' blood and body fluids, such as occupant specialists, caregivers, research center workers, and skilled birth attendants, were included in the study. They were recruited from all areas of the healthcare facility, including the entire medical practice, obstetrics and gynecology unit, clinical departments, crisis management offices, pediatrics, laboratory and blood donation center units, and other departments. An instrument derived from linked reports related to words was used. They found that 70.4% of healthcare professionals were at high risk for needlestick injuries, with the highest prevalence being among those aged 40 and older. The prevalence of unintentional needlestick injuries among healthcare professionals is significant, and is largely due to the widespread use of hollow needles, particularly when recapping.(Dr. Sahar Kamil Jawad et al, 2023)

The cross-sectional study assessed the knowledge, attitudes, and practices of nurses regarding needle-stick injuries (NSIs) in a public hospital in Kuala Lumpur, Malaysia. Most of medical attendants showed great familiarity with NSIs and related contaminations. Nurses frequently expressed concerns regarding sharps disposal containers and NSIs. The majority of nurses practiced safe needle handling and disposal, but they could use gloves more frequently. The majority of nurses adhered to hospital policies, including receiving post-exposure prophylaxis (PEP) within 72 hours (n=3, 100%) and informing their supervisor (n=11, 100%). However, there were a variety of hand hygiene practices, with some nurses unsure whether to use water alone (54.55 percent) or soap and water (45.45 percent). Targeted interventions and educational programs are needed to improve knowledge, attitudes, and practices, ensure better workplace safety for healthcare workers, and reduce the risk of blood-borne pathogen transmission (n=10, 90.91 percent) and instrument use (n=5, 45.46 percent). (JheffanyYazid et al,2023)

Needlestick injuries pose the greatest risk to medical students during clinical practice because they can be inadvertently exposed to body fluids and contaminated blood. The purpose of this study was to measure nursing students' awareness of needlestick injuries and their attitudes and practices toward this area. A secret school in Saudi Arabia had 300 undergraduate nursing students enrolled. Of these, 281 participated, resulting in a response rate of 82%. The survey results showed that those who responded had high understanding scores (mean = 6.4, SD = 1.4) and the students had a positive attitude (mean = 27.1, SD = 4.12). According to the students, they knew little about needlestick

injuries (mean = 14.1, SD = 2.0). The overall prevalence of needlestick injuries in the sample was 14.1%. Of the 15 children, 24.4% reported 2 incidents, compared to the majority (65.1%) who reported 1 incident in the previous year. Summary was the most common (74.1%), followed by injection (22.3%). Most of the assistants (77.4%) did not write reports, and the most common reason for not reporting (91.2%) was stress and worry. Results showed that female fourth-year students and students scored higher than male third-year students and students in all categories related to needlestick injuries (knowledge, attitude, and practice). Students with 3 or more needlestick injuries had lower scores in all needlestick injury categories compared to other groups in the past year (Al-Mugheed Khalid et al., 2023).

A descriptive cross-sectional study was conducted in a tertiary care hospital in southern India. A random sample of 400 healthcare professionals with at least 1 year of experience, including doctors, nurses, personnel, and cleaning staff, was selected. A self-reported, anonymous, semi-structured questionnaire was distributed. Of the 400 respondents, 89% reported that they understood the waste disposal procedures fairly well. However, 44% of participants incorrectly believed that it was better to avoid needlestick injuries (NSIs), and 30.5% of participants (mostly physicians) practiced recapping needles. Most (79.8%) knew that NSIs are the most common way for healthcare workers to be exposed to bloodborne diseases such as HIV, hepatitis B, and hepatitis C. However, only 49% of people knew that the highest risk of hepatitis B infection after a needlestick injury is after a needlestick. Of those surveyed, 75% knew the appropriate dose for hepatitis B vaccination. 89.5% of healthcare professionals reported knowing what to do and how to follow instructions after an NSI, and 96% said they would report an NSI immediately. Hepatitis C vaccine and post-exposure prophylaxis were not readily available, with only 47% of healthcare professionals knowing about them. While 61% of healthcare professionals were concerned about injuries from needlestick injuries, 56.5% said that patient needs took priority over their own safety. 91.3% of healthcare professionals said that needlestick injuries could be prevented. 93.5% of participants ensured that bystanders were especially careful when handling sharps or needles. Most responders (88%) disposed of sharps in containers specifically designed for this purpose, while only 53% used needle cutters or shredders. 85% of healthcare workers had previously attended specialized training courses on sharps handling and safety equipment, and 728.8% had been vaccinated against hepatitis B. A second study was conducted to assess the frequency of needlestick injuries and post-injury behavior among nurses working in hospitals in the Kurdistan Region of Iraq. Data were collected using nonprobability convenience sampling from 300 nurses who provided healthcare between early October 2022 and March 1, 2023. Of the 223 participants in the study, 74.3% suffered from needlestick injuries. Among the specific devices, threaded devices (88.7%) were fairly well known. The nurses considered compressing the injured area to drain blood after the injury as the most important action (28.4%). The nurses rated sterilizing the injured area as 48.9%. Most nurses (57.4%) did not provide blood for further testing, and only 73.1% did not receive any preventive measures after the injury. The needlestick injuries were mostly from syringe needles, which were injured in 3 out of 4 people. Also, sterilizing the exposed part of the wound after the needlestick was the first task that the nurses performed.(Ramand Mohammad Haji et al , 2024) .

This study aimed to assess the knowledge of healthcare workers (HCWs) about non-surgical surgical infections (NSIs) in a specific location of a tertiary care hospital, following exposure to NSIs. A cross-sectional study was conducted in the Women's Health (OBG) department. All HCWs with varying levels of expertise comprised the target population of the study (n = 272). The study used a well-written English questionnaire. The summary contained 22 items covering a variety of NSI-related topics. Pearson chi-square tests were used to guide subgroup analyses. Seventy-two percent of the participants were female, 61% were single, and 85% were from a metropolitan area. Seventy-five percent of the participants were in their 20s and 30s. Ninety-six percent of the participants knew that NSIs could be prevented. Similarly, 90% of the participants knew that NSIs could spread disease, and 77% of the participants reported having received training on the management and disposal of

biological waste. Approximately 74% of the participants in the survey reported having had contact with NSIs. Approximately 47% of respondents reported that they cleaned the area with soap and water after exposure. After exposure to an NSI, 56% of individuals reported that they did not take any post-exposure precautions, and 46% reported that they did not report the NSI. Approximately 38% of participants reported the NSI to a senior healthcare professional at work. Twenty-seven percent of members reported that they discovered the NSI because of anxiety about the outcome. Twenty-two percent of healthcare professionals reported the NSI for further research and prevention. In relation to the psychological impact of non-infectious infections (NSIs), 41% of respondents reported that they experienced extreme anxiety and concern about spreading blood-borne diseases. The of this provide insight into the views and experiences of OBG department healthcare staff regarding NSIs. Despite the high level of knowledge noted, the study identified areas for improvement in reporting procedures, post-exposure care, and implementation of preventive measures.(LatikaRidhi Suri et al, 2024)

RESEARCH METHODOLOGY

3.1. STUDY DESIGN

The descriptive[13] cross-sectional[8] study was planned to assess the knowledge, attitude, practice, and clinical screening of OR workers exposed to needle stick injury.

3.2. AREA OF STUDY

The survey will be conducted at the National Medical and Health Facility in Lahore.

3.3. DURATION OF STUDY

The current study duration was 4 months after approval of the synopsis.

3.4. SAMPLE TECHNIQUE

A convenient sampling technique was selected for the study sample.

3.5. SAMPLE SIZE AND PROCEDURE

Considering the Operation Theater staff working in the Operating rooms of National Hospital & Medical Center Lahore. as 250, at 95% confidence level and 5% absolute precision, the calculated sample size is 152.(open epi app)

- **Inclusion criteria**
  All the healthcare workers who worked in this hospital in the study were included. Those willing to participate and with working experience was more than one year.

- **Exclusion criteria**
  Those who were not willing to participate and those who had less than one year of experience at the time of data collection will be excluded from the study. [8]

3.6. DATA COLLECTION TOOLS AND METHODS

Data was collected using a structured proforma that assesses the knowledge, attitude, and practice about needlestick injury, how the injury occurred, and whether they were officially reported to the appropriate authority.

3.7. DATA ANALYSIS

Data was analyzed through SPSS. Descriptive statistics were presented asfrequencies as percentages. The chi-square test[27] was used.

3.8. ETHICAL CONSIDERATION

- The rights of the research participants were respected and the guidelines set by the ethics committee of Times Institute Multan were followed throughout the research process.
- All participants gave informed consent. [22]- All data were collected and kept confidential.
- The participants remained anonymous.
- It was also made known to the participants that they could withdraw from the study at any time during the research.

RESULTS AND DISCUSSION

4.1. AGE OF THE RESPONDENT

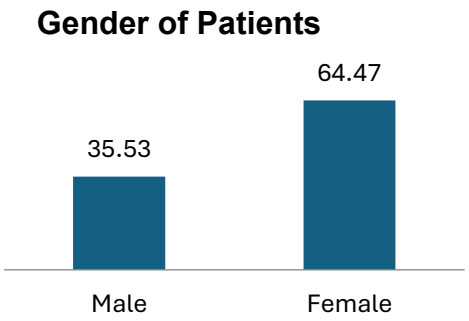

Figure 4. 1: Gender of the respondents

Out of a total of 152 individuals, males comprise 35.53% (54 individuals), while females make up 64.47% (98 individuals), indicating a significant majority of females, almost two-thirds of the total, compared to males, who account for about one-third.

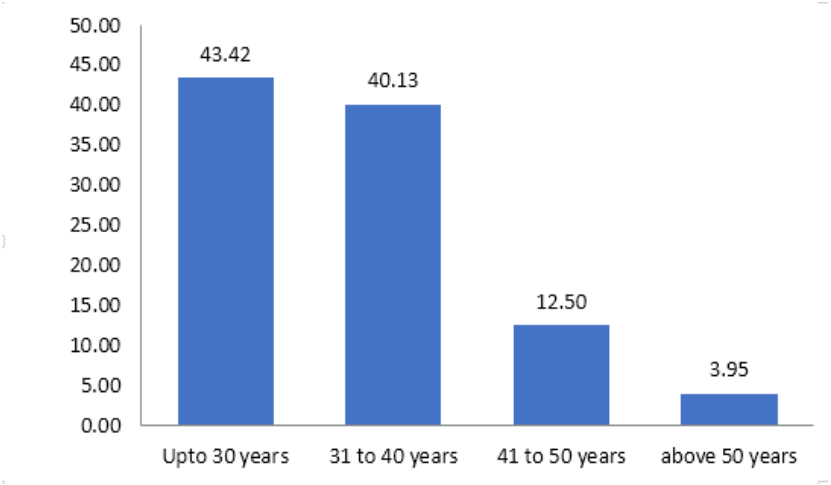

Figure 4. 2: Age of the respondents

The age distribution of the 152 individuals is as follows: the majority (43.42%, 66 individuals) are under 30 years old, followed by 31-40 years old (40.13%, 61 individuals), then 41-50 years old (12.50%, 19 individuals), and the smallest group is above 50 years old (3.95%, 6 individuals), showing a clear trend of a younger population.

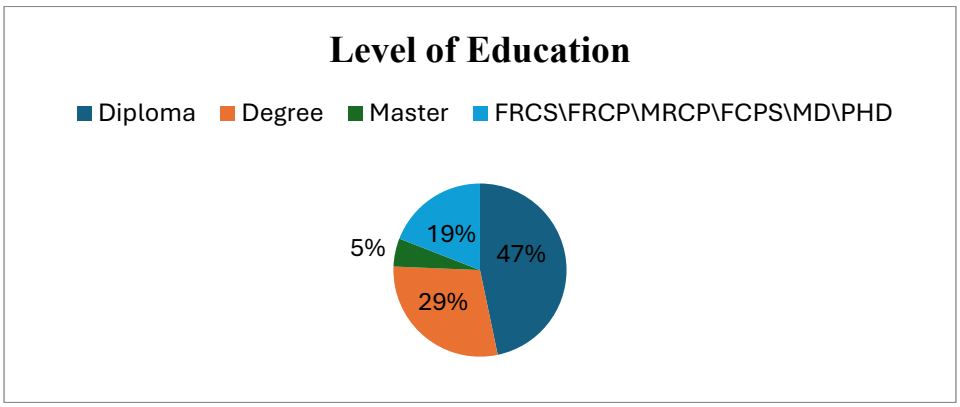

Figure 4. 3: Level of education of the respondents

The level of education among the 152 individuals is distributed as follows: nearly half (46.71%, 71 individuals) hold a Diploma, while approximately one-third (28.95%, 44 individuals) hold a Degree, a small but significant portion (5.26%, 8 individuals) hold a Master's degree, and a notable proportion (19.08%, 29 individuals) hold advanced qualifications such as FRCS, FRCP, MRCP, FCPS, MD, or PhD, indicating a diverse range of educational backgrounds with a strong presence of advanced degree holders

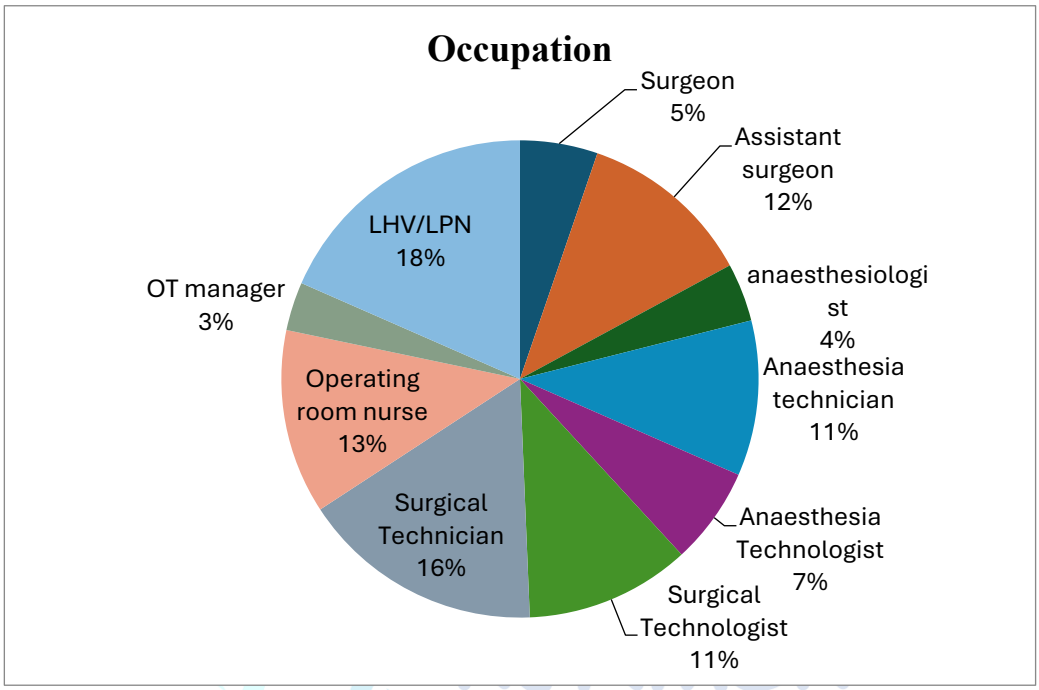

Figure 4. 4: Occupation of the respondents

The distribution of occupations shows that LHV/LPN make up the largest group LHV/LPN (18.42%, 28 individuals), followed by Surgical Technicians (16.45%, 25 individuals). Operating Room Nurses comprise 12.50% (19 individuals), while Surgical Technologists and Assistant Surgeons each account for around 11% (17 and 18 individuals, respectively). Anaesthesia Technicians make up 10.53% (16 individuals), and Anaesthesia Technologists comprise 6.58% (10 individuals). Percept Surgeons and OT Managers are the smallest groups, with 5.26% (8 individuals) and 3.29% (5 individuals), respectively. Anaesthesiologists account for 3.95% (6 individuals) of the total.

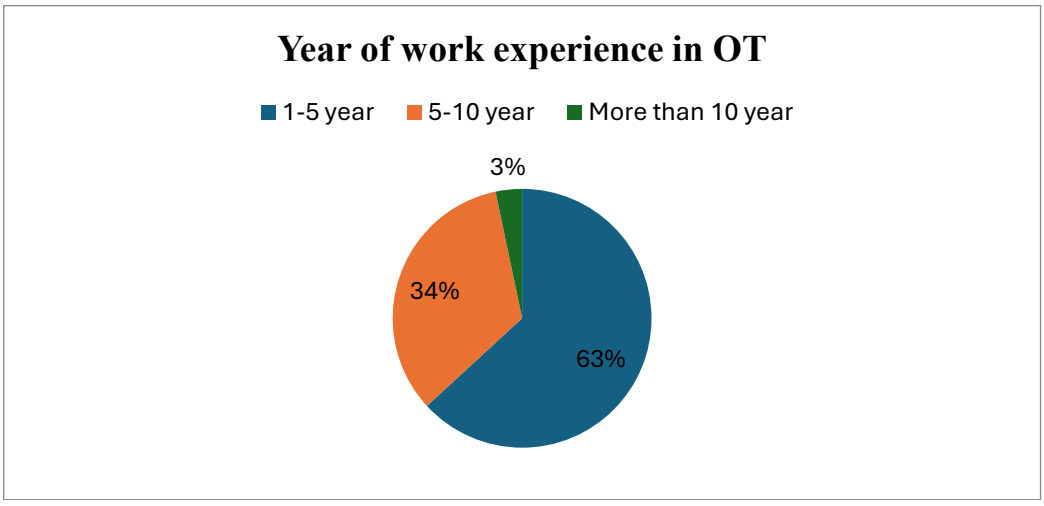

Figure 4. 5: Year of work experience in OT

The year of work experience in the Operating Theatre (OT) among the 152 individuals is distributed as follows: the majority (63.16%, 96 individuals) have 1-5 years of experience, followed by a significant portion (33.55%, 51 individuals) with 5-10 years of experience, and a small but experienced group (3.29%, 5 individuals) with more than 10 years of experience, indicating a relatively young and inexperienced workforce with a notable presence of seasoned professionals.

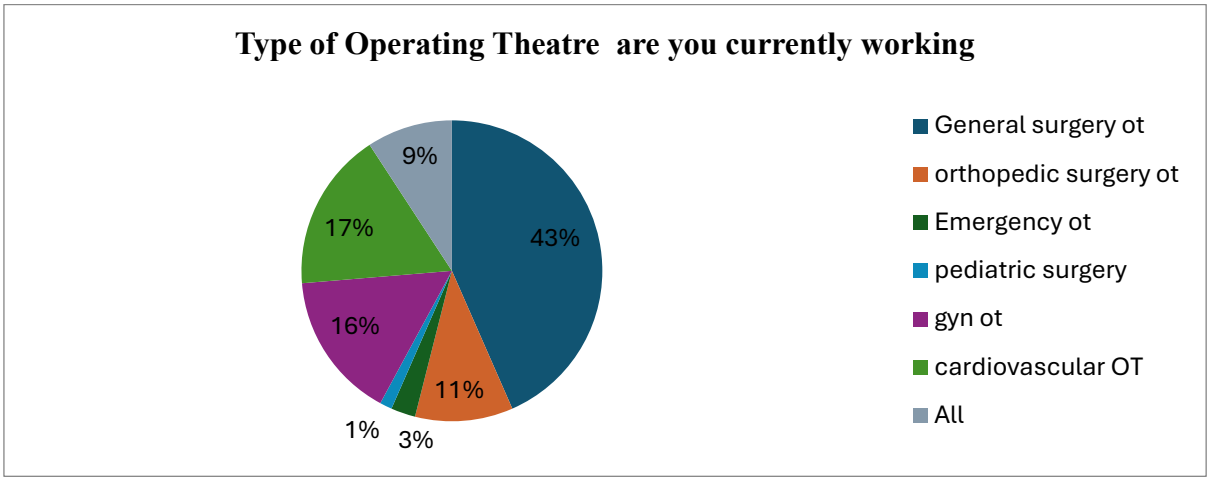

Figure 4. 6: Type of Operating Theatre are you currently working

The distribution of the type of Operating Theatre (OT) where individuals are currently working is as follows: the majority (43.42%, 66 individuals) work in General Surgery OT, followed by Cardiovascular OT (17.11%, 26 individuals), and Gynaecology OT (15.79%, 24 individuals). Smaller groups work in Orthopaedic Surgery OT (10.53%, 16 individuals), All (9.21%, 14 individuals), Emergency OT (2.63%, 4 individuals), and Pediatric Surgery OT (1.32%, 2 individuals), indicating a diverse range of specialties with a strong presence in general and cardiovascular surgery.

Table 4. 1: Frequency of NSI Incidents

Types of Needle Stick Injuries	Count	Percent
Experienced a needle stick injury while recapping a needle	42	27.632
Dispose of needle in designated sharp container	73	48.026
NSIs during surgical procedure and passing IV cannule	64	42.105
NSIs due to colleagues negligence	43	28.289
Experienced a NS Is due to lack of training	37	24.342
NSIs	122	80.263

The types of needle stick injuries (NSIs) experienced by individuals include: 42 (27.63%) who experienced NSIs while recapping a needle, 73 (48.03%) who disposed of needles in designated sharp containers, 64 (42.11%) who experienced NSIs during surgical procedures and passing IV cannulas, 43 (28.29%) who experienced NSIs due to colleagues' negligence, and 37 (24.34%) who experienced NSIs due to lack of training, highlighting the various circumstances under

which NSIs can occur, with improper disposal and surgical procedures being the most common. The majority of individuals (80.26%, 122 out of 152) have experienced needle stick injuries (NSIs) at some point, highlighting the widespread nature of this occupational risk.

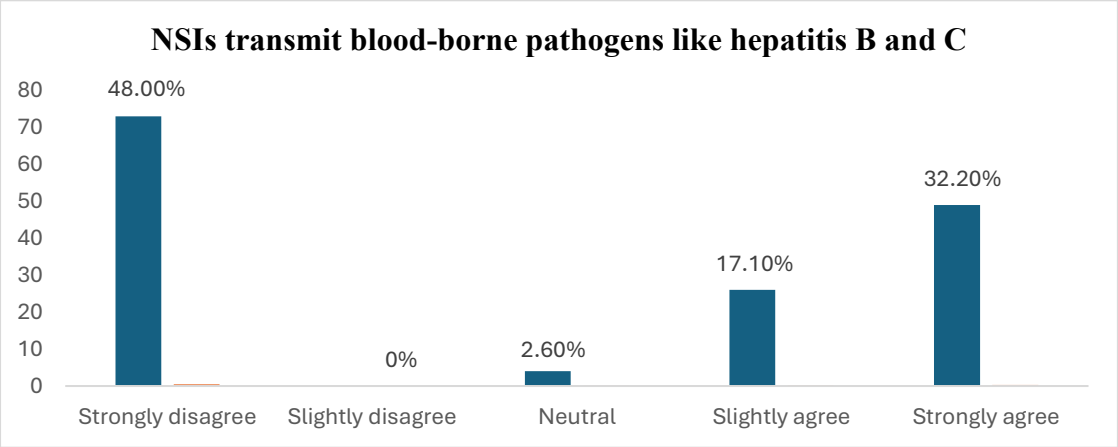

Figure 4. 7: Frequency of NSIs transmit blood borne pathogen

The majority (73 respondents) strongly agree that NSIs can transmit diseases like hepatitis B and C.There is a small percentage who are neutral or slightly agree.

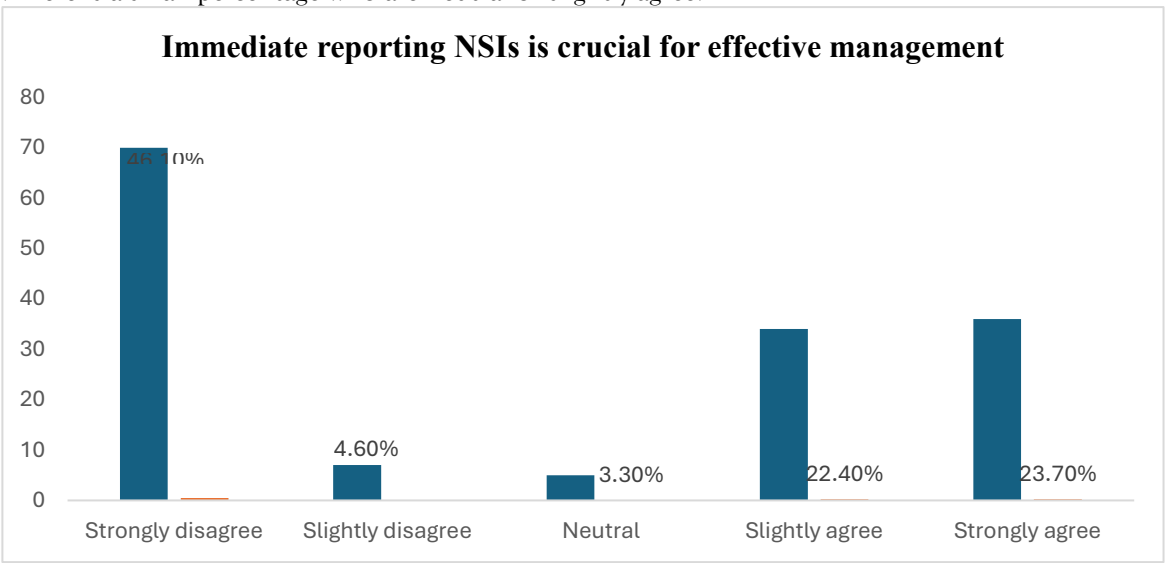

Figure 4. 8: Frequency of Immediate reporting NSIs is crucial for effective management

Most respondents (70) strongly agree that immediate reporting is crucial for managing NSIs.A smaller number slightly disagree or are neutral.

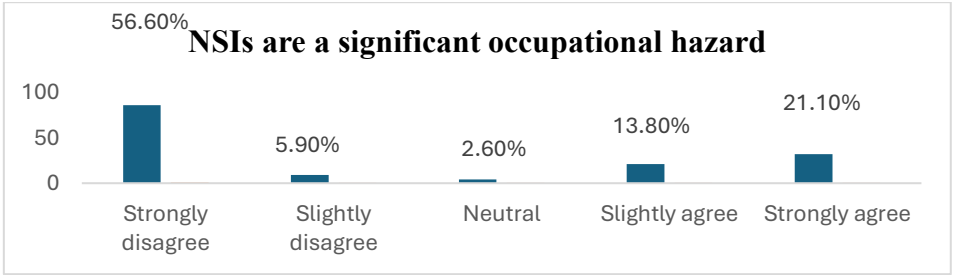

Figure 4. 9: Frequency of NSIs are significant occupational hazard

86 respondents strongly agree that NSIs are a significant occupational hazard. A few slightly disagree or remain neutral

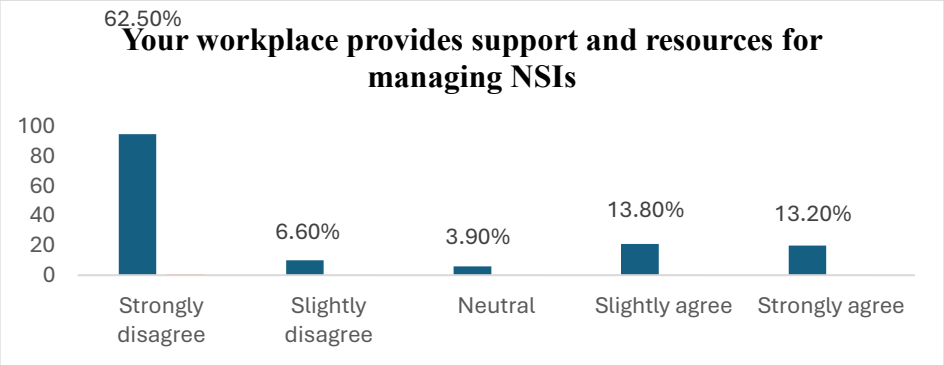

Figure 4. 10: Frequency of Your workplace provides support and resources for managing

95 respondents strongly agree that their workplace provides adequate support and resources for managing NSIs. Others slightly agree, while a smaller number slightly disagree or remain neutral.

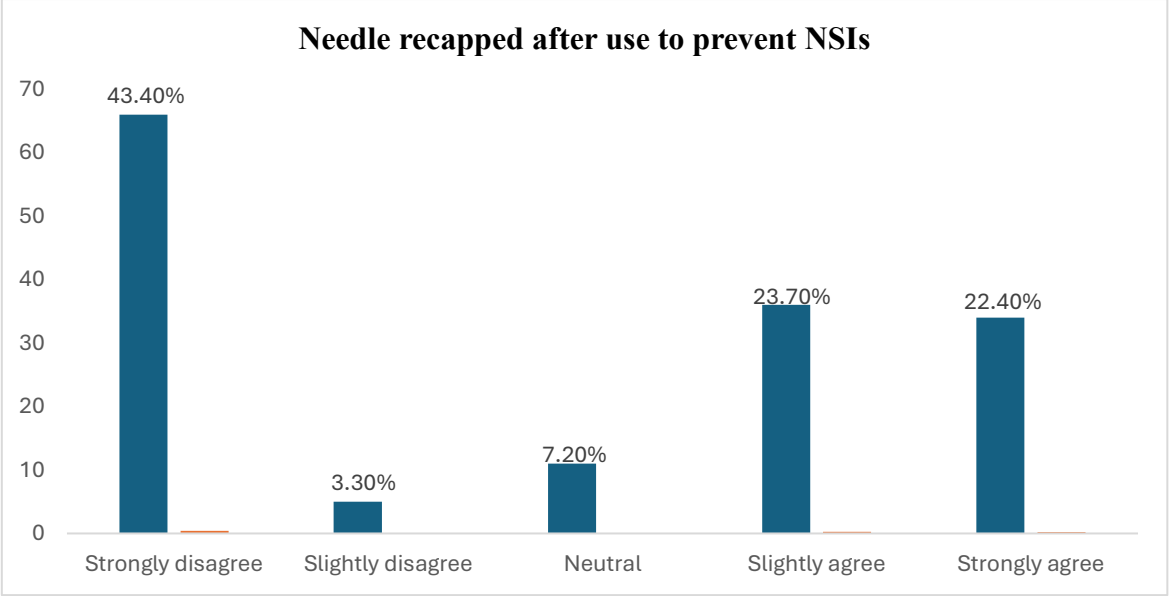

Figure 4. 11: Frequency of needle recapped after use to prevent NSIs

Respondents are divided, with 66 strongly disagreeing with the recapping of needles after use, while others slightly agree or are neutral.

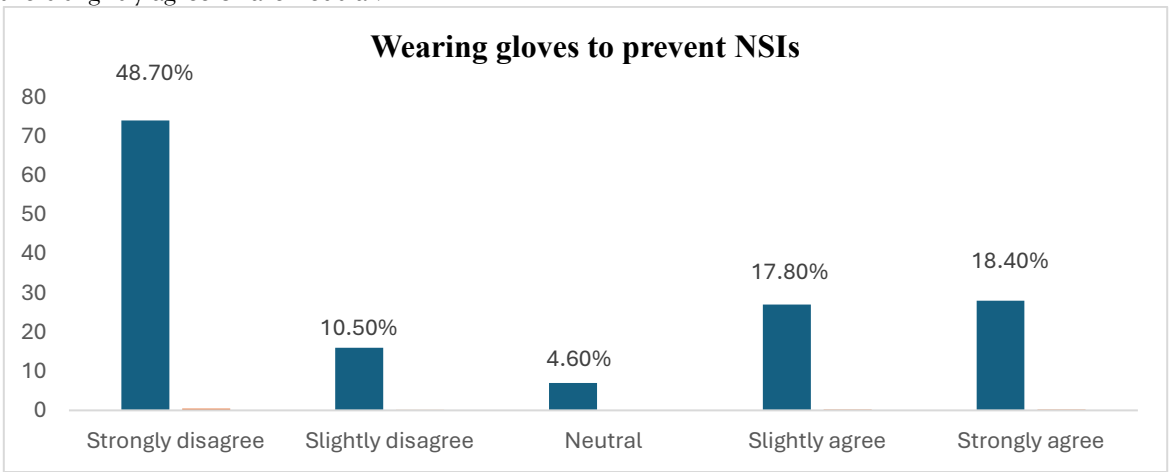

Figure 4. 12: Frequency of Wearing gloves to prevent NSIs

Responses are varied; 74 strongly disagree with gloves being sufficient to prevent NSIs, while others slightly agree or disagree.

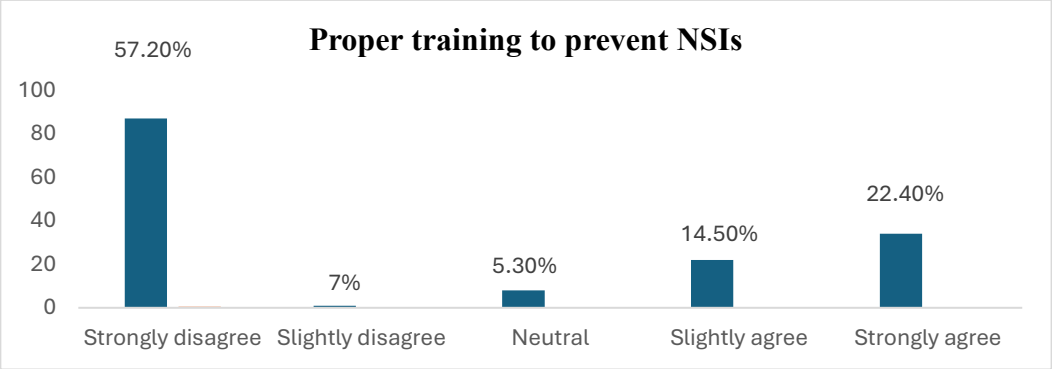

Figure 4. 13: Frequency of Proper training can prevent NSIs

87 respondents strongly agree on the importance of proper training to prevent NSIs. Others slightly disagree or are neutral.

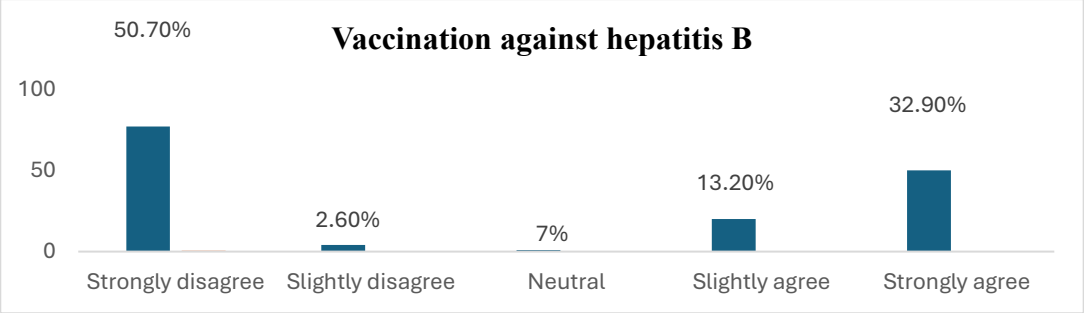

Figure 4. 14: Frequency of Vaccination against hepatitis B virus

77 respondents strongly agree that vaccination against hepatitis B is crucial. A few slightly disagree or are neutral.

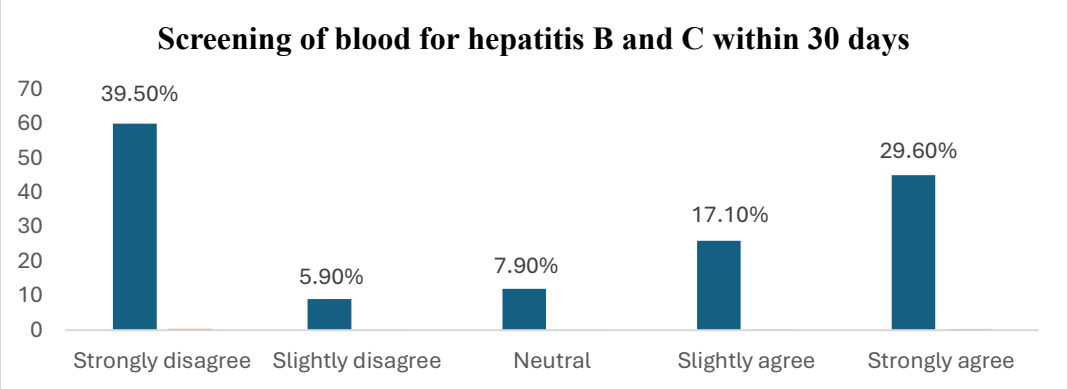

Figure 4. 15: Frequency of Screening of blood for hepatitis B and C within 30 days

Responses are varied with 60 strongly disagreeing with blood screening within 30 days, while others slightly agree or are neutral.

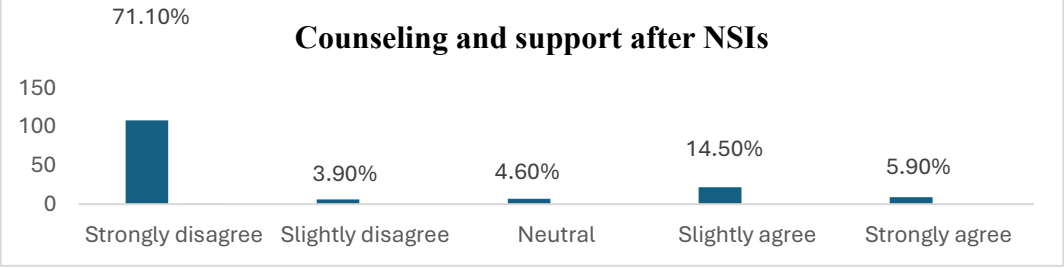

Figure 4. 16: Frequency of Counselling and support after NSIs

108 respondents strongly agree on the importance of counseling and support after NSIs. A smaller percentage slightly agree or remain neutral.

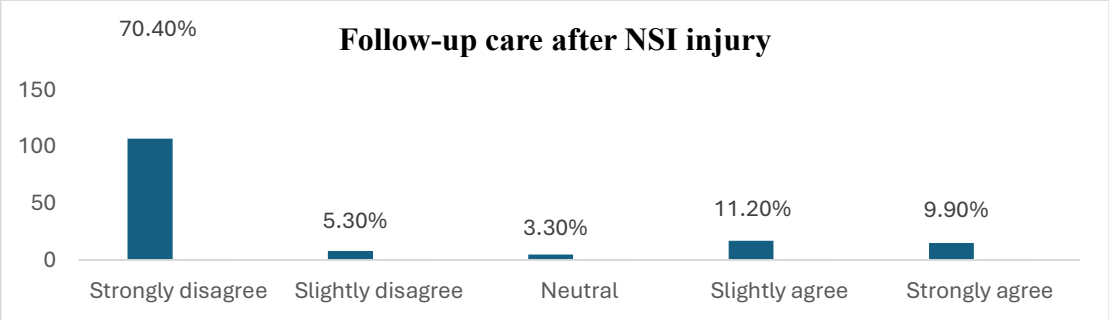

Figure 4. 17: Frequency of Follow up care after NSIs

107 respondents strongly agree on the importance of follow-up care after an NSI injury. Others slightly agree or are neutral.

Table 4. 2: Knowledge, Attitudes and Practices Towards NSI Prevention and Management

Characteristics	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree
NSIs transmit blood borne pathogen	73 (48)	-	4 (3)	26 (17)	49 (32)
Immediate reporting NSIs is crucial for effective management	70 (46)	7 (5)	5 (3)	34 (22)	36 (24)
NSIs are significant occupational hazard	86 (57)	9 (6)	4 (3)	21 (14)	32 (21)
Your workplace provides support and resources for managing	95 (63)	10 (7)	6 (4)	21 (14)	20 (13)
needle recapped after use to prevent NSIs	66 (43)	5 (3)	11 (7)	36 (24)	34 (22)
Wearing gloves to prevent NSIs	74 (49)	16 (11)	7 (5)	27 (18)	28 (18)
Proper training can prevent NSIs	87 (57)	1 (1)	8 (5)	22 (14)	34 (22)
Wash hand with antiseptic solution for 3 minute after NSIs	74 (49)	4 (3)	4 (3)	22 (14)	48 (32)
Overall Knowledge Attitude and Practice about needle stick injury	78 (51)	7 (5)	9 (6)	29 (19)	29 (19)

EXPLANATION:

1. **NSIs transmit blood-borne pathogens:**
   - A significant proportion of respondents strongly disagree (48%), indicating a lack of awareness about the potential risks associated with NSIs.
   - However, a substantial number strongly agree (32%), recognizing the risk.
2. **Immediate reporting of NSIs is crucial for effective management:**
   - The majority strongly disagree (46%) or slightly disagree (5%), showing a potential underestimation of the importance of reporting NSIs promptly.
   - Meanwhile, 24% strongly agree, indicating awareness among some respondents.
3. **NSIs are a significant occupational hazard:**
   - Over half of the respondents strongly disagree (57%), which could suggest a perception that NSIs are not a major concern in their work environment.
   - However, 21% strongly agree, acknowledging the risks.
4. **Your workplace provides support and resources for managing NSIs:**
   - A majority strongly disagree (63%), highlighting a perceived lack of workplace support for NSI management.
   - Only 13% strongly agree, indicating limited satisfaction with workplace resources.
5. **Needles are recapped after use to prevent NSIs:**
   - A significant proportion of respondents strongly disagree (43%), suggesting unsafe practices.

- However, 22% strongly agree, indicating compliance among some respondents.

6. **Wearing gloves to prevent NSIs:**
   - Nearly half of the respondents strongly disagree (49%), showing a reluctance or negligence in using protective gear.
   - On the other hand, 18% strongly agree, adhering to safety protocols.
   - **Proper training can prevent NSIs:**
   - A majority strongly disagree (57%), indicating skepticism about the effectiveness of training.
   - Conversely, 22% strongly agree, valuing the role of training in prevention.
7. **Washing hands with antiseptic solution for 3 minutes after NSIs:**
   - Nearly half strongly disagree (49%), possibly due to lack of knowledge or resources.
   - However, 32% strongly agree, following recommended post-exposure practices.
8. **Overall Knowledge, Attitude, and Practice about NSIs:**
   - Over half strongly disagree (51%), reflecting a need for improved education and practices.
   - 19% strongly agree, indicating that some respondents have good knowledge and practices.

The results indicate that there are gross disparities in terms of how different respondents conceived and addressed NSIs. Although a proportion of respondents is knowledgeable, safe practice oriented and protective regarding NSIs, a large section of the sample consists of disagree/neutral observers implying the lack of awareness, unsafe inclination and lapse in safe practice and protective knowledge and attitudes concerning NSIs in the respondents' working environments. This clearly brings out the need for increased and better training, better equipment and facilities, and massive awareness creating campaigns on better ways of handling NSIs in the workplace

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Table 4. 3: Frequency of Hepatitis B and C

Variable	Hepatitis B	Hepatitis C	Not detected
Have you ever diagnosed with Hepatitis?	2	0	138
	1.43%	0.00%	98.50%

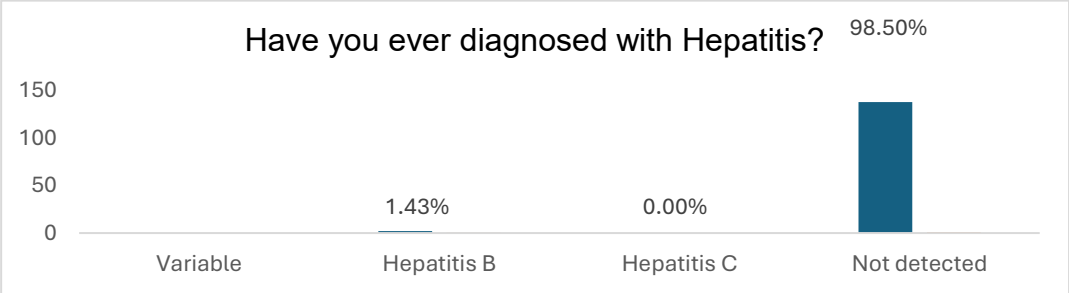

Figure 4. 18: Frequency of hepatitis B and C

Figure 4.18 represents that hepatitis B was diagnosed in 2 LHVs and Hepatitis C was not detected in anyone.The 2 cases of Hepatitis B reported among LHVs could be due to occupational exposure. This highlights the need of protective measures, such as vaccination and safe handling practices, to reduce the risk of transmission. In other occupations it is not detected. It may be due to adherence to safety protocols.The absence of Hepatitis B cases in doctors, compared to the 2 cases in LHVs, could be due to several factors. Doctors may have stricter adherence to protective protocols, higher vaccination rates, or more access to preventive measures. Additionally, other professionals might have less direct contact with patients' bodily fluids than LHVs, who often perform more hands-on tasks, increasing their risk of exposure.

Table 4. 4: Knowledge, Attitudes and Practices Towards NSI Prevention and Management

Characteristics	Strongly disagree	Slightly disagree	Neutral	Slightly agree	Strongly agree
Vaccination against hepatitis B virus	77 (51)	4 (3)	1 (1)	20 (13)	50 (33)
Screening of blood for hepatitis B and C within 30 days	60 (39)	9 (6)	12 (8)	26 (17)	45 (30)
Counselling and support after NSIs	108 (71)	6 (4)	7 (5)	22 (14)	9 (6)
Follow up care after NSIs	107 (70)	8 (5)	5 (3)	17 (11)	15 (10)

Explanation:

1. **Vaccination against hepatitis B virus:**
   - **Strongly Disagree (51%)**: A majority of respondents do not believe that vaccination against hepatitis B is necessary, which could suggest a lack of awareness or skepticism about the benefits of vaccination.
   - **Strongly Agree (33%)**: A significant portion of respondents recognize the importance of hepatitis B vaccination, indicating that some are well-informed about its protective benefits.
2. **Screening of blood for hepatitis B and C within 30 days:**
   - **Strongly Disagree (39%)**: A large group of respondents does not see the need for timely screening after NSIs, which could point to either a lack of knowledge about the risks of bloodborne pathogens or barriers to accessing screening services.
   - **Strongly Agree (30%)**: A significant number of respondents understand the importance of timely screening to manage the risk of hepatitis B and C transmission after an NSI.
3. **Counseling and support after NSIs:**
   - **Strongly Disagree (71%)**: An overwhelming majority do not perceive counseling and support after NSIs as important, possibly reflecting a lack of available services or understanding of the psychological impact of NSIs.
   - **Strongly Agree (6%)**: Only a small percentage of respondents value counseling and support, indicating a need to raise awareness about the emotional and mental health aspects of NSI incidents.
4. **Follow-up care after NSIs:**
   - **Strongly Disagree (70%)**: Similar to counseling, a majority do not believe in the necessity of follow-up care, which could be due to either a perceived lack of benefit or inaccessibility of follow-up services.
   - **Strongly Agree (10%)**: A small percentage recognize the importance of follow-up care, which is critical for monitoring and managing any potential infections or complications.

The findings presented show that there is a serious problem of knowledge and implementation of post-exposure management of NSIs. Over 50% of the respondents fall into the either strongly disagree or neutral categories when it comes to vaccination, early screenings, counselling and follow ups. This necessitates the need for a stepped up education crusade, effective treatment service makes easily accessible and available to patients who have been exposed to NSIs, and efficient support to prevent further mishandling of NSIs and consequently limiting the likelihood of blood-borne diseases. The findings show that there is a very high level of variability when it comes to what define, measure, and manage NSIs, among the respondents. A significant proportion of the respondents were found to be either disagreeing with or being neutral to most of the items, which suggests that there are knowledge, attitude, and practice deficits concerning NSIs among them. This emphasises the imperative of training, staffing and public education with an endeavour to enhance the general safety and dealing with NSIs in working environment.

Table 4. 5: Needle Stick Injury Rates by Profession and Characteristics"

Have you ever had a needle stick injury?

Characteristics	Yes	No	P-value
Occupation			
Surgeon	7	1	
Assistant surgeon	15	3	0.981
anaesthesiologist	5	1	

Anaesthesia technician	12	4	
Anaesthesia Technologist	9	1	
Surgical Technologist	14	3	
Surgical Technician	18	7	
Operating room nurse	15	4	
OT manager	4	1	
LHV/LPN	23	5	
Gender			
Male	42	12	0.356
Female	80	18	
Age			
Upto 30 years	51	15	0.835
31-40 years	51	10	
41-50 years	15	4	
Above 50 years	5	1	
Level of education			
Diploma	56	15	0.491
Degree	34	10	
Master	8	0	
FRCS\FRCP\MRCP\FCPS\MD\PH.D	24	5	

The results showed no significant association between occupation, gender, age, and level of education with the likelihood of experiencing a needle stick injury (NSI), as indicated by the high p-values (range: 0. 356 to 0. 981) of the patients. This means that NSIs can happen to anyone in any profession, gender, age or educational group; therefore, one should be careful all the time and there must be sensitization programs so that everybody should be taught how to prevent NSIs. The bases for concluding this involve the p-values or probabilities that for all the different groups of NSI frequencies, the differences noted are mere by chance and not necessarily because of a positive association. Hence, it is important that greater emphasis is laid on the potency of full-scale NSI prevention models that would apply all healthcare professionals without compromising their jobs, gender, ages or educational levels

Table 4. 6: Workplace Resources and Prevention Strategies for Needle Stick Injuries

	Have you ever had a needle stick injury?		
Characteristics	**Yes**	**No**	**P-value**
Your workplace provide support and resources for managing			
strongly disagree	79	16	
slightly disagree	9	1	
Neutral	3	3	0.231
Slightly agree	15	6	
strongly agree	16	4	
Needle recapped after use to prevent NSIs			
Strongly disagree	51	15	
Slightly disagree	3	2	
Neutral	8	3	0.496
Slightly Agree	31	5	
Strongly agree	29	5	
Wearing gloves to prevent NSIs			
Strongly disagree	57	17	
Slightly disagree	12	4	0.564
Neutral	7	0	

Slightly agree	23	4	
Strongly agree	23	5	
Proper training can prevent NSIs			
Strongly disagree	69	18	
Slightly disagree	1	0	
Neutral	6	2	0.967
Slightly agree	18	4	
Strongly agree	28	6	

The results revealed varying levels of agreement on workplace support, needle recapping, glove wearing, and proper training as measures to prevent needle stick injuries (NSIs). Notably, the p-values indicate that the differences in opinions on these measures are not statistically significant (range: 0.231 to 0.967), suggesting that healthcare professionals' views on these preventive measures are not strongly associated with their experiences of NSIs. This implies that healthcare organizations should prioritize implementing comprehensive NSI prevention programs that address these measures, as they are not necessarily influenced by individual experiences or opinions. By doing so, organizations can reduce the risk of NSIs and promote a safer working environment .

Table 4. 7: Healthcare Worker Safety: Needle Stick Injury Experiences and Factors

	Have you ever had a needle stick injury?		
Characteristics	**Yes (3)**	**No (149)**	**P-value**
Have you ever had a needle stick injury?			
Yes	3	119	0.515
No	0	30	
Experienced a needle stick injury while recapping a needle			
Yes	2	40	0.185
No	1	109	
NSIs during surgical procedure and passing IV cannule			
Yes	2	62	0.382
No	1	87	
NSIs due to colleagues negligence			
Yes	1	42	0.634
No	2	107	
Experienced a NS Is due to lack of training			
Yes	1	36	0.57
No	2	113	

The findings showed that participants have difference levels of compliance with workplace support, needle recapping, wearing gloves, and appropriate training as strategies to prevent NSIs. Notably, the p-values indicate that the differences in opinions on these measures are not statistically significant range: This is not very far from our predicted hypothesis in range 0. 231 to 0. 967 indicating that healthcare professionals' attitudes towards the above preventive measures are likely to have weak relationship with their experience of NSIs. This means that healthcare organizations need to focus on eradicating a wide ranging NSI preventive measures program because these are not dictated by a single firsthand or secondhand experience. In this way, organizations may decrease NSIs occurrence and, thus, improve the safety of the working environment.

Table 4. 8: Follow-up Care, Counselling, and Prevention Practices Among Healthcare Workers

	Have you ever had a needle stick injury?		
Characteristics	**Yes (3)**	**No (149)**	**P-value**
Follow up care after NSIs			
Strongly disagree	1	106	
Slightly disagree	1	7	
Neutral	1	4	0.007
Slightly agree	0	17	
Strongly agree	0	15	
Counselling and support after NSIs			
Strongly disagree	2	106	
Slightly disagree	0	6	
Neutral	0	7	0.878
Slightly agree	1	21	
Strongly agree	0	9	
Wash hand with antiseptic solution for 3 minutes after NSIs			
strongly disagree	2	72	
Slightly disagree	0	4	
Neutral	0	4	0.937
Slightly agree	0	22	
Strongly agree	1	47	
Vaccination against hepatitis B virus			
Strongly disagree	2	75	
Slightly disagree	1	3	
Neutral	0	1	0.014
Slightly agree	0	20	
Strongly agree	0	50	

The survey results revealed significant associations between follow-up care after needle stick injuries (NSIs) and certain measures, including vaccination against hepatitis B virus (p-value: 0.014), indicating a strong association. In contrast, other measures such as counselling and support (p-value: 0.878), and hand washing with antiseptic solution (p-value: 0.937) showed no significant associations. The p-values reveal that specific measures, such as hepatitis B vaccination, are strongly linked to effective follow-up care, whereas others have weaker associations. This underscores the need for targeted initiatives and training that prioritize proven strategies, guaranteeing thorough post-exposure support for healthcare workers.

4.2. DISCUSSION

Needlestick injuries (NSIs) continue to be a significant occupational danger in healthcare facilities, especially in high-pressure settings like operating rooms. The NSIs' suggestions are wise since they can result in the spread of blood-borne infections including HIV, hepatitis B, and hepatitis C, which seriously jeopardizes the health of medical personnel. The purpose of this study was to assess operating room staff members' clinical screening, knowledge, practice, and attitude about NSIs in a tertiary care setting. These fundamentals must be taken into account when developing new safety protocols and training initiatives in order to spot weaknesses and develop policies that will lessen the risks associated with NSIs.

The study's contributors' demographic analysis provides insightful information on the patient population in the healthcare system who is at risk of NSIs. The age distribution of the contributors, who are primarily between the ages of 25 and 45, represents a labour force that is widely employed but may not all be equally knowledgeable about contemporary safety procedures. This stage series is crucial because it includes both more seasoned professionals who may have developed certain customs that could increase or decrease their adherence to safety procedures, and more junior

competitors who may not have extensive applied knowledge.

According to Waqar et al. (2011), mid-career healthcare personnel are often more susceptible to needle-related infections (NSIs) as a result of their frequent involvement in patient care activities that include needles. Their findings regarding this demographic shift are dependable.

The gender distribution of employees reflects the general trend in healthcare, where women dominate nursing and other caregiving occupations, with a higher percentage of female professionals. The findings of this study are consistent with those of Altaf et al. (2022), who observed that female healthcare practitioners reported a greater frequency of NSIs than their male counterparts (Afrasyab et al., 2022). This discrepancy could be attributed to the greater representation of women in positions involving direct patient care, like nursing, where handling needles occurs often (2019). Further findings from the Zhang et al. (2015) study indicate that female nurses in China suffered from greater NSIs as a result of their major responsibilities for collecting blood, handling needles, and giving injections.

Gender dynamics in NSI risk highlight the need for focused interventions that take into account the unique roles and experiences of female healthcare workers (Xujun et al 2015).

The contributors' professional backgrounds also provide important context. This course primarily covered all the foundational knowledge on the operation of operating rooms, including surgeons, anaesthesiologists, and nurses. These characteristics typically cover a large hazard of needlestick injuries (NSIs) due to the frequent handling of needles and sharp objects. According to Makeen et al. (2022), surgeons and nurses in the healthcare system are largely exposed to non-surgical infections (NSIs) because of their line of work, which frequently entails conducting procedures in stressful situations with time constraints (Makeen et al., 2022). Furthermore, Gogoi et al. (2017) emphasised that factors such as a work environment with inadequate safety precautions, low staffing, and a high patient turnover rate might typically influence the likelihood of non-surgical infections.

The study's conclusions thus suggest that any intervention meant to lower NSIs should replicate the wide range of risks associated with various healthcare occupations.

Significant perceptions about the current state of awareness and conduct about non-surgical surgical infections (NSIs) among healthcare providers in the operating room were found using the KAP evaluation in this study. The inquiry revealed that although most contributors have basic knowledge regarding non-surgical infections (NSIs), there were glaring gaps in more detailed information, including the post-exposure prophylaxis (PEP) protocols. This inquiry is crucial since PEP is a vital measure in preventing the spread of illnesses that result in NSIs. Additionally, Lukianskyte et al. (2012) found that although healthcare professionals were typically aware of the hazards associated with NSIs, their knowledge of the proper post-exposure procedures was frequently inadequate (Lukianskyte, 2012).

This information leak emphasises the need for more comprehensive training programs that provide healthcare professionals with the knowledge and abilities they need to respond effectively in the event of an injury in addition to alerting them to the hazards of NSIs.

This study also examined healthcare providers' perspectives regarding NSI prevention. The majority of participants agreed that adhering to safety procedures is crucial. A subset of participants, therefore, indicated a philosophical outlook, believing that NSIs were an unavoidable aspect of their work. The major reason this approach is dangerous is because it might result in satisfaction and a lack of commitment to safety procedures. Healthcare providers' attitudes are crucial in determining how they behave when it comes to safety regulations, as noted by Ramand Mohammed et al. (Haji et al., 2024).

The effective application of safety rules requires a positive outlook on NSI prevention. But as Nawafleh et al. (2017) pointed out, these attitudes need to be constantly reinforced by ongoing instruction and training in order to stop the growth of contentment (Nawafleh et al., 2017).

The study indicated that while most contributors followed basic safety protocols, there were gaps in more stringent practices, such as the immediate reporting of NSIs and double-gloving during surgical procedures, when it came to training. These are critical procedures meant to ensure prompt treatment and lower the risk of NSIs

when an injury occurs. But the main concern with these practices is that their adherence to them is inconsistent. Angrup et al. (2014) noted that whereas healthcare providers usually adhere to fundamental safety protocols, including donning gloves, they are not as consistent in adhering to more stringent precautions (Angrup et al., 2013).

The implementation of best practices is frequently unpredictable, according to Bhargava et al. (2013), with time constraints and perceived unpleasantness serving as the main causes of this disparity. According to these findings, healthcare institutions should establish a culture in which adherence to all safety protocols is viewed as strong and supported by necessary equipment and facilities.

The majority of the surveys on clinical screening practices following NSI were alarming. The analysis revealed that a significant portion of contributors either delayed or skipped the recommended testing, which resulted in an NSI. This disruption or lack of testing presents a significant concern because prompt reporting of potential infections is essential to the real treatment of NSIs. Abdallah et al. (2020) identified a serious void in the supervision of NSIs and also noted limited compliance with post-exposure testing among healthcare practitioners. A number of reasons may contribute to the discontent or reluctance to undergo prompt testing, such as ignorance regarding the current state of rapid testing, anxiety regarding the potential consequences of a positive test result, and the impression that testing is exhausting (Ibrahim et al., 2021).

These factors—which emphasise the need of post-exposure testing and give healthcare professionals the essential opportunity to undertake testing without interruption—need to be addressed through targeted interventions.

The way that contributors responded to NSIs also differed greatly. While some healthcare providers promptly record the events, others either failed to disclose them completely or delayed doing so. According to Haji et al. (2024), underreporting of NSIs is a significant problem in the healthcare system. This is typically because people are afraid of facing consequences, fear embarrassment, or worry about how their injury will affect their professional standing.

Qazi et al. (2016) identified a number of obstacles to reporting, including concerns about the possible consequences of reporting a non-strategic incident (NSI) and the conviction that reporting would not result in any significant improvements to safety protocols. According to the findings of these investigations, healthcare facilities should create a supportive atmosphere that promotes the prompt reporting of NSIs without fear of reprisal. Furthermore, healthcare professionals must be reassured that filing a report on a non-sexual assault (NSI) would result in appropriate action and that their employer's primary concerns are their safety and well-being (Qazi et al., 2016).

The study's concerns coincide with those of other investigations conducted in different contexts, offering a thorough foundation for comprehending the problem of NSIs among healthcare professionals. As an example, Suri &Dahiya (2024) saw in their study of healthcare professionals in India the widespread lack of stated knowledge about NSIs and the pauses in demanding practice observance. According to this study, there were significant gaps in healthcare workers' understanding regarding the proper post-exposure activities and the necessity of strictly adhering to safety procedures, even if they were typically aware of the hazards associated with non-surgical infections (NSIs) (Latika et al., 2024).

Similar problems were discovered by Al-Mugheed et al. (2023) among Saudi Arabian nursing students, indicating that these assignments are common in many nations and healthcare systems. The fact that these findings are consistent in a variety of contexts emphasises the need for a worldwide strategy to address the issue of NSIs, with a focus on improving healthcare personnel' attitudes, practices, and understanding (Al-Mugheed et al., 2023).

The study's findings about how gender distribution and work roles affect NSI risk and NSI risk are consistent with those of other studies. The greater vulnerability of nurses and surgeons to NSIs was highlighted by Zhang et al. (2015) and Makeen et al. (2022), underscoring the need for focused interventions in these populations. According to Lukianskyte et al. (2012)'s findings, some employment responsibilities in healthcare settings seem to be associated with an increased risk of needlestick

injuries (NSIs). This risk is particularly significant for jobs that require frequent handling of needles and other sharp objects.

These studies suggest that interventions aimed at reducing NSIs should consider the precise risks associated with different healthcare roles and should be personalized to address the exclusive challenges faced by each group(Lukianskyte, 2012).

This study has highlighted significant gaps in the knowledge, attitudes, and practices of operating room staff about non-surgical infections (NSIs) in a tertiary care hospital. The findings highlight the necessity of inclusive training programs that address these violations, particularly with regard to management to best practices and thorough understanding of NSI observance. The study also reveals important issues in clinical screening and post-injury behaviour that must be resolved to ensure the security of healthcare professionals. Given the potential for serious health consequences in the wake of a non-surgical surgical infection (NSI), it is imperative that healthcare facilities move quickly to improve staff management and NSI prevention practices, attitudes, and understanding.

Our study evaluated the operating room staff at a tertiary care hospital's knowledge, attitudes, behaviours, and clinical screening about needle stick injuries. Because there is a significant danger of bloodborne disease transmission from needle stick injuries, healthcare personnel—especially those working in high-risk environments like operating rooms—must possess the necessary expertise and adhere to stringent safety protocols.

While most survey participants were aware of the dangers of needle stick injuries, there were some gaps in their comprehension and use of this information. This outcome is consistent with the research conducted by Yazid et al. (2023), which showed that while the majority of nurses were versed in the risks connected to needle stick wounds, they were not fully aware of the preventative measures. Similarly, Irshad et al. (2023) discovered that although nurses at Nishtar Hospital, Multan, had generally higher knowledge levels, there were still misconceptions regarding the spread of bloodborne illnesses and the efficacy of post-exposure prophylaxis.

The assessment discusses a topic that is relevant to all backgrounds in health care: the necessity for ongoing education to bridge the knowledge gap between rudimentary awareness and in-depth comprehension, which can result in better preventive measures.

The study's participants demonstrated a generally positive attitude towards preventing needle stick injuries, highlighting the importance of safety precautions. Nonetheless, a significant discrepancy existed between their mindset and their actual behaviours, a critical issue that Jawad's study (2023) also highlights. Although Jawad indicated that healthcare professionals in Tikrit City are aware of the need of preventing needle stick injuries, their methods did not always reflect this knowledge, frequently as a result of a lack of resources and time constraints (Jawad, 2023).

Sawad (2023). Similar justifications were provided by Sharma et al., who stated that medical students had a good outlook on hepatitis B and C prevention and recognised the importance of safe protocols and vaccinations. However, our study's findings indicate that this optimistic outlook did not always translate into trustworthy practice (Mane, 2018).

One significant finding from our study was the inconsistency in the use of safety standards, such as the use of protective gear and the proper disposal of sharps. The study by Makeen et al. (2022) reveals this inconsistency. It discovered that there were failures in safety measure compliance even among secondary and tertiary healthcare workers in Saudi Arabia, primarily because of a lack of regular training and follow-up (Makeen et al., 2022). Furthermore, the observation made in our study that clinical screenings are suggested but not always implemented is consistent with the findings of Makeen et al., who pointed out that the lack of routine clinical screening constituted a barrier to effectively managing, preventing, and monitoring needle stick injuries. Effectively addressed in the absence of routine follow-up and clinical examinations.

SUMMARY AND CONCLUSION

5.1. METHODOLOGY

5.1.1. DESCRIPTIVE STATISTICS

Categorical variables such as gender, age groups, years of experience, and incidence of NSIs are shown in form of frequency and percentages. Data is presented in tables showing the distribution of demographic variables and the prevalence of NSIs among different subgroups.

5.1 2. INFERENTIAL STATISTICS

In the document you provided, the chi-square test is used for data analysis. Specifically, this test was applied to evaluate the significance of the associations between various categorical variables related to needlestick injuries among healthcare workers.

5.1.3. DATA PRESENTATION

Tables and Graphs:

Tables summarizing descriptive statistics (e.g., demographics, incidence rates). Bar charts or pie charts are used to visualize the distribution of categorical variables.

Significance Levels:

A p-value < 0.05 is typically considered statistically significant.

5.1.4. Software used

SPSSV-23 is used to analyse the data

5.1.5. Outcome measures

NSI Incidence Rate: The primary outcome measured was the incidence rate of NSIs, calculated as the proportion of workers experiencing NSIs out of the total sample.

Secondary Outcomes: These may include the knowledge, attitudes, and practices (KAP) scores, analyzed to assess the effectiveness of training and awareness programs.

5.2. CONCLUSION

The findings of our study show a persistent concern in the healthcare sector: while knowledge and positive attitudes towards needle stick injury prevention are generally good, but there is a substantial gap in practice. This difference is obvious across different healthcare situations and worker groups, from nurses and medical students to operating theatre workers.

The requirement for consistent, in-depth training and the implementation of strict safety procedures is clear. Moreover, the study highlights the need of even clinical screenings to manage and monitor needle stick injuries efficiently. Without these methods, the risk of needle stick injuries remains a substantial concern, possibly conceding the care and well-being of healthcare workers.

5.3. LIMITATIONS OF THE STUDY

This study has several limitations. Firstly, It is conducted in a single setting, which may bind the generalizability of the results to other healthcare settings. Secondly, the dependence on self-reported data presents the likelihood of response bias. Participants may overrate their knowledge or compliance to safety protocols. Thirdly, the study does not explain the possible effect of external aspects, like the availability of resources, which can considerably influence the application of safe protocols.This study duration was six months which was too short ,for better results duration period should be one year

5.4. RECOMMENDATIONS

Based on the discussion of the study's findings and the assessment with related research, here are some recommendations:

1. Enhanced Training Programs

Regular and Comprehensive Training: Implement continuous, comprehensive training programs concentrated on needle stick injury (NSI) prevention. These should go beyond basic awareness to cover exact preventive measures, proper use of protective equipment, and right disposal techniques for sharps. Training should be obligatory for all operating theatre workers and should include consistent refresher courses to keep knowledge up to date.

2. Implementation of Strict Protocols

Enforcement of Safety Practices: Establish and strictly apply protocols for the usage of protective gear and the disposal of sharps. This could comprise routine inspections and audits to guarantee compliance, with clear consequences for non-compliance. Standardizing these protocols across all departments can help lessen variability in safety practices.

3. Regular Clinical Screenings

Routine Monitoring and Follow-ups: Present systematic clinical screenings for all healthcare workers in high-risk areas, such as operating theatres. Early exposure of needle stick injuries and potential infections can lead to timely intervention and improved management. These screenings should be documented and revised periodically to trail compliance and outcomes.

4. Institutional Support and Resources

Provision of Adequate Resources: Make sure that all necessary resources, including protective gear, disposal containers, and access to post-exposure prophylaxis, are readily accessible. Institutions should also deliver support systems, such as easy access to healthcare and counseling for workers who involvement NSIs, to encourage reporting and proper management.

5. Fostering a Safety Culture

Promote a Culture of Safety: Encourage a workplace culture that prioritizes safety over suitability. This can be attained by recognizing and rewarding devotion to safety practices, and by ensuring that workers feel supported and empowered to follow protocols, even in high-pressure situations.

6. Research and Feedback Integration

Continuous Improvement through Feedback: Use the data from clinical screenings, training outcomes, and safety audits to constantly progress safety protocols and training programs. Inspiring feedback from healthcare workers can provide treasured insights into potential areas of improvement and help tailor interventions to meet their specific needs.

7. Multidisciplinary Approach

Collaborative Efforts: Encourage collaboration between different departments, including infection control, occupational health, and management, to confirm a corresponding approach to NSI prevention. Regular meetings and communication channels between these departments can help address challenges and share best practices.

These recommendations are planned to address the gaps recognized in the study and comparison, directing to improve knowledge, attitudes, and practices related to needle stick injury prevention in operating theatre workers. Applying these policies can help create a safer working environment and lessen the incidence of NSIs in healthcare settings.

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