Enhancing Hospital Safety through Hazard Identification and Risk Assessment (HIRA): An Analytical Study

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Abstract

The safety of patients, staff members, and visitors in healthcare environments is essential, as biological, chemical, mechanical, and psychosocial hazards can all pose substantial risks. The purpose of this study is to assess the efficacy of safety policies adopted at VY Hospital in lowering the severity and likelihood of hazards identified using the Hazard Identification and Risk Analysis (HIRA) methodology. Data were gathered from a variety of departments, including the Pathology Lab, Radiology, Critical Care Unit, and others, and appraised using a risk matrix based on severity and likelihood. Staff training, equipment maintenance, waste management, and monthly safety audits were among the control methods used. The effectiveness of the new safety protocols was assessed using a paired t-test, which compared risk scores before and after implementation. The study discovered a considerable reduction in the severity and likelihood of recognized hazards following the introduction of safety standards. Monthly safety audits and better training programs helped to foster a safe culture, resulting in fewer injuries among employees and increased operational efficiency. The findings show that systematic HIRA and proactive safety measures improve safety outcomes in hospital settings, highlighting the importance of ongoing assessments and improvements in safety standards to provide a safe healthcare environment.

Key Words: HIRA (Hazard Identification and Risk Assessment), Hospital Safety Protocols, Workplace Safety.

Abbreviations

HIRA - Hazard Identification and Risk Assessment

BMW - Biomedical Waste

CCU - Critical Care Unit

CSSD - Central Sterile Services Department

OT - Operating Theatre

PPE - Personal Protective Equipment

OSHA - Occupational Safety and Health Administration

CMC: Corrective Maintenance Cost

AMC: Annual Maintenance Contract

UHID: Unique Hospital Identification Number

Introduction

The safety of the general public, patients, and employees in the workplace must always be prioritized. Hazards in the workplace might be difficult to forecast and visualize. Adding new facilities to hospitals can make them more vulnerable to dangers over time. A hazard refers to any potential harm or negative impact on individuals or establishments (www.osho.gov). It can refer to the organization, procedure, or consequence of certain activities. Hazards might be natural or manmade. Hazards can be defined as physical, chemical, biological, ergonomic, psychological, or safety-related. Hazard identification involves inspecting facilities and procedures to identify potential safety risks. To identify hazards, interview staff members such as faculty, managers, housekeeping, security, doctors, and nurses. Incident reporting systems, checklist-based facility inspection rounds, process and activity charts, the tracer method for the journey of a patient or staff in the hospital, safety audits, medical record reviews, committee reports, assessment or accreditation reports, incident reports, minutes of meetings, circulars from the heads of institutions, feedback and grievance reports, surveys, logbooks, or complaint book reviews are additional methods for identifying hazards (Sahoo et al., 2024).

The severity of a potential injury or the effect of exposure to any dangers is defined as its seriousness. Scaling depends on the degree and extent of damage. It might be classified as human impact, infrastructure impact, financial effect, or other intangible consequences.

Risk refers to the risk of harm or adverse health effects from exposure to a hazard. The risk includes service disruption, financial losses, property loss, and environmental harm caused by hazards. Identifying and assessing dangers ahead of time helps reduce risk (www.britsafe.org).

The likelihood describes how probable an accident is to occur and cause injury. Past records of similar events can provide insight into this. Severity refers to the gravity of the hurt or harm. Risk assessment involves detecting and analyzing dangers

in the workplace, and applying appropriate control measures to mitigate them. The purpose of risk assessments analyze existing control mechanisms, prioritize implementation, and allocate resources accordingly (Kour et al., 2020).

Hospitals are inherently high-risk environments where various hazards, ranging from biological risks to mechanical failures, can compromise both staff and patient safety. To manage these risks, hospitals must implement effective safety protocols. This study assesses the effectiveness of such protocols implemented in VY Hospital which is a 200-Bedded Multispecialty Hospital, where a systematic approach was undertaken through Hazard Identification and Risk Analysis (HIRA). The key research objective is to evaluate how well these safety protocols reduce the frequency and severity of hazards identified across different hospital departments.

Hazards and risks in hospitals have an unbreakable connection with risk resulting from the potential for each identified hazard to cause injury. By methodically identifying these dangers and assessing their associated risks, hospitals can prioritize safety measures and devote resources to areas of most need, resulting in a safer environment for patients, staff, and visitors.

In the context of a hospital, risks and hazards are two separate but related ideas. Here is a thorough analysis of each:

1. Hospital hazards

Any potential injury or negative health impacts on patients, employees, or guests are referred to as hazards. The intricate relationships between patients, staff, tools, supplies, and processes that go into providing healthcare at hospitals give rise to a variety of risks. The following are typical hospital hazards:

a) Biological hazards.

Infection with bacteria, viruses, and fungus is a major worry in hospitals. Clinical personnel, patients, and even visitors may come into touch with infectious materials during treatment, testing, or patient care. Common sources include human fluids, contaminated medical equipment, and surfaces in patient care areas.

b) Chemical hazards.

Hospitals utilize a variety of chemicals, such as disinfectants, cleaning agents, anesthetic gases, and laboratory reagents. Exposure to these chemicals can cause breathing problems, skin irritation, and even long-term health problems for employees who come into touch with them on a regular basis. Chemical dangers are common in departments such as pathology labs, radiology, and biomedical waste disposal facilities.

c) Radiation hazards

Radiology departments pose unique risks because of the use of ionizing radiation in diagnostic imaging procedures (e.g., X-rays, CT scans). Prolonged or incorrect radiation exposure can raise the risk of cancer or radiation illness for both patients and personnel. This threat necessitates strict safety precautions, such as shielding, lead aprons, and dosimeters.

d) Mechanical hazards

Mechanical dangers are caused by the usage of equipment and machinery, such as ventilators, dialysis machines, lifts, and patient transport systems. Failures in these systems can result in injuries or life-threatening situations for patients and personnel. Regular maintenance and employee training are required to manage these threats.

e) Physical hazards.

Slips, trips, falls, and ergonomic difficulties are all potential risks that can injure hospital workers and patients (Miake-Lye et al., 2013). These dangers are widespread in the culinary, laundry, and maintenance sectors. Other physical hazards include noise pollution from machinery, which can lead to stress and hearing problems in employees over time.

f) Psychosocial Hazards.

Hospitals are frequently high-stress situations, which can contribute to mental health difficulties for employees such as burnout, anxiety, and depression. Psychosocial hazards are frequently less evident, yet they can have an influence on employee morale, job satisfaction, and overall productivity. To address these hazards, you must create a supportive work atmosphere, work suitable shift hours, and have access to mental health supports.

2. Risks in hospitals

Risk is defined as the possibility of a negative consequence as a result of exposure to a danger. In other words, risk is a function of both the frequency of a hazard occurring and the severity of the potential injury. In a hospital, risks are assessed in order to prioritize and minimize the most serious dangers. The primary dangers in hospitals are:

a) Infection risk

Because of biological hazards, hospitals are at significant risk of healthcare-associated illnesses (HAIs). Infections are more common in critical care units, operating rooms, and wards with immunocompromised patients. Without correct practices, diseases can spread swiftly, harming several patients and personnel (Englund et al., 2011).

b) Chemical Exposure Risk.

Chemical exposure occurs when normal handling and storage protocols are not followed, or when employees lack necessary personal protective equipment (PPE). This risk is particularly significant in departments such as pathology, radiology, and maintenance, where cleaning chemicals, reagents, and anesthetic gases are frequently used.

c) Radiation Exposure Risk.

Radiation dangers are high in departments that undertake diagnostic imaging and therapeutic operations. Staff and patients are at danger of cumulative ionizing radiation exposure, which can result in radiation burns or long-term health problems. Compliance with radiation safety standards, such as shielding and monitoring, is critical for reducing these dangers.

d) Equipment Failure Risk

Mechanical dangers caused by equipment failures can be life-threatening, especially in critical care settings where

patients rely on machines such as ventilators or dialysis machines. Without regular maintenance and proper user training, the chance of equipment failure increases, which can lead to poor patient outcomes.

e) Ergonomic and physical injury risks

Staff in sectors such as nursing, laundry, and maintenance confront ergonomic dangers since they handle patients and heavy equipment manually. Musculoskeletal injuries, falls, and strains are common without sufficient training, ergonomic equipment, or support systems.

f) Fire and electrical hazards

The increasing usage of electronic technology and oxygen supplies in hospitals creates electrical and fire concerns. Electrical failures or inadequately maintained fire safety equipment can result in hazardous situations, necessitating severe fire and electrical safety precautions to avoid mishaps.

g) Psychological and occupational stress risk.

Psychological concerns include mental health issues associated with high-stress workplaces, inconsistent shifts, and emotionally taxing patient care. This risk has an impact on employee performance and well-being, increasing the possibility of errors or breaches in safety compliance. Managing psychosocial hazards entails workplace initiatives, proper personnel, and access to mental health support for employees.

Need for hazard identification and risk assessment (HIRA) in hospitals

Hospitals are complex facilities with sophisticated equipment, oxygen and gas supply systems, furniture, drugs, stationery, and departments such as registration, billing, outpatient departments, laboratories, radio diagnosis, CSSD, kitchen and dietary services, wards, operation theaters (OTs), labor rooms, dialysis units, intensive care units (ICUs), linen and laundry services, and biomedical engineering (Chhabra et al., 2016). This requires a vast number of employees working 24 hours a day, seven days a week. Hospital staff may sustain injuries and develop a tolerance for them in the job if the hazard is not addressed. Newly hired staff, such as doctors, nurses and interns often sustain injuries . Patients who are new to hospitals are more likely to experience difficulty and sustain injuries. HIRA is essential for creating a safe atmosphere, instilling accountability in personnel, and fostering trust among patients. There is a need to shift from a reactive to proactive approach.

Literature Review

The review of Sahoo et al. (2024) and related studies highlights HIRA's role in creating safer healthcare environments by identifying hazards and assessing risks to reduce injuries, illnesses, and operational disruptions. HIRA promotes safe behavior, improves HCW well-being, and reduces financial burdens on hospitals by preventing workplace incidents. This systematic approach is essential in high-risk healthcare settings, where a proactive safety culture is integral to hospital sustainability and efficient service delivery.

The study by Kour et al. (2020) highlights the successful implementation of HIRA in a high-risk environment, the CCU, to identify and mitigate specific hazards that posed risks to patient and staff safety. Their use of a risk matrix, based on staff feedback, enabled targeted interventions that addressed corridor obstructions, equipment malfunctions, and electrical hazards. This research adds to the body of literature underscoring HIRA's value in critical care settings, where tailored risk management strategies can significantly improve safety outcomes and operational continuity. The literature supports the view that involving staff and using structured assessments like risk matrices are essential components of effective HIRA processes in hospitals.

Miake-Lye et al. (2013) review inpatient fall prevention programs, finding that multicomponent interventions significantly reduce fall rates in hospitals. Successful programs rely on leadership support, multidisciplinary collaboration, staff education, and IT systems for tracking falls. However, they caution against potential harms like the overuse of restraints, emphasizing the need for balanced approaches. The study highlights the importance of shifting hospital culture to view falls as preventable incidents. Future research should aim to identify the best combination of interventions and assess implementation strategies, supporting a proactive approach to patient safety in acute care.

Englund et al. (2011) examine viral infections in immunocompromised patients, particularly focusing on respiratory viruses that frequently affect transplant recipients. Viruses like respiratory syncytial virus (RSV), influenza, parainfluenza (PIV), adenovirus, rhinovirus (RhV), and coronaviruses are major causes of respiratory illness in these patients. With advances in molecular detection methods, identifying these viruses has become more reliable and widespread, enabling better disease monitoring and management. This review highlights the critical need for targeted infection control and preventive measures to protect immunocompromised patients from these prevalent and potentially severe viral infections.

Chhabra et al. (2016) rehabilitative services. Despite advances in medical science, the complexity of healthcare has introduced new risks, including biological (viruses, bacteria) and chemical hazards (disinfectants, drugs), as well as physical risks like needle pricks, radiation, and violence. Common issues include musculoskeletal disorders from patient handling, psychiatric stress, and workplace violence. Chhabra emphasizes the need for greater awareness among HCP about preventive measures and calls for stronger, accessible preventive policies, particularly in developing countries, to better protect HCP from these hazards.

Wicker et al. (2008) examine the occurrence and preventability of needlestick injuries among healthcare workers (HCWs), a common occupational risk associated with blood exposure. The study, conducted in a German university hospital, used anonymous questionnaires to gather data on the types and causes of needlestick injuries and the working conditions contributing to them. The findings highlight that, while needlestick injuries are a significant occupational hazard, many are potentially preventable through targeted interventions. Wicker et al. advocate for rational prevention strategies, which include improved training, safety protocols, and safer equipment to reduce the risk of percutaneous exposure in healthcare settings.

Harmon (2011) explains the use of t-tests in Excel for hypothesis testing, specifically comparing "Before" and "After" data. A one-tailed test is utilized to determine if the "After" data significantly exceeds the "Before" data, with the analysis based on paired data from the same subjects. The study employs a 5% level of significance (alpha = 0.05), indicating a 95% confidence level. The null hypothesis asserts that there is no difference in click rates between search and content networks, while the alternative hypothesis suggests that content networks generate more clicks. This overview highlights essential steps in conducting a t-test and the importance of defining clear hypotheses.

Research Objective

To analyze the effectiveness of safety protocols implemented at VY Hospital in reducing the severity and likelihood of hazards identified through the HIRA framework.

Hypotheses

Null Hypothesis (H0): Implementing safety protocols in VY Hospital does not significantly reduce the severity or likelihood of hazards across clinical and non-clinical departments.

Alternative Hypothesis (H1): Implementing safety protocols in VY Hospital significantly reduces the severity and likelihood of hazards across clinical and non-clinical departments.

Methodology

1. Data Collection

The study uses data from the **HIRA project** at VY Hospital, covering both clinical and non-clinical departments. The data were collected using a risk matrix that evaluated hazards based on their severity and likelihood. The departments studied include:

- Pathology Lab
- Radiology
- Dialysis
- Critical Care Unit (CCU)
- Operation Theatre (OT)
- Central Sterile Services Department (CSSD)
- Laundry
- Main Patient Kitchen

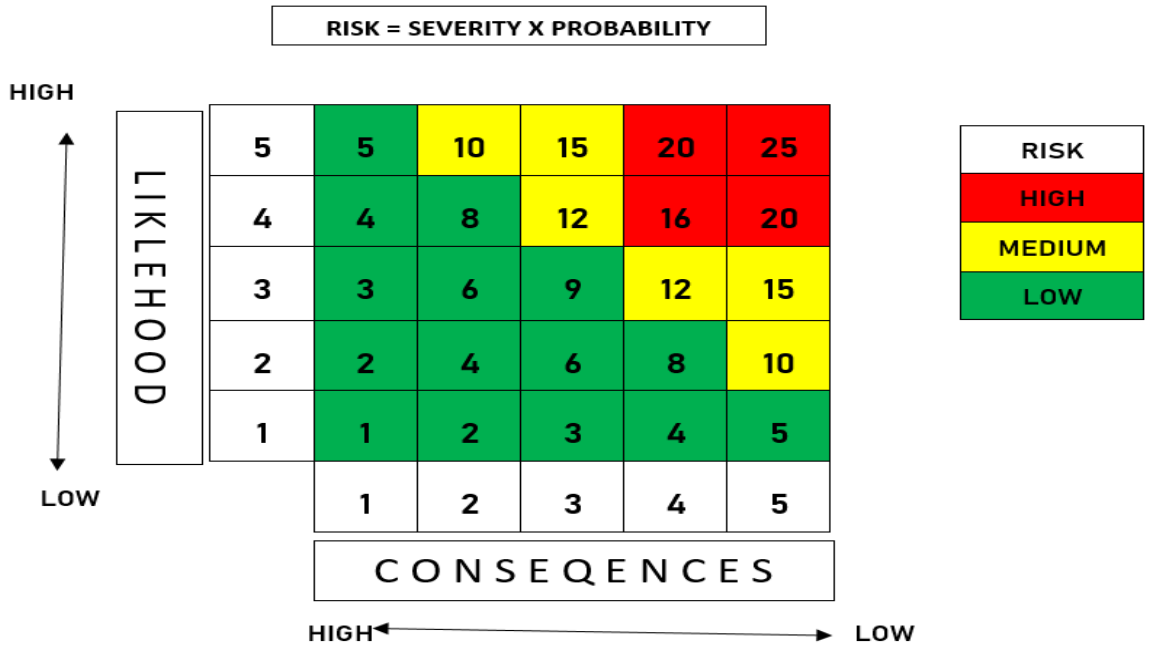
- Biomedical Waste (BMW) Disposal
- Pharmacy
- Maintenance
- Biomedical Equipment
- Canteen
- Fire Safety

2. Hazard Identification and Risk Matrix

The HIRA framework at VY Hospital identified various hazards, which were assessed using a **risk matrix** based on:

- **Severity (S)**: Rated on a scale from 1 to 5, indicating the potential consequences of the hazard.
- **Probability (P)**: Rated from 1 to 5, indicating the likelihood of the hazard occurring.
- **Low Risk:** Scores ranging from 1 to 8
- **Medium Risk:** Scores ranging from 9 to 15
- **High Risk:** Scores ranging from 16 to 25

The **Risk Score** was calculated as: Risk Score= Severity × Probability (www.youtube.com,2023)



3. Control Measures

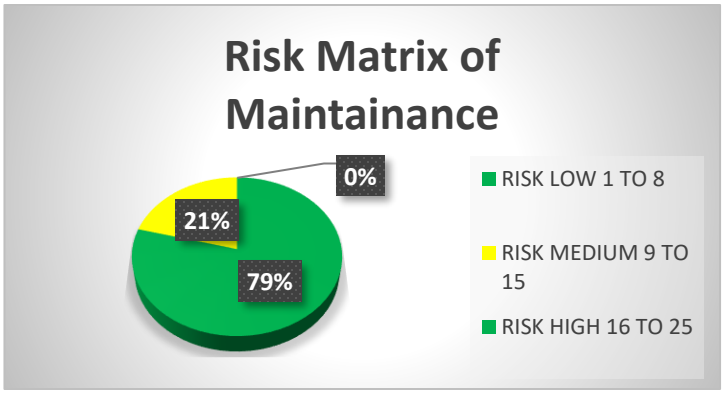
Once hazards were identified, the hospital implemented several control measures aimed at reducing the risks:

- **Staff training**: Regular safety training on equipment handling, infection control, and emergency response.
- **Equipment maintenance**: Routine inspections and maintenance of critical equipment like ventilators, radiology machines, and dialysis units.
- **Waste management**: Improved segregation of biomedical waste, proper labeling, and the use of personal protective equipment (PPE) to minimize exposure risks.
- **Safety audits**: Monthly safety audits were conducted to ensure compliance with protocols and update control measures as needed.

Data Collection

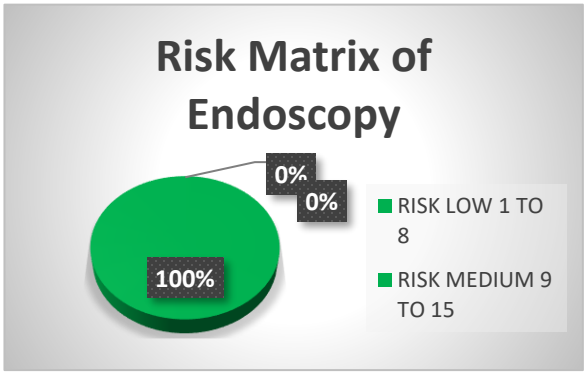
Data on hazards, risks, and existing control mechanisms were collected from each hospital department using a systematic questionnaire filled by department leaders and senior technical personnel. The questionnaire aimed to identify specific dangers, rate their likelihood and severity, and describe existing control measures in place, such as PPE use, equipment maintenance, and emergency procedures. Follow-up interviews with chosen respondents gave additional insights into the effectiveness and applicability of these measures, resulting in a more complete picture of each department's risk environment and indicating prospective safety improvements.

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
1	MAINTENANCE	ELECTRIC PANEL	ELECTRIC SHOCK	SEVER INJURY OR FATALTY DUE TO ELECTRIC SHOCK	SERVICING IN EVERY 6 MONTHS	1	4	LOW
			SHORT CIRCUIT	EQUIPMENT DAMAGE DUE TO SHORT CIRCUIT OR OVERHEATING		2	3	LOW
			OVERHEATING	FIRE LEADING TO EXTENSIVE DAMAGE POTENTIAL EVACUATION	EMERGENCY NO. 255 FOR EVERY SITUATION	2	4	LOW
			FIRE			2	4	LOW
		DIESEL GENERATOR	FUEL LEAKAGE	FIRE OR EXPLOSION DUE TO FUEL LEAKAGE	ANNUAL MAINTAINANCE CHECK UP AND SERVICING	2	3	LOW
			EXHAUST EMISSIONS	HEALTH ISSUES FROM EXPOSURE TO EXHAUST FUMES		2	2	LOW
			NOISE POLLUTION	HEARING DAMAGE FROM PROLONGED EXPOSURE TO NOICE	EMERGENCY NO. 255 FOR EVERY SITUATION	1	2	LOW
			MECHANICAL FAILURE	OPERATION DISRUPTION DUE TO MECHANICAL FAILURE		2	2	LOW
		LIFT	ELECTRIC FAILURE	INJURY OR FATATY FROM LIFT MALFUNCTION OR FALL	ANNUAL MAINTAINANCE CHECK UP AND SERVICING	2	4	LOW
			ENTRAPMENT	PASSENGERS TRAPED INSIDE LEADING TO PANIC AND DISTERSS		3	2	LOW
			FALL	DISRUPTION OF LIFT SERVICE CAN BE FATAL FOR EMERGENCY PATIENT	EMERGENCY NO. 255 FOR EVERY SITUATION	1	5	LOW
		AC VENT	POOR AIR QUALITY	RESPIRATORY ISSUES DUE TO POOR AIR QUALITY OR MOLD	EMERGENCY NO. 255 FOR EVERY SITUATION	2	3	LOW
			MOLD GROWTH			3	3	MEDIUM
			BLOCKAGES	REDUCED EFFICIENCY OR FAILURE OF AC SYSTEM DUE TO BLOCKAGES	ANNUAL MAINTAINANCE CHECK UP AND SERVICING	2	3	LOW
			ELECTRIC FAULT	FIRE HAZARD DUE TO ELECTRIC FAULTS		2	3	LOW
		TRANSFORMER	ELECTRIC SHOCK	SEVER INJURY OR FATALTY DUE TO ELECTRIC SHOCK	GENERAL ROUND CHECK UP /OIL GREACING /OIL FILTRATION	1	4	LOW
			OIL LEAKAGE	FIRE HAZARD FROM OVERHEATING AND OIL LEAKAGE		4	3	MEDIUM
			OVERHEATING		EMERGENCY NO. 255 FOR EVERY SITUATION	2	4	LOW
			EXPLOSION	EXPLOSION LEADING TO EXTENSIVE DAMAGE AND EVACUATION		1	5	LOW
		STP PLANT	CHEMICAL EXPOSURE	HEALTH ISSUES FROM EXPOSURE TO HAZARDOUS CHEMICALS OR BIOLOGICAL AGENTS	ANNUAL MAINTAINANCE CHECK UP AND SERVICING	3	4	MEDIUM
			BIOLOGICAL HAZARD			3	4	MEDIUM
			SLIPS AND FALL	SLIPS AND FALLS LEADING TO INJURY	WEEKLY CHECKUP	2	4	LOW
		OXYGEN PLANT	LEAKAGE	EXTENSIVE DAMAGE TO THE FACILITY, POTENTIAL INJURIES, OR FATALITIES AMONG PATIENTS, STAFF, AND VISITORS.	REGULAR INSPECTIONS AND MAINTENANCE OF THE OXYGEN PLANT AND ASSOCIATED PIPING AND VALVES TO PREVENT LEAKS.	2	4	LOW
			EXPLOSION	PROLONGED EXPOSURE TO HIGH LEVELS OF OXYGEN CAN LEAD TO OXYGEN TOXICITY, WHICH CAN CAUSE LUNG DAMAGE AND OTHER HEALTH ISSUES.	APPROPRIATE FIRE SUPPRESSION SYSTEMS THAT CAN HANDLE OXYGEN-ENRICHED ENVIRONMENTS.	3	4	MEDIUM



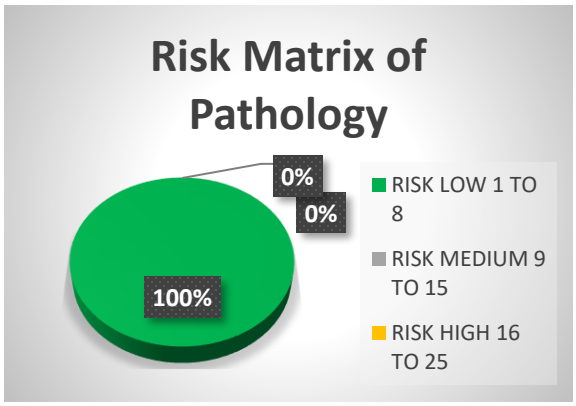
RISK			
	LOW	1 TO 8	19
	MEDIUM	9 TO 15	5
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
2	ENDOSCOPY	PATIENT PEPRATION	ALLERGIC REACTION TO SEDATIVES OR ANESTHETICS	ADVERSE DRUG REACTION	USE OF SEDATIVES AND ANESTHETICS AS PER INSTRUCTION WHICH IS HANDLED BY PROFFESIONALS	1	4	LOW
			INCORRECT FASTING INSTRUCTION	COMPLICATION DURING THE PROCEDURE	PRE CHECKUP INSTRUCTION BY DOCTORS	1	3	LOW
		EQUIPMENT STERILIZATION	INADEQUATE STERILIZATION OF ENDOSCOPES	INFECTION(eg: BACTERIAL,VIRAL)	CHEMICAL CIDEX (GLUTENALDEHYDE) USED FOR STERILIZATION	2	4	LOW
			CROSS CONTAMINATION FROM IMPROPER HANDLING	SPREAD OF HEALTHCARE ASSOCIATED INFECTIONs	CLEANING WITH GAUGE PIECE,MOP AND CLEAR WATER BEFORE AND AFTER STERILIZATION	2	4	LOW
		ENDOSCOPIC PROCEDURE	MECHANICAL FAILURE OF ENDOSCOPIC EQUIPMENT	EQUIPMENT RELATED INJURIES OR INCOMPLETE PROCEDURES	SERVICING OF EQUIPMENT IN EVERY 3 TO 6 MONTHS	2	4	LOW
			EXCESSIVE SEDATION OR ANESTHETIC COMPLICATIONS	RESPIRATORY DEPRESSION AND CARDIAC ARREST	PROPER KNOWLEDGE OF SEDATIVES AND ANESTHETICS BY TECHNICIAN	2	4	LOW
		WASTE MANAGEMENT	IMPROPER DISPOSALOF BIOHAZARDOUS WASTE	ENVIRONMENTAL CONTAMINATION	PROPER DISPOSAL OF BMW IN DIFFERENT CATEGORY OF DUSTBINS	1	3	LOW
			EXPOSURE TO HAZARDOUS CHEMICALS USED IN CLEANING	OCCUPATIONAL ILLNESS AMONG STAFF		1	3	LOW



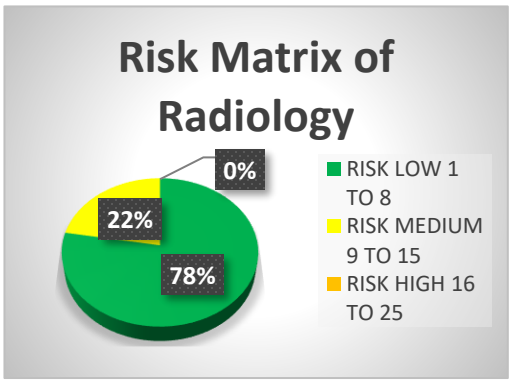
RISK			
	LOW	1 TO 8	8
	MEDIUM	9 TO 15	0
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
3	PATHOLOGY	SPECIMEN COLLECTION AND HANDLING	EXPOSURE TO INFECTIOUS AGENTS	LABORATORY AQUIERED INFECTIONS	USE OF PPE KITS AND SEPRATE ROOM FOR COLLECTION OF SAMPLES	2	4	LOW
			IMPROPER LABELING OR HANDLING LEADING TO CROSS CONTAMINATION	MIS-DIAGNOSIS DUE TO SPECIMEN MIX-UPS	TEST PRESCRIBED BY DR. AND DOCUMENT CHECK BEFORE LABELING	1	4	LOW
		CHEMICAL HANDLING	EXPOSURE TO TOXIC CHEMICALS (eg; formaldehyde,xylene)	RESPIRATORY PROBLEMS AND SKIN BURN	USES GLOVES AND MASKS	2	3	LOW
			CHEMICAL SPILLS AND ACCIDENTAL INGESTION OR INHALATION	CONTAMINATION OF LABORATORY ENVIRONMENT	CODE ORANGE ANNOUNCE (AREA SEAL) AND CLEANED BY HOUSE KEEPING STAFF WITH SAFETY	1	3	LOW
		EQUIPMENTS USE	ELECTRIC HAZARD	ELECTRIC SHOCK, BURNS, FIRES	TRANING OF HANDLING AND SERVICING BY BIOMEDICAL EQUIPMENT STAFF	1	3	LOW
			BIOLOGICAL HAZARD	INFECTION, DISEASES	USE OF STERILIZATION AND PPE KITS	2	3	LOW
		WASTE MANAGEMENT	IMPROPER DISPOSAL OF BIOHAZARDOUS AND CHEMICAL WASTE	ENVIRONMENTAL CONTAMINATION	PROPER DISPOSAL OF BMW IN DIFFERENT CATEGORY OF DUSTBINS	1	2	LOW
			EXPOSURE TO HAZARDOUS WASTE MATERIALS	OCCUPATIONAL ILLNESS AMONG STAFF		1	3	LOW



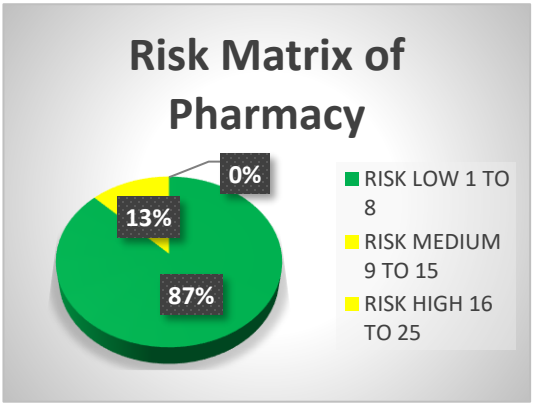
RISK			
	LOW	1 TO 8	8
	MEDIUM	9 TO 15	0
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
4	RADIOLOGY	IMAGING PROCEDURE (X-RAYS,CT SCANS,MRI)	EXPOSURE TO IONIZING RADIATION FOR PATIENTS AND STAFF	INCREASED RISK OF CANCER AND RADIATION SICKNESS	LEAD GOGGLES,THYROID GLAND COVER,LEAD APPRON,GONAD SHEILD AND LEAD GLOVES	1	4	LOW
			MRI MAGNET HAZARDS	PHYSICAL INJURIES FROM FLYING OBJECT IN MRI ROOMS	CHECKLISTS FOR PATIENT BEFORE ENTERING THE RADIATION AREA	1	2	LOW
		PATIENT HANDLING AND POSITIONING	MUSCULOSKELETAL INJURIES TO STAFF FROM LIFTING AND POSITIONING PATIENTS	BACK JOINT INJURIES AMONG STAFF	NO TRANING FOR STAFF	3	3	MEDIUM
			PATIENT FALLS OR INJURIES DURING TRANSFERS	HARM TO PATIENTS POTENTIALLY LEADING TO	IMMEDIATELY INFORM DR.	3	4	MEDIUM
		CONTRAST MEDIA ADMINISTRATION	ALLERGIC REACTIONS TO CONTRAST MEDIA	SEVERE ALLERGIC REACTION	ONLY FOR CRITICAL PATIENTS	1	2	LOW
			INCORRECT DOSAGE OR ADMINISTRATION TECHNIQUE	PATIENT CONDITION MAY GET WORSE	PROFFESIONALS GIVE SEDATIVE/ANESTHETIC ACCO. TO NEED	1	3	LOW
		EQUIPMENT HANDLING AND MAINTENANCE	ELECTRIC HAZARD FROM MALFUNCTION OR POORLY MAINTAINED EQUIPMENT	ELECTRIC SHOCK OR BURN	PMS (PRIMARY MAINTAINENCE SERVICE)IN EVERY 3 MONTHS	1	3	LOW
			MECHANICAL HAZARD FROM MOVING PARTS	PHYSICAL INJURIES FROM EQUIPMENT MALFUNCTION	PRE-PLANNED POSITIONING OF PATIENT BY DR.s AND MONITORING OF PATIENT THROUGH CAMERA	1	3	LOW
		WASTE MANAGEMENT	EXPOSURE TO HAZARDOUS MATERIALS	HEALTH ISSUES FOR STAFF AND COMMUNITY	CATEGORY WISE DISPOSAL OF WASTE	1	3	LOW



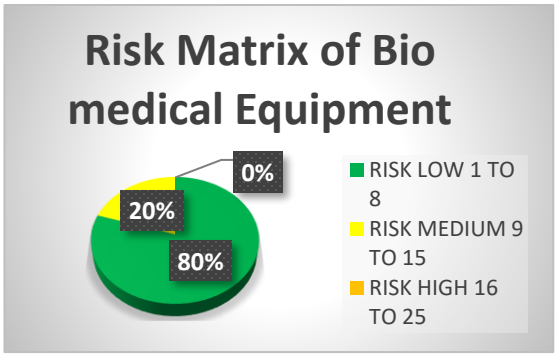
RISK			
	LOW	1 TO 8	7
	MEDIUM	9 TO 15	2
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
5	PHARMACY	PRESCRIPTION DISPENSING	MEDICATION ERRORS SUCH AS INCORRECT DOSAGE OR WRONG MEDICATION	ADVERSE DRUG REACTIONS OR INEFFECTIVE TREATMENT FOR PATIENTS	PRESCRIPTION AUDIT ON EVERY SALE OF MEDICINE	1	3	LOW
			MISLABELING OF MEDICATIONS	POTENTIAL LEGAL ISSUES AND LOSS OF TRUST IN THE PHARMACY	AUDIT OF EVERY BRAND OF MEDICINE RECEIVED	1	4	LOW
		HIGH RISK MEDICATION	EXPOSURE TO HAZARDOUS CHEMICALS AND DRUGS	RESPIRATORY ISSUES, SKIN IRRITATION, OR ALLERGIC REACTIONS AMONG STAFF	PROFFESIONAL INSTRUCTIONS BEFORE ADMINISTRATION	2	4	LOW
			RISK OF CONTAMINATION OF MEDICINE WHEN IN CONTACT WITH AIR OR LIGHT	INFECTIONS OR ADVERSE REACTIONS IN PATIENTS DUE TO CONTAMINATED MEDICATIONS	USING PPE KIT AND ADMINISTRATION IN ISOLATED AREA	2	4	LOW
		INVENTORY MANAGEMENT	HANDLING AND STORAGE OF HIGH-RISK MEDICATIONS SUCH AS NARCOTICS	RISK OF THEFT OR MISUSE OF CONTROLLED SUBSTANCES	LOCKED IN DOUBLE LOCKER, AND ONLY AUTHORIZED PERSON DEALS WITH PRESCRIBING NARCOTIC MEDICINE	1	4	LOW
			EXPIRED OR IMPROPERLY STORED MEDICATIONS	REDUCED EFFICACY OR HARM FROM EXPIRED MEDICATIONS	RETURN OF MEDICINE TO SUPPLIER EXPIRES IN 3 MONTHS	1	3	LOW
					SALE OF MEDICINE WITH 6 MONTHS LEFT FOR EXPIERY			
		MONITORING AND DOCUMENTATION	INACCURATE RECORD-KEEPING AND DOCUMENTATION ERRORS	MEDICATION ERRORS LEADING TO ADVERSE DRUG REACTIONS	MEDICATION AUDIT INCLUDING UHID,CONSULTANT NAME,IPD OR OPD	1	3	LOW
			UNAUTHORIZED ACCESS TO SENSITIVE PATIENT INFORMATION	BREACH OF PATIENT CONFIDENTIALITY AND TRUST	STRICT ACCESS CONTROLS AND ENCRYPTION FOR PATIENT INFORMATION	3	3	MEDIUM



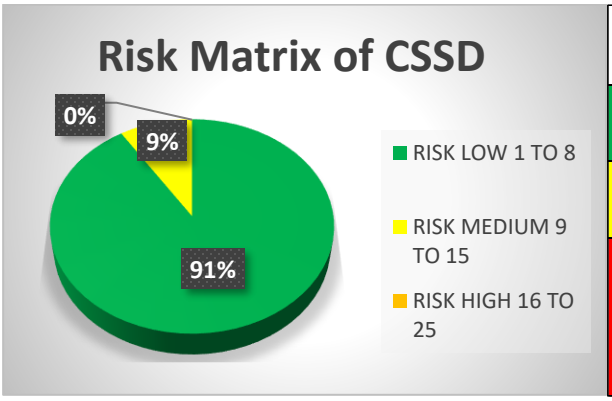
RISK			
	LOW	1 TO 8	7
	MEDIUM	9 TO 15	1
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
6	BIOMEDICAL EQUIPMENT	INSTALLATION AND SETUP	ELECTRICAL SHOCKS FROM IMPROPER HANDLING OF ELECTRICAL COMPONENTS	SEVERE ELECTRICAL INJURIES OR BURNS	PROPER KNOWLEDGE OF INSTALLATION NO SAFTEY MEASURES TAKEN	3	4	MEDIUM
			PHYSICAL INJURIES FROM LIFTING AND MOVING HEAVY EQUIPMENT	INJURIES, INCLUDING BACK AND JOINT PROBLEMS	PROPER PLANNING BEFORE INSTALLING, USING EXTRA MANPOWER,TROLLY OR CRANE FOR HEAVY LIFTING	3	4	MEDIUM
		MAINTAINANCE AND REPAIR	EXPOSURE TO HAZARDOUS MATERIALS (eg, BATTERY ACIDS)	CHEMICAL BURNS	USE OF CORRECT TOOLS	1	3	LOW
			FAILURE TO CHECK OR MAINTAIN EQUIPMENT	EQUIPMENT FAILURE OR MALFUNCTION	USING CHECKLISTS FOR SAFTEY SERVICING	1	4	LOW
		CALIBRATION AND TESTING	RADIATION EXPOSURE FROM IMAGING EQUIPMENT (E.G., X-RAY, CT SCANNERS)	INCREASED RISK OF CANCER AND RADIATION-RELATED HEALTH ISSUES	EQUIPMENT-RELATED ENGENIER COMES FOR SERVICE EVERY 3-6 MONTHS AND FOLLOWS SAFETY PROCEDURE BY WEARING LEAD GOGGLES,THYROID GLAND COVER,LEAD APPRON,GONAD SHEILD, AND LEAD GLOVES.	2	3	LOW
			EXPOSURE TO HIGH-FREQUENCY EMISSIONS FROM DEVICES LIKE MRI MACHINES	POTENTIAL LONG-TERM HEALTH EFFECTS FROM ELECTROMAGNETIC FIELDS		2	3	LOW
		CLEANING AND STERILIZATION	EXPOSURE TO CLEANING CHEMICALS AND DISINFECTANTS	SKIN IRRITATION OR ALLERGIC REACTIONS	STERILIZATION IN CSSD BEFORE INSTALLATION USING SAFE METHODS	1	3	LOW
			RISK OF CONTAMINATION IF CLEANING IS NOT THOROUGH	SPREAD OF INFECTIONS DUE TO INADEQUATE STERILIZATION		2	3	LOW
		USER TRAINING AND SUPPORT	INSUFFICIENT TRAINING LEADING TO IMPROPER USE OF EQUIPMENT	INCREASED RISK OF EQUIPMENT-RELATED ERRORS AND PATIENT HARM	TECHNICIAN OR EQUIPMENT ENGENIER GIVES INSTRUCTION TO THE NURSING STAFF	1	4	LOW
			NO PROPER TRAINING FOR SAFE INSTALLATION	INJURIES	NO SAFTEY DRILLS	3	3	LOW



RISK			
	LOW	1 TO 8	8
	MEDIUM	9 TO 15	2
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
7	CSSD (CENTRAL STERILE SUPPLY DEPARTMENT)	DECONTAMINATION	EXPOSURE TO BLOODBORNE PATHOGENS AND BIOLOGICAL CONTAMINANTS	INFECTIONS AND TRANSMISSION OF DISEASES LIKE HEPATITIS AND HIV	RUBBER OR LOOSE GLOVES ,MASK, HAIR CAP FOR COLLECTION OF INFECTED LINEN etc AND WEARS HIGH LONG SHOES	1	4	LOW
			HANDLING OF SHARP INSTRUMENTS LEADING TO CUTS AND PUNCTURE WOUNDS	OCCUPATIONAL INJURIES AND POTENTIAL INFECTIONS AMONG STAFF	USES DOUBLE GLOVE FOR SHARP OBJECT (SURGICAL GLOVE)	2	4	LOW
		CLEANING AND DISINFECTION	EXPOSURE TO HAZARDOUS CHEMICALS USED FOR CLEANING AND DISINFECTION	SKIN IRRITATION, BURNS, OR RESPIRATORY PROBLEMS FOR STAFF	USES GLOVES AND MASK FOR DISINFECTING	1	3	LOW
			RISK OF CHEMICAL BURNS OR RESPIRATORY ISSUES	INADEQUATE DISINFECTION LEADING TO POTENTIAL INFECTIONS IN PATIENTS	USES CHEMICAL CARSOLEX PLUS IN ADEQUATE AMOUNT	1	3	LOW
		STERILIZATION	EXPOSURE TO HIGH TEMPERATURES AND STEAM UNDER PRESSURE	BURNS AND HEAT-RELATED INJURIES TO STAFF	STERILIZATION THROUGH AUTOCLAVE AND ETO (ETHYLIN TRIOXIDE) MACHINE FOR 45 MIN AT TEMP 121^{o}C PRESSURE 1.5 , AFTER PROCESS IS OVER STEAM IS RELEASED THROUGH PIPE LINE SAFELY	1	3	LOW
			MALFUNCTIONING STERILIZATION EQUIPMENT	INEFFECTIVE STERILIZATION RESULTING IN CONTAMINATED INSTRUMENTS	3 MONTHS CMC (COMPREHENSIVE MAINTENANCE CONTRACT)	1	3	LOW
		STORAGE AND HANDLING OF STERILE SUPPLIES	CONTAMINATION OF STERILE SUPPLIES DUE TO IMPROPER STORAGE	INCREASED RISK OF SURGICAL SITE INFECTIONS IN PATIENTS	STORED IN TEMP CONTROLLED ROOM (AC)	2	3	LOW
			PHYSICAL INJURIES FROM LIFTING AND MOVING HEAVY TRAYS AND EQUIPMENT	MUSCULOSKELETAL INJURIES AMONG STAFF	USES CLOSED TROLLY FOR CARRING STOCK WHICH ARE STERILIZED BY CHEMICAL STERILLIUM	1	3	LOW
		INVENTORY MANAGEMENT	INCORRECT INVENTORY TRACKING LEADING TO SHORTAGES OR OVERSTOCK	DELAYS IN PROCEDURES DUE TO LACK OF NECESSARY INSTRUMENTS	NO STOCK OF EXTRA LINEN OR WRAPP CLOATHES	3	3	MEDIUM
			EXPIRED OR IMPROPERLY ROTATED SUPPLIES	USE OF EXPIRED SUPPLIES POTENTIALLY COMPROMISING PATIENT SAFETY	CHEMICAL INDICATORS ARE USED FOR DIFFRENCATING ITEM,EXPIREY DATE ARE ALSO WRITTEN IN INDICATORS 7DAYS FOR AUTOCLVE AND 3MONTHS FOR ETO	1	3	LOW
		EQUIPMENT MAINTAINANCE	IMPROPER MAINTAINACE LEADS TO EQUIPMENT FAILURE OR MALFUNTIONING	DELAY IN DISINFECTING PROCEDURE	DAILY CHECKING AND 3MONTHS CMC (COMPREHENSIVE MAINTENANCE CONTRACT)	1	3	LOW

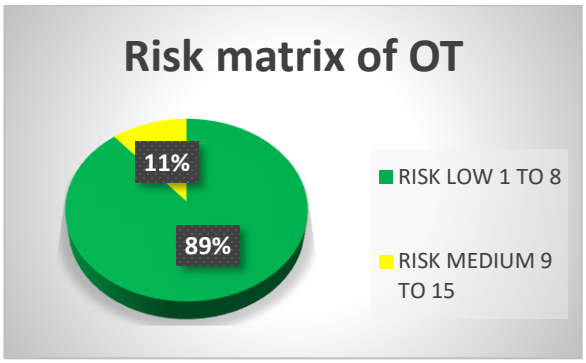


RISK			
	LOW	1 TO 8	10
	MEDIUM	9 TO 15	1
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
8	LAUNDRY	HANDLING SOILED LINEN	EXPOSURE TO BLOODBORNE PATHOGENS AND INFECTIOUS AGENTS	RISK OF INFECTIONS AND TRANSMISSION OF DISEASES LIKE HEPATITIS AND HIV	INFECTIOUS LINEN ARE SOAKED IN HYPO LIQUID	2	4	LOW
			CONTACT WITH HAZARDOUS WASTE OR SHARP OBJECTS HIDDEN IN LINENS	INJURIES AND POTENTIAL INFECTIONS AMONG STAFF	GLOVES ARE USED FOR COLLECTION,DIRTY LINEN ARE COLLECTED IN RED AND INFECTED LINEN IN YELLOW	3	4	MEDIUM
		WASHING AND DRYING	EXPOSURE TO CHEMICALS AND DETERGENTS USED IN WASHING	SKIN IRRITATION, RESPIRATORY ISSUES, OR CHEMICAL BURNS	WEARS GLOVES BEFORE WASHING	1	3	LOW
			HIGH TEMPERATURES AND MECHANICAL HAZARDS FROM WASHING AND DRYING MACHINES	BURNS OR MECHANICAL INJURIES FROM EQUIPMENT	TEMPERATURE CONTROL IN MACHINE	1	3	LOW
		FOLDING AND SORTING & CLEANING LINENS	MOTION AND BLOOD STAIN	RISK OF INFECTIONS AND TRANSMISSION OF DISEASES SUCH AS HEPATITIS, HIV, AND GASTROINTESTINAL INFECTIONS	OXY BLEACH(HYDROGEN PEROXIDE) FOR COLOUR CLOTHS AND HYPO LIQUID OR FREE WASH FOR WHITE CLOATHS,MLC FOR OIL STAIN AND LIPID SOFT DETERGENT ARE USED	2	2	LOW
			RISK OF CONTAMINATION IF LINENS ARE NOT PROPERLY SORTED AND HANDLED	POTENTIAL FOR CROSS-CONTAMINATION AND INFECTION	CLOTHES ARE IRONED FOLDED AND ARRANGED DEPARTMENT WISE, INFECTIOUS LINEN AND DIRTY LINEN ARE WASHED IN SAME WASHING MACHINE	3	4	MEDIUM
		TRANSPORTAION OF LINEN	PHYSICAL STRAIN FROM LIFTING AND MOVING HEAVY LOADS	BACK AND JOINT INJURIES AMONG STAFF	TROLLY ARE USED FOR CARRYING LINEN	2	2	LOW
			RISK OF ACCIDENTS OR SPILLS DURING TRANSPORTATION	SPREAD OF CONTAMINANTS AND POTENTIAL INFECTION RISKS	OPEN TROLLYS ARE USED	3	3	LOW
		EQUIPMENT MAINTAINANCE	ELECTRICAL AND MECHANICAL HAZARDS DURING MAINTENANCE ACTIVITIES	ELECTRICAL SHOCKS, BURNS, AND MECHANICAL INJURIES	TECHNICIAN PRESENT ON DUTY EVERY DAY	1	4	LOW
			RISK OF EXPOSURE TO RESIDUAL CHEMICALS AND HOT SURFACES	CHEMICAL EXPOSURE LEADING TO HEALTH ISSUES	WEEKLY CHECKUP AND CLEANING OF MACHINE	1	3	LOW

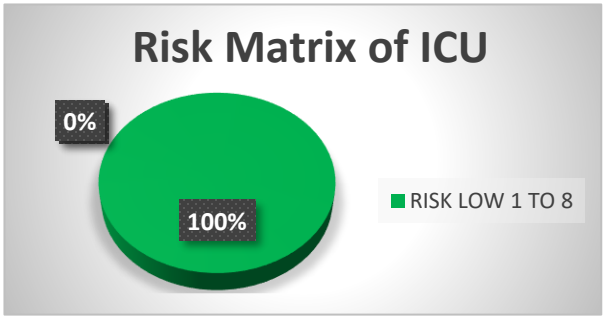
RISK			
	LOW	1 TO 8	8
	MEDIUM	9 TO 15	2
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
9	OT	SURGICAL PROCEDURE	EXPOSURE TO BLOODBORNE PATHOGENS	INFECTIONS OR TRANSMISSION OF DISEASES LIKE HEPATITIS AND HIV	USE OF PPE KITS AND SANITIZERS	1	4	LOW
			RISK OF SURGICAL FIRES DUE TO THE PRESENCE OF FLAMMABLE MATERIALS AND OXYGEN	BURNS OR OTHER INJURIES TO PATIENTS AND STAFF	FIRE SAFTEY WATER SPRINKLER AND FIRE EXTINGUISHER	2	3	LOW
		SURGICAL INSTRUMENTS	CUTS, PUNCTURES, OR LACERATIONS FROM SHARP INSTRUMENTS	OCCUPATIONAL INJURIES AMONG STAFF	WEARS PPE KITS AND HANDLESHARP OBJECT WITH GREAT CARE	3	3	MEDIUM
			INADEQUATE STERILIZATION LEADING TO INFECTION	POSTOPERATIVE INFECTIONS IN PATIENTS	ALL EQUIPMENTS AND PPEs STERILIZED IN CSSD	1	3	LOW
		ANESTHETIC ADMINISTRATION	OVERDOSE OR ALLERGIC REACTIONS TO ANESTHETIC AGENTS	RESPIRATORY DISTRESS, CARDIAC ARREST, OR DEATH	PROFFESIONALS SAFELY ADMINISTER SEDATIVE/ANESTHETIC IN REQUIRED AMOUNT	1	4	LOW
			IMPROPER ADMINISTRATION	INCOMPLETE ANESTHESIA LEADING TO PATIENT DISCOMFORT OR AWARENESS DURING SURGERY		1	3	LOW
		USE OF ELECTRO-SURGICAL DEVICES	ELECTRICAL SHOCKS OR BURNS	INJURIES TO BOTH PATIENTS AND STAFF	INSTURCTION ARE GIVEN BEFORE USE AND HANDLED WITH GREAT CARE	2	4	LOW
		PATIENT POSITIONING AND TRANSFER	MUSCULOSKELETAL INJURIES FROM LIFTING OR POSITIONING PATIENTS	BACK AND JOINT INJURIES AMONG STAFF	SURGEN INSTRUCT THE NURSES AND STAFF FOR POSITIONING THE PATIENT	1	3	LOW
			RISK OF PATIENT FALLS OR INJURIES DURING TRANSFERS	HARM TO PATIENTS, POTENTIALLY LEADING TO FURTHER MEDICAL COMPLICATIONS		1	4	LOW



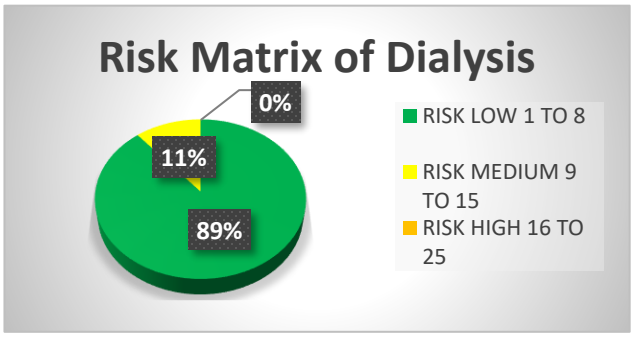
RISK			
	LOW	1 TO 8	8
	MEDIUM	9 TO 15	1
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
10	ICU (INTENSIVE CARE UNIT)	PATIENT MONITORING CARE	EQUIPMENT MALFUNCTION OR FAILURE (E.G., VENTILATORS, MONITORS).	RESPIRATORY OR CARDIAC ARREST DUE TO UNDETECTED EQUIPMENT ISSUES	ALARM IN VENTILATOR	1	4	LOW
			INADEQUATE MONITORING LEADING TO DELAYED RECOGNITION OF PATIENT DETERIORATION	INCREASED MORBIDITY AND MORTALITY DUE TO DELAYED INTERVENTION	TIME TO TIME ROUND TAKEN BY STAFF NURSE	1	4	LOW
		ADMINISTRATION OF MEDICATIONS	MEDICATION ERRORS SUCH AS INCORRECT DOSAGE OR DRUG INTERACTIONS	COMPLICATIONS SUCH AS HYPOTENSION, ARRHYTHMIAS, OR ALLERGIC REACTIONS	EVERY MEDICINE ARE PRISCRIBED BY DR.s AND INSTRUCTION ARE GIVEN FOR ADMINISTRATION	1	4	LOW
			MEDICATION ERRORS SUCH AS INCORRECT DOSAGE OR DRUG INTERACTIONS	INCREASED PATIENT MORBIDITY OR POTENTIAL FATAL OUTCOMES		1	4	LOW
		INVASIVE PROCEDURES	RISK OF INFECTION AT THE INSERTION SITE	SEPSIS OR OTHER SEVERE INFECTIONS	STERILLIUM IS USED FOR STERILIZATION BEFORE	1	4	LOW
		HANDLING OF BIOLOGICAL SAMPLES	EXPOSURE TO INFECTIOUS AGENTS	OCCUPATIONAL INFECTIONS AMONG STAFF	COLLECTION OF SAMPLE USING GLOVES AND MASKS	2	3	LOW
			IMPROPER LABELING OR HANDLING LEADING TO DIAGNOSTIC ERRORS	MISDIAGNOSIS OR DELAYED TREATMENT DUE TO SAMPLE MIX-UPS	AUDIT OF SAMPLE COLLECTED IS DONE, HANDED TO AUTHORIZED PERSON AND LABELED CHECKING PATIENT DOCUMENTS	1	3	LOW
		EMERGENCY RESPONSE	INADEQUATE RESPONSE TO SUDDEN PATIENT DETERIORATION OR CODE BLUE SITUATIONS	INCREASED RISK OF MORTALITY DUE TO DELAYED OR INEFFECTIVE RESUSCITATION	STAFF ALWAYS AVAILABLE FOR EMERGENCY SITUTATION	1	4	LOW
			LACK OF COORDINATION AMONG TEAM MEMBERS	REDUCED QUALITY OF CARE AND INCREASED STRESS FOR STAFF		2	3	LOW



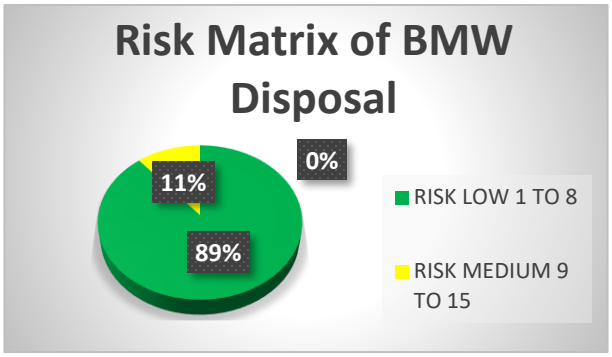
RISK			
	LOW	1 TO 8	9
	MEDIUM	9 TO 15	0
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
11	DIALYSIS	PATIENT CONNECTION AND DISCONNECTION	IMPROPER NEEDLE INSERTION OR CATHETER HANDLING	BLEEDING, INFECTION, AND VASCULAR ACCESS COMPLICATIONS	USE COTTON AND WRAP THE BLEEDING AREA TIGHTLY, INSERTION PROCESS IS DONE BY PROFFESIONALS	1	4	LOW
			ACCIDENTAL DISLODGEMENT OF NEEDLES OR CATHETERS		IF SWELLING THAN ICE ARE USED	2	3	LOW
		DIALYSIS PROCEDURE	BLOOD EXPOSURE AND CONTAMINATION	INCREASED RISK OF BLOODBORNE INFECTIONS (E.G., HEPATITIS, HIV)	WEAR GLOVE DURING INJECTING AND SANITIZERS ARE USED	3	4	MEDIUM
			EQUIPMENT MALFUNCTIONS OR POWER FAILURES	INCOMPLETE TREATMENT, PATIENT DISCOMFORT, OR EMERGENCIES	EQUIPMENT SERVICING IN EVERY 3MONTHS AND HOSPITAL HAS GENERATOR IN CASE OF NO ELECTRICITY	1	4	LOW
		WATER TREATMENT	CONTAMINATION OF WATER SUPPLY OR DIALYSATE	INFECTIONS OR ADVERSE REACTIONS IN PATIENTS	RO WATER DAILY CHECKUP TWICE	1	5	LOW
		MEDICAL ADMINISTRATION	INCORRECT MEDICATION DOSAGE OR ADMINISTRATION	COMPLICATIONS SUCH AS HYPOTENSION, ALLERGIC REACTIONS, OR TOXICITY	MEDICINE PRESCRIBED ONLY BY DR.s AND PATIENT FILE IS MAINTIENEND WITH COMPLETE PATIENT DATA AND TIME OF DIALYSIS	1	4	LOW
			ADVERSE DRUG REACTIONS	INCREASED MORBIDITY OR MORTALITY		1	4	LOW
		WASTE MANAGEMENT	IMPROPER DISPOSAL OF BIOHAZARDOUS AND CHEMICAL WASTE	ENVIRONMENTAL CONTAMINATION	PROPER DISPOSAL OF BMW IN DIFFERENT CATEGORY OF DUSTBINS	1	2	LOW
			EXPOSURE TO HAZARDOUS WASTE MATERIALS	OCCUPATIONAL ILLNESS AMONG STAFF		1	3	LOW



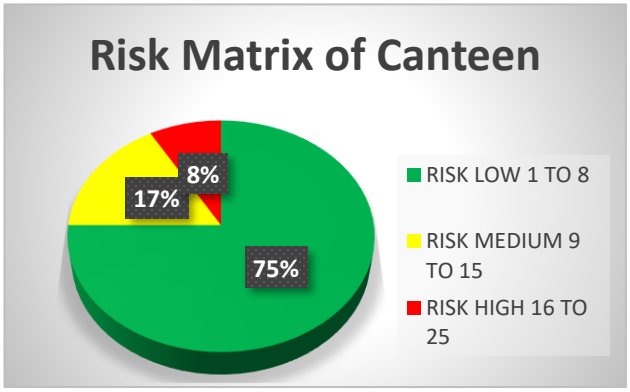
RISK			
	LOW	1 TO 8	8
	MEDIUM	9 TO 15	1
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
12	BMW DISPOSAL	SEGREGATION OF WASTE	IMPROPER SEGREGATION LEADING TO MIXING OF INFECTIOUS AND NON-INFECTIOUS WASTE	INCRESED RISK OF INFECTION OR OCCUPATIONAL INJURIES	COLLECTION OF WASTE IN CATEGORY WISE DUSTBINS AND SEPRATELY SEGREGATED AFTERWARDS IN CASE OF MIXTURE OF WASTE AND HANDLED CAREFULLY	2	3	LOW
			EXPOSURE TO SHARP AND CONTAMINATED MATERIAL	SPREAD OF CONTAMINANTS AND DISEASES		2	4	LOW
		COLLECTION AND HANDLING	DIRECT CONTACT WITH INFECTIOUS WASTE	TRANSMISSION OF BLOODBORNE PATHOGENS	COLLECTION OF HAZARDOUS WASTE IN CATEGORY WISE DUSTBIN WASTE ARE COLLECTED IN CATEGORY WISE POLYTHENS AND HANDLED CAREFULLY	2	4	LOW
			RISK OF NEEDLE STICKS AND CUTS FROM SHARP	INJURIES AND POTENTIAL INFECTION AMONG STAFF		3	4	MEDIUM
		TRANSPORTATION OF WASTE	SPILLS OR LEAKAGE DURING TRANSPORT	CONTAMINATION OF ENVIRONMENT AND SPRED OF INFECTION	TRANSPORTED IN CLOSED DUSTBINS	1	3	LOW
			EXPOSURE TO PATHOGENS IN THE EVENT OF ACCIDENTS	HEALTH RISK TO STAFF AND COMMUNITY		1	3	LOW
		STORAGE OF WASTE	IMPROPER STORAGE CONDITIONS LEADING TO SPOILAGE OR CONTAMINATION	INCREASED RISK OF INFECTIONS AND OCCUPATIONAL HAZARDS	HAZARDOUS WASTE ARE COLLETED CATEGORY WISE AND ARE STORED IN SEPRATE ROOM OUTSIDE OF HOSPITAL BUILDING	1	3	LOW
			RISK OF EXPOSURE TO TOXIC FUMES OR BIOHAZARDS	POTENTIAL LEGAL AND REGULATORY CONSEQUENCES		1	3	LOW
		TREATMENT AND DISPOSAL	EXPOSURE TO CHEMICAL USED IN TREATMENT PROCESSES	INCOMPLETE STERILIZATION RESULTING IN CONTAMINATED WASTE	HOSPITAL HAS MOE WITH SMS COMPANY PVT LTD. FOR DISCARDING OR DISPOSAL OF WASTE	1	3	LOW



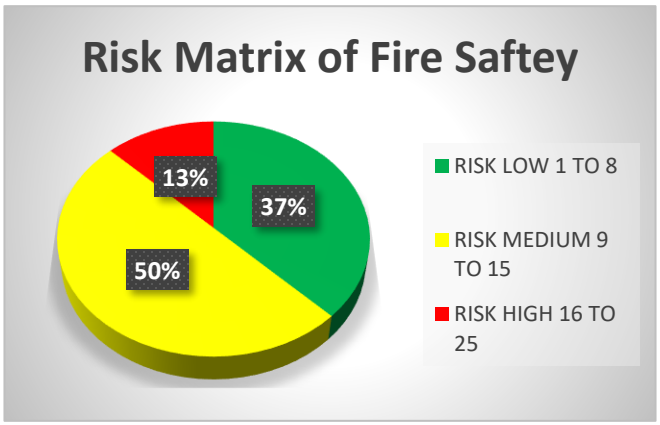
RISK			
	LOW	1 TO 8	8
	MEDIUM	9 TO 15	1
	HIGH	16 TO 25	0

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
13	CANTEEEN	VEGETABLE CUTTING	RISK OF CUTS AND LACERATIONS FROM KNIVES	INJURIES TO STAFF, CONTAMINATION OF FOOD WITH BLOOD	VEGETABLE CUTTING SAFELY	1	3	LOW
			VEGETABLE CUT ON UNCLEAN SURAFACE	FOOD MIGHT NOT BE HYGINIC	CHOPPING BOARDS ARE USED	2	3	LOW
		VEGETABLE WASHING	EXPOSURE TO PESTICIDES AND CONTAMINANTS	CHEMICAL EXPOSURE LEADING TO HEALTH ISSUES, CONTAMINATION	SOAKED AND CLEANED WITH CLEAN WATER	2	3	LOW
		GAS STOVE MAINTAINANCE	GAS LEAKS, EXPLOSION RISK, BURNS FROM HOT SURFACES	FIRE HAZARDS, BURNS, AND INJURIES TO STAFF	SERVICING EVERY MONTH	2	4	LOW
		KITCHEN CLEANING	SLIPS, TRIPS, AND FALLS ON WET OR GREASY FLOORS	INJURIES TO STAFF, CONTAMINATION IF CLEANING IS INADEQUATE	FLOOR CLEANING EVERY DAY AND KITCHEN CLEANING ONCE IN A WEEK	4	4	HIGH
		TRAINING WHEN CYLINDER ON FIRE	IMPROPER HANDLING OF FIRE EXTINGUISHERS, PANIC IN EMERGENCY	INJURIES FROM BURNS, INEFFECTIVE FIRE RESPONSE, PROPERTY DAMAGE	TRAINING IS GIVEN FOR THE FIRE SITUATION WITH CYLINDER	1	5	LOW
		FOOD STORAGE	IMPROPER STORAGE TEMPERATURES, CROSS-CONTAMINATION	FOOD SPOILAGE, FOODBORNE ILLNESSES	EVERY DAY MEAL IS STORED IN STEEL CONTAINERS AND USED FOR 4 HOURS. CONTAINERS ARE CLEANED EVERY DAY WITH HOT WATER	2	4	LOW
		EXPIRY DATE OF SNACKS IN CANTEEN	CONSUMPTION OF EXPIRED FOOD	FOOD POISONING, HEALTH ISSUES FOR CONSUMERS	EXPIRY DATE ARE CHECKED	2	4	LOW
		MEAL DISTRIBUTION FOR PATIENTS	RISK OF SPILLS, CROSS-CONTAMINATION	INJURIES FROM SLIPS AND FALLS, CONTAMINATED FOOD LEADING TO ILLNESSES	CLOSED TROOLY ARE USED WHICH CAN CARRY 60 PEOPLES MEAL	1	3	LOW
		MEAL PACKAGING	IMPROPER PACKAGING LEADING TO CONTAMINATION	FOOD SPOILAGE, FOODBORNE ILLNESSES	MEAL IS PACKED WITH CLEAN SHEET (POLYTHENE)	3	4	MEDIUM
		DIET PLAN FOR PATIENTS	INCORRECT DIETARY PREPARATIONS, ALLERGEN CROSS-CONTAMINATION	ADVERSE REACTIONS IN PATIENTS, NUTRITIONAL IMBALANCES	DIETIECIAN GUIDENCE FOR MAKING FOOD	2	4	LOW
		FOOD QUALITY	IMPROPER COOKING TECHNIQUES	REDUCED NUTRITIONAL VALUE, FOODBORNE ILLNESSES AND POOR TASTE AND PATIENT DISSATISFACTION	MEAL QUALITY ACCORDING TO PRICE	4	3	MEDIUM



RISK			
	LOW	1 TO 8	9
	MEDIUM	9 TO 15	2
	HIGH	16 TO 25	1

S.NO	DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	IMPACT LEVEL
14	FIRE SAFETY	FIRE SAFETY INSPECTIONS	INSUFFICIENT INSPECTIONS OR MISSED HAZARDS.	UNDETECTED FIRE RISKS LEADING TO POTENTIAL FIRES.	HOSE REEL PUMP INSPECTION DAILY	3	4	MEDIUM
				INCREASED RISK OF FIRE-RELATED INJURIES OR DEATH.	NO PROPER MAINATAINCE OF FIRE EXTINGUISHERS	4	5	HIGH
		FIRE DRILL CONDUCTING	LACK OF PARTICIPATION OR NON-COMPLIANCE BY STAFF.	INEFFECTIVE EVACUATION IN THE EVENT OF A REAL FIRE.	FIRE SAFETY DRILL IN EVERY 4 MONTHS/ FORMING EVACUATION TEAM, FIRE FIGHTING TEAM, MAINTAINANCE AND SECURITY TEAM/ FORMING EVACUATION POINT AND SIGNS LEADING TO THE EVACUATION AREA	3	3	MEDIUM
			IMPROPER USE OF FIRE EXTINGUISHERS OR EVACUATION PROCEDURES.	INCREASED PANIC AND CHAOS DURING ACTUAL EMERGENCIES.		3	3	MEDIUM
		FIRE EQUIPMENT MAINTENANCE	FAILURE TO MAINTAIN OR SERVICE FIRE EXTINGUISHERS, SPRINKLERS, AND ALARMS.	MALFUNCTIONING EQUIPMENT DURING A FIRE.	1 YEAR AMC/CMC FOR MAINTAINANCE OF FIRE SAFETY EQUIPMENTS.	2	4	LOW
				INABILITY TO CONTROL OR EXTINGUISH FIRES, LEADING TO GREATER DAMAGE.	MOE WITH OTHER COMPANYS FOR REFILING THE EXPIREY FIRE EXTINGUISHERS.	2	3	LOW
		FIRE SAFETY TRAINING	INSUFFICIENT TRAINING OR LACK OF UNDERSTANDING BY STAFF.	STAFF UNPREPARED FOR FIRE EMERGENCIES.	FIRE SAFETY TRINING AT THE TIME OF INDUCTION	3	3	MEDIUM
				INCREASED RISK OF INJURIES OR MISTAKES DURING FIRE RESPONSE.	DECISION MAKING FOR RESCUE ACCORDING TO THE CATEGORY OF FIRE.	2	4	LOW



RISK			
	LOW	1 TO 8	3
	MEDIUM	9 TO 15	4
	HIGH	16 TO 25	1

Hazards were classified by impact level after data collection, allowing us to identify which locations needed further action. Hazards identified with a low impact level—those with a low potential of causing severe harm—were deemed appropriately handled by present practices and did not require additional modification. Hazards having medium or high impact, on the other hand, were identified for further action. To reduce risk, these sectors required upgraded safety procedures or additional control measures, such as updated PPE protocols, increased personnel training, or more frequent equipment maintenance. By focusing efforts on medium and high-risk locations, the hospital may guarantee that resources are directed to where they are most required, improving overall safety.

DEPARTMENT	ACTVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	RISK MATRIX	IMPACT LEVEL	IMPLEMENTED CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	RISK MATRIX	IMPACT LEVEL
OT	SURGICAL INSTRUMENTS	CUTS, PUNCTURES, OR LACERATIONS FROM SHARP INSTRUMENTS	OCCUPATIONAL INJURIES AMONG STAFF	WEARS PPE KITS AND HANDLESHARP OBJECT WITH GREAT CARE	3	3	9	MEDIUM	ENSURE ALL STAFF WEAR APPROPRIATE PPE, INCLUDING CUT-RESISTANT GLOVES, GOWNS, AND FACE SHIELDS, WHILE HANDLING SURGICAL INSTRUMENTS, AND TRAIN STAFF ON SAFE HANDLING TECHNIQUES FOR SHARP INSTRUMENTS, SUCH AS USING DESIGNATED TRAYS, AVOIDING PASSING INSTRUMENTS DIRECTLY BETWEEN TEAM MEMBERS, AND KEEPING SHARP ENDS POINTED DOWN, WHILE ENCOURAGING THE USE OF INSTRUMENT HOLDERS OR TRAYS TO PREVENT ACCIDENTAL CONTACT WITH SHARP EDGES.	2	3	6	LOW
DIALYSIS	DIALYSIS PROCEDURE	BLOOD EXPOSURE AND CONTAMINATION	INCREASED RISK OF BLOODBORNE INFECTIONS (E.G., HEPATITIS, HIV)	WEAR GLOVE DURING INJECTING AND SANITIZERS ARE USED	3	4	12	MEDIUM	TRAIN STAFF ON SAFE INJECTION PRACTICES, INCLUDING THE USE OF STERILE EQUIPMENT, PROPER NEEDLE DISPOSAL, AND AVOIDING THE USE OF MULTI-DOSE VIALS WHENEVER POSSIBLE, AND USE SINGLE-USE SYRINGES AND NEEDLES FOR ALL INJECTIONS TO REDUCE THE RISK OF CROSS-CONTAMINATION, WHILE PROVIDING TRAINING ON THE PROPER SELECTION, USE, AND DISPOSAL OF PPE.	1	4	4	LOW
BMW DISPOSAL	COLLECTION AND HANDLING	RISK OF NEEDLE STICKS AND CUTS FROM SHARP	INJURIES AND POTENTIAL INFECTION AMONG STAFF	COLLECTION OF HAZARDOUS WASTE IN CATEGORY WISE DUSTBIN WASTE ARE COLLECTED IN CATEGORY WISE POLYTHENS AND HANDLED CAREFULLY	3	4	12	MEDIUM	PROVIDE STAFF WITH CUT-RESISTANT GLOVES, FACE SHIELDS, AND APRONS, TRAIN THEM ON SAFE WASTE COLLECTION TECHNIQUES, AND USE TROLLEYS TO MINIMIZE HANDLING AND INJURY RISK.	1	4	4	LOW
CANTEEN	KITCHEN CLEANING	SLIPS, TRIPS, AND FALLS ON WET OR GREASY FLOORS	INJURIES TO STAFF, CONTAMINATION IF CLEANING IS INADEQUATE	FLOOR CLEANING EVERY DAY AND KITCHEN CLEANING ONCE IN A WEEK	4	4	16	HIGH	TRAIN STAFF ON BEST CLEANING PRACTICES, EMPHASIZING SPILL RESPONSE, DEGREASING PROCEDURES, AND EQUIPMENT HANDLING TO MINIMIZE HAZARDS, AND INSTALL NON-SLIP MATS IN HIGH-RISK AREAS SUCH AS COOKING AND DISHWASHING STATIONS TO PROVIDE BETTER TRACTION AND REDUCE SLIPS.	1	4	4	LOW
	MEAL PACKAGING	IMPROPER PACKAGING LEADING TO CONTAMINATION	FOOD SPOILAGE, FOODBORNE ILLNESSES	MEAL IS PACKED WITH CLEAN SHEET (POLYTHENE)	3	4	12	MEDIUM	TRAIN STAFF ON HYGIENIC PACKAGING METHODS, EMPHASIZING THE IMPORTANCE OF HAND HYGIENE, GLOVE USE, AND CORRECT PACKAGING TECHNIQUES, AND SWITCH TO CERTIFIED FOOD-GRADE PACKAGING MATERIALS THAT OFFER BETTER SEALING AND PROTECTION AGAINST CONTAMINATION.	1	4	4	LOW
	FOOD QUALITY	IMPROPER COOKING TECHNIQUES	REDUCED NUTRITIONAL VALUE, FOODBORNE ILLNESSES AND POOR TASTE AND PATIENT DISSATISFACTION	MEAL QUALITY ACCORDING TO PRICE	4	3	12	MEDIUM	EDUCATE STAFF ON COOKING METHODS THAT RETAIN NUTRIENTS, SUCH AS STEAMING AND BLANCHING FOR VEGETABLES AND PROTEINS, AND ENCOURAGE MINIMAL OIL USE, REDUCED FRYING, AND THE INCLUSION OF HERBS AND SPICES FOR FLAVOR ENHANCEMENT WITHOUT COMPROMISING HEALTH.	2	3	6	LOW
FIRE SAFETY	FIRE SAFETY INSPECTIONS	INSUFFICIENT INSPECTIONS OR MISSED HAZARDS.	UNDETECTED FIRE RISKS LEADING TO POTENTIAL FIRES.	HOSE REEL PUMP INSPECTION DAILY	3	4	12	MEDIUM	CREATE A DETAILED CHECKLIST THAT COVERS ALL CRITICAL AREAS, INCLUDING EQUIPMENT TESTING, EMERGENCY EXIT ACCESSIBILITY, AND HAZARD IDENTIFICATION, AND USE THE CHECKLIST TO ENSURE ALL STEPS ARE COMPLETED DURING EACH INSPECTION WHILE RECORDING FINDINGS FOR REFERENCE.	1	4	4	LOW
			INCREASED RISK OF FIRE-RELATED INJURIES OR DEATH.	NO PROPER MAINATAINCE OF FIRE EXTINGUISHERS	4	5	20	HIGH	IMPLEMENT A MONTHLY INSPECTION SCHEDULE FOR ALL FIRE EXTINGUISHERS, CHECKING FOR ACCESSIBILITY, PRESSURE LEVELS, AND SIGNS OF DAMAGE OR CORROSION, AND CLEARLY MARK THE LOCATIONS OF FIRE EXTINGUISHERS WITH VISIBLE SIGNAGE TO ENSURE THEY ARE EASILY ACCESSIBLE DURING AN EMERGENCY.	1	5	5	LOW
	FIRE DRILL CONDUCTING	LACK OF PARTICIPATION OR NON-COMPLIANCE BY STAFF.	INEFFECTIVE EVACUATION IN THE EVENT OF A REAL FIRE.	FIRE SAFETY DRILL IN EVERY 4 MONTHS/ FORMING EVACUATION TEAM, FIRE FIGHTING TEAM, MAINTAINANCE AND SECURITY TEAM/ FORMING EVACUATION POINT AND SIGNS LEADING TO THE EVACUATION AREA	3	3	9	MEDIUM	INCLUDE REALISTIC SCENARIOS IN DRILLS THAT SIMULATE VARIOUS EMERGENCY SITUATIONS, SUCH AS SMOKE CONDITIONS OR BLOCKED EXITS, TO TEST STAFF READINESS AND ADAPTABILITY, AND ENCOURAGE STAFF TO TREAT EACH DRILL AS A REAL EMERGENCY, FOSTERING A SERIOUS AND COMPLIANT ATTITUDE.	2	3	6	LOW
		IMPROPER USE OF FIRE EXTINGUISHERS OR EVACUATION PROCEDURES.	INCREASED PANIC AND CHAOS DURING ACTUAL EMERGENCIES.		3	3	9	MEDIUM	PROVIDE TRAINING SESSIONS ON THE PROPER USE OF FIRE EXTINGUISHERS, EMPHASIZING THE PASS TECHNIQUE (PULL, AIM, SQUEEZE, SWEEP) AND THE APPROPRIATE TYPE OF EXTINGUISHER FOR VARIOUS FIRE CLASSES, AND INCLUDE PRACTICAL DEMONSTRATIONS AND OPPORTUNITIES FOR STAFF TO PRACTICE USING EXTINGUISHERS DURING DRILLS.	1	3	3	LOW
	FIRE SAFETY TRAINING	INSUFFICIENT TRAINING OR LACK OF UNDERSTANDING BY STAFF.	STAFF UNPREPARED FOR FIRE EMERGENCIES.	FIRE SAFETY TRINING AT THE TIME OF INDUCTION	3	3	9	MEDIUM	INCORPORATE INTERACTIVE WORKSHOPS, VIDEOS, AND HANDS-ON PRACTICE TO CATER TO DIFFERENT LEARNING STYLES; USE CASE STUDIES TO HIGHLIGHT FIRE SAFETY IMPORTANCE; PROVIDE QUICK REFERENCE GUIDES FOR PROCEDURES; AND ASSESS KNOWLEDGE RETENTION WITH SURVEYS OR QUIZZES AFTER TRAINING SESSIONS.	2	3	6	LOW

Statistical Analysis

The hospital's CEO and COO fully supported and approved the implementation procedures for enhanced safety measures across various departments, including Maintenance, Radiology, Pharmacy, Biomedical Equipment, Central Sterile Supply Department (CSSD), Laundry, Operating Theatre (OT), Dialysis, Biomedical Waste (BMW) Disposal, Canteen, and Fire

DEPARTMENT	ACTIVITY	HAZARD	POSSIBLE OUTCOME	EXISTING CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	RISK MATRIX	IMPACT LEVEL	IMPLEMENTED CONTROL MEASURE	PROBABILITY RATING	SEVERITY RATING	RISK MATRIX	IMPACT LEVEL
MAINTENANCE	AC VENT	POOR AIR QUALITY & MOLD GROWTH	RESPIRATORY ISSUES DUE TO POOR AIR QUALITY OR MOLD	ANNUAL MAINTAINANCE CHECK UP AND SERVICING	3	3	9	MEDIUM	SHIFT FROM ANNUAL TO QUARTERLY MAINTENANCE AND CLEANING TO ENSURE THAT VENTS, FILTERS, AND DUCTS REMAIN FREE OF MOLD AND DUST BUILDUP.	1	3	3	LOW
	STP PLANT	CHEMICAL EXPOSURE	HEALTH ISSUES FROM EXPOSURE TO HAZARDOUS CHEMICALS OR BIOLOGICAL AGENTS	ANNUAL MAINTAINANCE CHECK UP AND SERVICING	3	4	12	MEDIUM	IMPLEMENT MANDATORY USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR ALL PERSONNEL WORKING NEAR THE STP, INCLUDING RESPIRATORS, GLOVES, AND PROTECTIVE CLOTHING.	2	4	8	LOW
		BIOLOGICAL HAZARD											
	TRANSFORMER	OIL LEAKAGE	FIRE HAZARD FROM OVERHEATING AND OIL LEAKAGE	GENERAL ROUND CHECK UP /OIL GREACING /OIL FILTRATION / EMERGENCY NO. 255 FOR EVERY SITUATION	4	3	12	MEDIUM	ADD AUTOMATIC OVERLOAD PROTECTION TO SHUT DOWN THE TRANSFORMER IF TEMPERATURE OR LOAD EXCEEDS SAFE THRESHOLDS, WITH AN EMERGENCY BACKUP TO ALERT MAINTENANCE STAFF IMMEDIATELY.	1	3	3	LOW
		OVERHEATING											
	OXYGEN PLANT	EXPLOSION	EXTENSIVE DAMAGE TO THE FACILITY, POTENTIAL INJURIES OR FATALITIES AMONG PATIENTS, STAFF, AND VISITORS.	REGULAR INSPECTIONS AND MAINTENANCE OF THE OXYGEN PLANT AND ASSOCIATED PIPING AND VALVES TO PREVENT LEAKS.	3	4	12	MEDIUM	PROVIDE STAFF WITH TRAINING ON OXYGEN HANDLING AND SAFETY, INCLUDING LEAK DETECTION, EMERGENCY SHUTDOWNS, AND USE OF PROTECTIVE EQUIPMENT, AND CONDUCT BI-ANNUAL EMERGENCY DRILLS FOR RAPID EVACUATION AND RESPONSE IN CASE OF LEAKS OR FIRES.	1	4	4	LOW
RADIOLOGY	PATIENT HANDLING AND POSITIONING	MUSCULOSKELETAL INJURIES TO STAFF FROM LIFTING AND POSITIONING PATIENTS	BACK JOINT INJURIES AMONGS STAFF	NO TRAINING FOR STAFF	3	3	9	MEDIUM	INTRODUCE MANDATORY TRAINING PROGRAMS FOR ALL STAFF ON SAFE PATIENT HANDLING AND ERGONOMIC TECHNIQUES TO MINIMIZE STRAIN DURING LIFTING AND POSITIONING, AND INCORPORATE REFRESHER TRAININGS EVERY SIX MONTHS TO REINFORCE SAFE HANDLING PRACTICES.	1	3	3	LOW
		PATIENT FALLS OR INJURIES DURING TRANSFERS	HARM TO PATIENTS POTENTIALLY LEADING TO FURTHER MEDICAL COMPLICATIONS	IMMEDIATELY INFORM DR.	3	4	12	MEDIUM	ESTABLISH STANDARDIZED TRANSFER PROTOCOLS WITH DETAILED STEPS FOR SAFE PATIENT TRANSFERS AND PROCEDURES FOR INCIDENTS, AND CREATE A CLEAR INCIDENT REPORTING PROTOCOL WHERE STAFF IMMEDIATELY NOTIFY THE ATTENDING PHYSICIAN AND DOCUMENT THE INCIDENT FOR QUICK RESPONSE AND FOLLOW-UP.	1	4	4	LOW
PHARMACY	MONITORING AND DOCUMENTATION	UNAUTHORIZED ACCESS TO SENSITIVE PATIENT INFORMATION	BREACH OF PATIENT CONFIDENTIALITY AND TRUST	STRICT ACCESS CONTROLS AND ENCRYPTION FOR PATIENT INFORMATION	3	3	9	MEDIUM	ENFORCE ROLE-BASED ACCESS TO ENSURE ONLY AUTHORIZED PERSONNEL CAN ACCESS SENSITIVE PATIENT INFORMATION BASED ON JOB RESPONSIBILITIES, AND REQUIRE TWO-FACTOR AUTHENTICATION (2FA) FOR ALL SYSTEMS CONTAINING PATIENT DATA TO PREVENT UNAUTHORIZED ACCESS.	1	3	3	LOW
BIOMEDICAL EQUIPMENT	INSTALLATION AND SETUP	ELECTRICAL SHOCKS FROM IMPROPER HANDLING OF ELECTRICAL COMPONENTS	SEVERE ELECTRICAL INJURIES OR BURNS	PROPER KNOWLEDGE OF INSTALLATION NO SAFTEY MEASURES TAKEN	3	4	12	MEDIUM	DEVELOP DETAILED SOPS FOR THE INSTALLATION, AND SETUP OF EACH TYPE OF BIOMEDICAL EQUIPMENT, WITH STEP-BY-STEP GUIDANCE ON SAFE HANDLING OF ELECTRICAL COMPONENTS, AND POST SOPS IN INSTALLATION AREAS WITH CHECKLISTS TO ENSURE TECHNICIANS FOLLOW EACH SAFETY STEP.	1	4	4	LOW
		PHYSICAL INJURIES FROM LIFTING AND MOVING HEAVY EQUIPMENT	INJURIES, INCLUDING BACK AND JOINT PROBLEMS	PROPER PLANNING BEFORE INSTALLING, USING EXTRA MANPOWER, TROLLY OR CRANE FOR HEAVY LIFTING	3	4	12	MEDIUM	DESIGNATE A SAFETY OFFICER TO OVERSEE EQUIPMENT INSTALLATIONS, ENSURING ADHERENCE TO SAFETY PROTOCOLS AND PROVIDING SUPPORT AS NEEDED.	1	4	4	LOW
CSSD (CENTRAL STERILE SUPPLY DEPARTMENT)	INVENTORY MANAGEMENT	INCORRECT INVENTORY TRACKING LEADING TO SHORTAGES OR OVERSTOCK	DELAYS IN PROCEDURES DUE TO LACK OF NECESSARY INSTRUMENTS	NO STOCK OF EXTRA LINEN OR WRAPP CLOATHES	3	3	9	MEDIUM	IDENTIFY CRITICAL ITEMS, SUCH AS EXTRA LINEN AND WRAP CLOTHS, AND MAINTAIN A BUFFER STOCK TO PREVENT SHORTAGES, WHILE CREATING A SEPARATE INVENTORY CATEGORY FOR HIGH-DEMAND ITEMS TO ENSURE AVAILABILITY DURING PEAK USAGE PERIODS.	2	3	6	LOW
LAUNDRY	HANDLING SOILED LINEN	CONTACT WITH HAZARDOUS WASTE OR SHARP OBJECTS HIDDEN IN LINENS	INJURIES AND POTENTIAL INFECTIONS AMONG STAFF	GLOVES ARE USED FOR COLLECTION ,DIRTY LINEN ARE COLLECTED IN RED AND INFECTED LINEN IN YELLOW	3	4	12	MEDIUM	PLACE SHARPS CONTAINERS IN PROXIMITY TO LINEN HANDLING AREAS FOR THE IMMEDIATE DISPOSAL OF ANY SHARP OBJECTS FOUND IN SOILED LINEN, AND ENSURE THAT STAFF IS TRAINED ON HOW TO SAFELY HANDLE AND DISPOSE OF SHARP OBJECTS.	2	4	8	LOW
	FOLDING AND SORTING & CLEANING LINENS	RISK OF CONTAMINATION IF LINENS ARE NOT PROPERLY SORTED AND HANDLED	POTENTIAL FOR CROSS-CONTAMINATION AND INFECTION	CLOTHES ARE IRONED FOLDED AND ARRANGED DEPARTMENT WISE, INFECTIOUS LINEN AND DIRTY LINEN ARE WASHED IN SAME WASHING MACHINE	3	4	12	MEDIUM	DESIGNATE SEPARATE WASHING MACHINES FOR INFECTIOUS LINEN AND REGULAR DIRTY LINEN TO PREVENT CROSS-CONTAMINATION, ENSURING THAT ALL MACHINES ARE CLEARLY LABELED TO INDICATE THEIR SPECIFIC USE, AND USE COLOR-CODED BAGS OR BINS—RED FOR INFECTIOUS LINEN, YELLOW FOR GENERAL SOILED LINEN, AND GREEN FOR CLEAN LINEN.	1	4	4	LOW

Safety. This endorsement aided in the development of comprehensive training programs and control measures that were adapted to each department's specific hazards.

These newly implemented control measures have had a significant impact on the hospital's safety and quality standards. The proactive approach to safety has created a culture of compliance and awareness among employees, resulting in fewer workplace injuries and contamination issues. Furthermore, the implementation of defined protocols and training resources has increased operational efficiency in all areas. Regular assessments and feedback mechanisms have ensured ongoing

improvement in safety measures, ultimately improving patient safety, satisfaction, and overall healthcare delivery quality in the hospital setting.

In order to evaluate our hypothesis, we are comparing the old and new control measures that were put in place at VY Hospital using a paired t-test. Because it is appropriate for comparing two related samples, in this case the risk matrix scores of the same departments before and after the implementation of new safety procedures, the paired t-test was selected (Harmon, 2011). To ascertain whether the means of these two linked groups differ in a way that is statistically significant, this test is perfect. The paired t-test helps to account for inter-subject variability by testing the same entities before and after the intervention. This gives a more accurate picture of how well the control measures that were put in place reduced the likelihood and severity of hazards. This rigorous statistical approach enables us to robustly test the null hypothesis and ascertain the efficacy of the new safety protocols.

RISK MATRIX OF PREVIOUS CONTROL MEASURES	RISK MATRIX OF NEW CONTROL MEASURES	DIFFERENCE
9	3	-6
12	8	-4
12	3	-9
12	4	-8
9	3	-6
12	4	-8
9	3	-6
12	4	-8
12	4	-8
9	6	-3
12	8	-4
12	4	-8
9	6	-3
12	4	-8
12	4	-8
16	4	-12
12	4	-8
12	6	-6
12	4	-8
20	5	-15
9	6	-3
9	3	-6
9	6	-3

A paired sample t-test was performed on the risk matrix scores before and after the implementation of new control measures at VY Hospital. This test was designed to determine whether the implementation of safety protocols had a statistically significant effect on reducing the severity and likelihood of hazards in both clinical and non-clinical departments. The risk matrix values ranged from low (1 to 8), medium (9 to 15), and high (16 to 25).

Results

The t-test findings showed a p-value of 1.35459E-10, which is much lower than the standard significance level of 0.05. This exceptionally low p-value suggests that there is very strong statistical evidence against the null hypothesis (H0), which states that establishing safety standards in VY Hospital does not significantly lower the severity or frequency of risks. The null hypothesis is consequently rejected in favor of the alternative hypothesis (H1), which asserts that implementing safety standards resulted in a significant reduction in risk matrix scores.

The data acquired before and after the implementation of safety standards showed a significant decrease in risk levels. Before the deployment, numerous departments had medium to high risk rankings, indicating that major hazards existed. Following the implementation of the new control measures, the majority of the risk scores went into the low-risk category, indicating a significant increase in safety.

This significant reduction in risk matrix ratings demonstrates the efficacy of the recently adopted safety standards. The statistical significance of the p-value ($p<0.05$) demonstrates that these improvements are not attributable to chance, but rather are a direct outcome of the safety measures implemented. Thus, this analysis supports the alternative hypothesis (H1): Implementing safety protocols at VY Hospital greatly minimizes the severity and likelihood of risks in both clinical and non-clinical areas. The new safety protocols have successfully decreased the severity and frequency of risks at VY Hospital, improving the overall safety environment for both clinical and non-clinical departments.

Discussion

The results of this study demonstrate how crucial it is to put in place a systematic HIRA approach in order to provide a secure and safe workplace in healthcare settings. The examination of several departments showed that each has its own set of problems, ranging from ergonomic issues in administrative spaces to physical risks like needlestick accidents in hospital settings. Hospital administrators can efficiently prioritize safety actions by using the HIRA method to systematically identify these hazards and categorize them based on risk levels.

Compared to previous research, our results are consistent with the literature that highlights the frequency of particular health risks in hospitals, like the hazards of needlestick injuries and viral infections in immunocompromised patients (Sahoo et al., 2024; Wicker et al., 2008). Furthermore, this study supports the importance of performing HIRA in specialized units, like Critical Care Units (CCU), where the concentration of high-risk tasks necessitates strict risk management procedures, in line with Kour et al. (2020). Using HIRA not only aids in identifying urgent safety hazards, but it also provides a basis for putting preventive and remedial measures in place, like putting standard operating procedures (SOPs) into place and planning frequent staff training.

The study's key finding was the disparity in risk perception among departments, which emphasizes the value of customized safety initiatives as opposed to a one-size-fits-all strategy. For example, administrative departments could concentrate on

ergonomics and emergency readiness, whereas clinical areas might gain more from infection control training and safe handling procedures. Furthermore, adding technical tools like UHID systems can improve traceability in medical procedures, which lowers risk overall.

Limitations

While the study provides valuable insights, certain limitations must be acknowledged. Data was collected from a limited number of departments in one hospital, which may restrict the generalizability of the findings. Additionally, varying levels of staff participation and awareness across departments may have influenced the reported hazards, as some staff members might underreport due to unfamiliarity with HIRA processes. Future studies incorporating a larger sample size across multiple hospitals could provide more comprehensive data, enhancing the applicability of finding

Conclusion

This research on hazard identification and risk assessment (HIRA) at VY Hospital underlines the importance of comprehensive safety protocols in reducing workplace risks in healthcare settings. We identified and classified a variety of potential hazards, including biological, chemical, mechanical, and psychosocial risks, after conducting a thorough assessment across 14 hospital departments, including Laundry, Main Patient Kitchen, Biomedical Waste (BMW) Disposal, Pathology Lab, Radiology, Dialysis, Endoscopy, Critical Care Unit (CCU), Biomedical Equipment, Maintenance, Operation Theatre (OT), Central Sterile Services Department (CSSD), and Pharmacy.

Targeted actions, such as increased training, routine maintenance, improved waste management, and frequent safety audits, have resulted in observable changes in the hospital's safety culture. Post-implementation findings showed a significant reduction in the likelihood of identified risks, confirming the efficacy of these strategies. Regular audits have also helped to foster a culture of safety, with hospital employees becoming more involved in hazard prevention and reporting.

The implementation of HIRA frameworks at VY Hospital has successfully improved workplace safety for both staff and patients. These findings emphasize the importance of ongoing hazards assessment and staff training to promote long-term safety gains. Moving forward, implementing HIRA on a regular basis and updating safety measures to suit changing healthcare standards can assist hospitals in maintaining a safer and more efficient environment. Engaging all stakeholders in the refinement of safety protocols will be critical to sustaining these improvements over time.

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