The EHS Management Issues of Public Hospitals

By

Muhammad Rehan Ashraf

2011-NUST-MSPhD-EnvE-13

Institute of Environmental Sciences and Engineering (IESE)
School of Civil and Environmental Engineering (SCEE)
National University of Sciences and Technology (NUST)
Islamabad, Pakistan
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It is certified that the contents and form of the thesis entitled

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Submitted by

Muhammad Rehan Ashraf

has been found satisfactory for the requirement of the degree.

Supervisor: _____
Dr. Zahiruddin Khan
Associate Professor
IESE, SCEE, NUST

Member: _____
Prof Dr. M. Anwar Baig,
IESE, SCEE, NUST

Member: _____
Prof Dr. Imran Hashmi,
IESE, SCEE, NUST

External Examiner: _____
Dr. Shaista Habibullah
Deputy Director National
Institute of Rehabilitation
Medicine Islamabad

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Abbreviations

EHS	Environmental Health and Safety
EIA	Environment Impact Assessment
IEE	Initial Environmental Examination
EHU	Environmental Health Unit
WHO	World Health Organization
PPE	Personal Protective Equipment
OT	Operation Theatre
WMS	Waste Management System
HWM	Hospital Waste Management
MSDS	Material Safety Data Sheet

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ABSTRACT

Hospitals are established and operated for providing healthcare services to physically and mentally unhealthy human beings. Such facilities should therefore demonstrate high quality Environmental, Health and Safety (EHS) practices. Unfortunately, the situation in most of the public hospitals in the developing countries like Pakistan is pathetic and prone to sickening the healthy visitors rather than curing. The objective of this study was to investigate the existing EHS practices in some of the local hospitals and develop a generic operational manual for improved and sustained EHS practices in a public hospital. In order to setup the bench mark, a private hospital was selected and literature from the hospitals all around the developed world was reviewed. A gap analysis was performed to evaluate the existing situation. In addition a review of EHS issues was done via personal visits and randomly interviewing management and staff of the hospitals to understand the difference between claims and practices. Results reveal that EHS is not a priority area in public hospitals and thus hospitals are propagating sickness along with provision of healthcare.

The generic manual proposed as a result of this investigation, addresses most of the EHS issues and suggests most economical and effective solutions to enhance the hospital image as a health facility. Chapter one of the manual is 'EHS and Hospital Planning' which covers the issues concerned with initial planning of the hospital. Chapter two is 'The EHS Management System' which covers the matters related to EHS policy, EHS department, role and responsibilities, training, communication and monitoring. Chapter three is 'Fire Safety and Emergency Response' which covers procedures when fire is discovered. Chapter four is 'Biological Safety' which covers lab procedures. Chapter five is 'Waste Management and Disposal' which deals with different types of hospital wastes along with their proper categorization, collection

and disposal. Chapter six is 'General Safety' which deals with EHS issues related to the daily functions of the hospital. While the real test of this manual can only be seen during practice and several modifications may be required, this may prove a first step in the right direction.

INTRODUCTION

1.1 EHS in Hospitals

Hospitals, all over the globe are corporate organizations that are complex in there working and they also employ a large number of workers belonging to various professions. As a result they become potentially hazardous places and expose their workforce to a number of chemical, physical, psychological and biological hazards (Aharony et al., 1993).

Environmental Health and Safety (EHS) Management in a hospital is responsible for the maintenance of the procedures, policies and programs that might be necessary to maintain a safe and healthy environment for the people visiting the premises. It also serves the important purpose of protecting the people against unforeseen incidents by making sure that hospital operations are in accordance with environmental health and safety codes and regulations of the country, (Aharony et al., 1993). Hospitals also play a vital role of community safety and protection. Along with the major responsibility of providing a high standard of health services for patients, healthcare facilities are also responsible for the protection and wellbeing of the workforce which include, emergency evacuation, treatment of inpatients and preparation of food which involves kitchen handling. Hospitals also perform the vital function of environmental protection on both micro and macro scopic level via waste management strategies that requires special attention because hospitals generate a variety of infectious and non-infectious waste (Cakil et al., 2013).

Various studies have shown that the leading factors that greatly influence the choice of patients when it comes to hospitals are clinical environment, attitude of the staff, different types of services available and the operating hours. This rise in demand for assessment is attributed to the constrained resources, rise in cost of health care and evidence of variations in clinical practice (Nicholas et al., 2008).

The World Health Organization (WHO) has immensely focused on the importance of health care and it has been defined on the criteria of cost effectiveness and social acceptability. Other researchers are stressing the need of assessing the health care infra structures. It is the application of professional standards that set the bases for the patients views and their experiences (Richard et al., 2012). It is the assessment of patient satisfaction that represents a balance between the expected standard set by them for the service and the perceptions they make of the delivered service. By giving importance to the views of the patient for improving health standards is a way of respecting the sovereignty of the client for the purpose of democratizing the process of care (Naomi et al., 2012).

1.2 EHS Issues and Hospital Management

In its report 'The Hospital in Rural and Urban Districts' (WHO, 1992) sections seven and eight has given an overview of the principles of management in a district health system.

1.2.1 Planning of Service

The act of serving their communities is soul function of hospitals. It is done by meeting their health needs. Planning is for identifying those needs and determining why they are not being met. The process of planning is continuous because epidemiological, demographic and economic changes result in a change of the pattern of demand.

1.2.2 EHS and Human Resources Management

The top most responsibility of the management to ensure that all the staff employed in the hospital is:

- Trained and appraised

- Well informed of the job requirements

- Well aware of the management policies

- Adequately rewarded with bonus and other incentives

1.2.3 Information System for EHS Management

Information system is the key component of EHS management. Hospital cannot work efficiently without efficient communication system. Hospital top brass have to ensure that good systems are available for different types of information's which include personnel, patient-related, financial and others. Information is vital in the development of research systems within the hospital and also in the identification, analyzing, collecting relevant data for problem solving. The management requires an expert manager with the relevant communication skills.

1.2.4 EHS Strategies in Plan and Design of New Building

This involves an investment decision of major consequences. A lot of people with different perspectives and needs are involved. As a result it affects the quality of health care in times to come. The necessity of utilizing optimum space against provision for future developments, accessibility against privacy and visual attractiveness against maintenance cost are some of the major concerns that have to be looked in to with a lot of thought and careful consideration.

The working boundaries and roles of hospitals in many nations have become more fluid over the last decade. The development of much improved surgical techniques along with new anesthetics aiming at minimal invasive surgery have resulted in an increase of surgical procedures. An efficiently trained and competent staff at the primary level facilities help in both reducing the rate of referral and also the need of daily hospital visits. The remarkable progress in electronic communication have enabled the linking of central hospitals for diagnosis with remote areas. There is a possibility that the future hospitals might only be small intensive surgical units. It is essential that the hospital directors are aware of both national and international trends of treatment and care. In this way advantage may be taken of the best procedures available and managing change positively.

1.3 Legal Framework of EHS in Hospital

1.3.1 Pakistan Environmental Protection Act, 1997

It was passed by both the houses of National Assembly of Pakistan on September 3, 1997 and the Senate of Pakistan on November 7, 1997. The President gave his assent on December 3, 1997. It is based on multiple sections serving the authorities as law for a number of things including conservation, protection, rehabilitation and improvement of the environment for the purpose of controlling the pollution and help promoting sustainable development. In order to examine both the environmental benefits and risks associated with any project development the environmental assessment seems to be a sound process.

Section Twelve makes clear that in no way any proponent of a project would commence operation or construction until the filing with the federal agency an initial environmental examination which is based on addressing those issues where the project is expected to create an adverse environmental effect.

Prohibition on import of hazardous waste under section 13 impose limitation and even ban on import of hazardous substances with toxic nature, chemical activity, potentially flammable, radioactive, explosive, corrosive or having the potential of contaminating the environment in any way.

1.3.2 National Environmental Policy 2005

This is a national level policy providing a detailed and well-structured framework in order to address the environmental issues concerning Pakistan. For this purpose importance is laid upon issues concerning air pollution, water pollution, natural disasters, lack of proper waste management and climate change. It is only by addressing the above mentioned issues this policy can serve to conserve, protect and restore Pakistan's environment and improve the quality of life in Pakistan

The goals of the environmental policy are:

- Restoration and conservation via environmental management
- Building capacity of both public and private sectors at every level
- To meet international obligations effectively

1.3.3 Hospital Waste Management Rules 2000

When it comes to public sector hospitals, Pakistan has a capacity of about 92,000 beds. A careful estimation shows a rise of two hundred and fifty million by 2025 due to the unplanned population growth of the country. This will eventually result in a rise in the hospital waste generated. This rise rate will be alarming because of this unplanned growth. Then another observation which support this fact is that the generation is also accompanied by a constant dumping of hospital waste alongside municipal waste. The country desperately needs an effective segregation system.

It is also the leading cause of various problems like air pollution and water pollution that poses a health danger for the people of Pakistan. It is hoped that these rules will serve to resolve all the problems that are awaiting our attention due to mismanagement of hospital waste.

1.3.4 Pakistan Sanitation Policy 2005

This policy help by providing a framework that is based on a wide base. It also guides the authorities at all levels including national, local, federal and provincial via authorizing them in increasing the ability to maintain and sustain coverage of sanitation throughout the country. It also enables the authorities to formulate the sanitation plans and programmes at every level for the improvement of the quality of life of the people.

1.4 Pre-Selection Visits

In order to carry out this study, a group of well reputed hospitals of the twin cities were selected. Visits were made to observe the EHS issues and seek permission of the health facility management to carry out the research. The group selected included the following facilities:

- Shifa International Hospital

- Polyclinic Islamabad

- Pakistan Institute of Medical Sciences (PIMS)

- Holy Family Hospital Rawalpindi

- Benazir Hospital

- NESCOM

- Maroof Hospital Islamabad

- CDA Hospital Islamabad

1.5 Bench Marking

In order to setup the bench mark for this purpose two public and one private hospital were finally selected. Shifa International was selected as bench mark. This study provides first hand information about the existing EHS situation in highly reputed medical facilities and outlines the short falls. Solution to these shortfalls and many other problems has been addressed in the manual.

Whilst permission was requested from all of the above listed health facilities, only three namely Shifa International, Polyclinic and PIMS allowed for the study to be carried out. These hospitals enjoy a very good repute and people from all parts of the

country visit these facilities in large number on daily basis. This study, after investigating the on-going EHS practices at theses prestigious facilities, chalks out a generic programme for effective EHS management.

1.6 Brief Methodology

Following steps were taken to undertake the proposed study

Step 1: Preliminary visits and review of ongoing EHS practices in three local hospitals

Step 2: Review of legal obligations

Step 3: Identification of EHS issues in various departments

Step 4: a) Observations of national practices at

- Shifa International Hospital (Hospital A)
- Polyclinic (Hospital B)
- Pakistan Institute of Medical Sciences (PIMS) (Hospital C)

    b) International practices

Step 5: Visits to the area of study and collection of data via

    a) Observations

    b) Personal communications with

- Administration
- Staff Officers
- Doctors
- Patients

Step 6: Data acquisition

Step 7: Data analysis

Step 8: Generic manual development

1.7 Objectives of the Study

Following were the objectives of this study:

- To study the existing EHS practices in selected hospitals

- To highlight major areas of EHS concerns being neglected in public /private hospitals

- To develop an EHS best practice manual for public hospitals

LITERATURE REVIEW

Environmental Health and Safety (EHS) in a hospital is responsible for the maintenance of the procedures, policies and programs that might be necessary to maintain a safe and healthy environment. It also affects the health and wellbeing of the public. Occupational Health is related to the interaction between the health of the workforce and the place of work of that work force (Xue Wang et al., 2011).

2.1.1 Occupational Health and Safety

Occupational health and safety is an important instrument for those companies which are making an effort for ensuring a healthy and safe work environment (Donabedian et al., 1998; Campbell et al., 2000; Creel et al., 2003). It is due to these efforts that occupational health and safety has increasingly been applied in the corporate world in recent decades. These days the management of health and safety is being covered by OHSAS 18001. Companies in order to become certified must observe the legal legislation and also improve performance of health and safety on a daily basis.

2.1.2 Global Action Plan on Workers Health by WHO (2008-2017)

Both World Health Organization (WHO) and International Labor Organization (ILO) has paid a lot of attention on the protection and health of workers. It is for this purpose that WHO in its action plan has set five priorities which are developing and implementing the OHS policy, development of national action programs and plans on occupational safety and health; promoting and protecting the health of workers, improving both the performance and accessibility services and policies for sustainable

development. When it comes to workers healthcare it means both economic development and sustainable human resource, which is important prerequisite to every nation of the world. Macroeconomic policy on economic development, trade liberalization and structural adjustment has a huge influence on working conditions of the workers. Poverty together with dismal working conditions are the leading causes of injuries at workplace and occupational diseases. These diseases may often cause permanent or temporary disability ending in loss of income and economic decline. This is why capacity building in the health sector for determining the healthcare needs along with environmental protection has been given top most priority in the action plan developed for the workers health by WHO (GPA, 2010).

2.1.3 International Labor Organization (ILO)

In a report of the Union for International Cancer Control (UICC) it has been said that there are almost twelve million people in the world who are diagnosed with cancer every year. International Labor Organization reported that when it comes to work related deaths, occupational cancer deaths alone account for 32%, where as cardiovascular disease 26% and accidents at work place accounts for 17%. Some of the leading causes of cancer have been identified as, mesothelioma along with exposure to asbestos which can cause lung problems. International organizations in order to prevent occupational incidents have developed a number of strategies, documents and plans. Cancers relating to asbestos have been eliminated in some nations of the world. In a recent survey approximately about 160-270 million workers across the globe suffer from occupational accidents or diseases each year (ILO, 2012).

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2.1.4 Environment, Health and Safety Management

Environment, Health and Safety Management has been focused on primary care and also within the hospital. It has dealt with issues involving monitoring and standards for cause of diseases and also the present technological review of health care. The focus is also on the improvement of communication and patient satisfaction.

Those practices are regarded as good practices which includes methodologies and behaviors focusing on the standards setting followed by communicating those standards to the ones using them, monitoring the services along with continuous improvement. The hospital Environment, Health and Safety Management standards consist of three parts enlisted in below:

2.1.5 Parts of Environment, Health and Safety Management Standards

- EHS Management of the Organization
- EHS Communication, Training and Implementation
- General Safety

The aim is to provide a framework to assess services provided in both private and public health facilities and also the framework for private and public hospitals in order to improve services in an organized manner. By doing this they become a useful tool for management of individual hospitals and help to identify their strengths, weaknesses and areas for improvement. It provides a mechanism for the identification of priority areas for overall improvements in the health sectors. These standards are also aimed at focusing on procedures which provide a firm footing for the identification and improvement of patient care, support processes and management within the hospital.

Improved service in a competitive environment among the various healthcare facilities is the only mean of acquiring a prestigious position in the market. Thus good environment, health and safety management is the key factor helping the customer to distinguish between the level of service being provided (WHO, 2010).

Various studies have confirmed the fact that those organizations which deliver a better quality of healthcare services are successful to a lot of extent in building a positive organizational image, gaining of the satisfaction of the customers, reduction of cost and eventually increasing profit. Those corporations having high standards of environment, health and safety management are more successful in reducing complaints, increasing satisfaction of customers and loyalty. It has been observed that these days customers are generally reasonably informed prior to utilizing services of any healthcare facility and they do have alternatives because of the improved standards of services which caused an increase in the expectations of the customers (Margolis et al., 2007).

2.2 Major Areas of Concern in International EHS and Hospital Management Practices (WHO, 2012)

The table 2-1 below shows the most essential practices that are being followed by the best service providing hospitals of the world.

Table 2-1: WHO Major Areas of Concern for EHS and Hospital Management

Name of Hospital	EHS DEPT	FIRE SAFEY & EMERGENCY RESPONSE	SAFETY TRAINING COURSES	WASTE WATER TREATMENT (Water from critical areas e.g. OT and grey water reuse)	GENERAL SAFETY MEASURES (Use of personal protection equipment)	WMS
NYU Langone Medical Center New York	Yes	Yes	Yes	Yes	Yes	Yes
Royal Children's Hospital	No	Yes	Yes	No	Yes	Yes
Columbia University Medical Center	Yes	Yes	Yes	Yes	Yes	Yes
University California Davis Health System	Yes	Yes	Yes	Yes	Yes	Yes
Massachusetts General Hospital	Yes	Yes	Yes	Yes	Yes	Yes

Name of Hospital	EHS DEPT	FIRE SAFEY & EMERGENCY RESPONSE	SAFETY TRAINING COURSES	WASTE WATER TREATMENT (Water from critical areas e.g. OT and grey water reuse)	GENERAL SAFETY MEASURES (Use of personal protection equipment)	WMS
Cornell Medical Center	Yes	Yes	Yes	Yes	Yes	Yes
Mount Sinai Medical Center New York	Yes	Yes	Yes	Yes	Yes	Yes
Samsung Medical Center	No	Yes	Yes	No	Yes	Yes
Society of Cardiovascular and International Radiology	No	Yes	Yes	No	Yes	Yes
National Hospital Organization	Yes	Yes	Yes	No	Yes	Yes
Hospital Authority Hong Kong	Yes	Yes	Yes	Yes	Yes	Yes

All these six major areas of concern are inter linked and serve to ensure that none of its workers whether doctors, paramedic staff, patients, contractors or visitors are exposed to any kind of risk that might be unacceptable to anybody's safety, health and welfare.

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These major areas of concern forms the risk management strategy and an effective framework that would provide the hospital with the foundation and infrastructure for efficient working, maintaining and governing of risk management throughout the hospital, including health and safety risks.

METHODOLOGY

In order to depict the true picture of EHS practices in the selected hospitals a 3- step approach was used:

- Pre-selection visits to eight local hospitals

- Detailed visits to selected facilities

- Personal interview with officials responsible for EHS practices

A multipurpose survey of all the selected facilities was conducted from July 2012- July 2013 for data collection in order to have an idea of experiences of doctors and patient's perceptions of the hospital.

3.1 Study Site

The study was conducted in one private and two public sector hospitals of Islamabad. These hospitals are also working as primary as well as secondary health care center for the area.

3.2 Stakeholders Selection

The population studied consisted of personnel working in the office management section, account section, medical store section and some medical officers, doctors, patients and visitors in the hospital. It also included interview of medical superintendent of the hospital.

3.3 Study Design

This was a Descriptive Cross Sectional Study and was based on three parts for EHS and quality standards for assessment of an organization as given below:

- EHS Management of the Organization

- EHS Communication, Training and Implementation

- General Safety

3.4 Study Duration

The duration of study was from July 2012 to July 2013.

3.5 Methodology

Following steps were taken to undertake the proposed study.

Step 1: Preliminary visits and review of ongoing EHS practices in three local hospitals

Step 2: Review of legal obligations

Step 3: Review of international EHS practices and identification of most critical

areas in EHS as practiced by most International reputed hospitals

Step 4: Selection of three most visited hospitals

Step 5: Identification of EHS issues and gaps in various departments

Step 6: Observations of EHS practices at:

- Shifa International Hospital (Hospital A)

- Polyclinic (Hospital B)

- Pakistan Institute of medical sciences (PIMS) (Hospital C)

  - Administration

  - Staff Officers

- Doctors

- Patients

Step 7: Data compilation

Step 8: Data analysis

Step 9: Development of generic manual

A set of questionnaires were prepared to serve the purpose of colleting real data in order to analyze the current situation and help making comparisons with bench marked facility for suggesting systems that would serve for a better future.

3.6 Personal Communication

After detailed visits of each selected healthcare facility, a group of individuals was selected for personnel interviews. Table 3-1 provides the list and the number of individuals interviewed in each hospital.

Table 3-1: Number of Individuals Interviewed in each Hospital

S. No.	Participants	Hospital A	Hospital B	Hospital C	Total
1	Directors	7	5	3	12
2	Doctors (Excl. Directors)	8	10	12	30
3	Managers	7	7	7	21
4	Nurses	7	7	7	21
5	Sweepers	7	7	7	21
6	Others	15	15	15	45
					150

OBSERVATIONS, RESULTS AND DISCUSSION

4.1 Observations

Case Study: **Hospital A (Shifa International)**

4.1.1 Fire Fighting and Emergency Response

There are three types of firefighting equipment available. First is the 6Kg dry chemical powder for solid fire e.g. wood. Second is the 5Kg carbon dioxide (CO_2) for electric fire and thirdly is 7Kg carbon dioxide (CO_2) for liquid and electric hazards. There are five hydrates for high pressure water (H_2O).

Figure 4.1: Fire extinguisher at hospital A

4.1.2 Emergency Response

Hot line is always alert to respond to any emergency. Drills are conducted but on monthly bases. There are defined assembly areas in case of emergency evacuation. Emergency exit signs and alarms are placed all over the hospital. Staff is trained to react quickly for counter measures. Emergency room is equipped with full kits to protect the workers while countering fire hazards.

4.1.3 Hospital Design and Construction

There is no separate department for environmental, health and safety (EHS). There is no concept of confined space. The measures to ensure good air quality via proper ventilation for the workforce are insufficient. There is proper distribution of fire extinguishers cabinets throughout the hospital. There are no defined assembly areas in case of emergency evacuation.

4.1.4 General Safety at the Hospital

A lack of proper use of personal protection equipment by the workforce was observed. There is also no emphasis on the importance of using personal protection equipment (PPE). No restriction is imposed on entry in to the laboratory by unauthorized personnel. The fire extinguishers in the labs are not placed in such a way that all the points are reachable with in fifty feet's. The wires are not properly insulated to avoid any electrical injury. Safety briefings are mandatory to raise the level of awareness of the workforce. Presence of hot line in case of emergency is a good measure. No separate department for EHS to ensure proper training, maintenance and monitoring of the safe work practices in the hospital.

4.1.5 Waste Water Treatment

There is no waste water treatment plant. No concept or efforts for grey water reuse. No concept of rain water harvesting. Small water filters are installed all over the hospital to facilitate drinking water. No division of waste water from critical areas (operation theater) of the hospital for treatment prior to disposal in to sewerage lines.

4.1.6 House Keeping

There is an efficient workforce present throughout the hospital. The hospital has a well maintained machinery working efficiently. Staff is divided into three categories.

- Junior

- Senior

- Most Senior

4.1.7 Waste Generation and Segregation

There is no use of personal protection equipment. Waste is divided into three categories differentiated by different colors.

Blue Liner: Normal waste (paper, glass, wood)

Red Liner: Infectious waste (Plunger, material in direct contact with patient)

Yellow Liner: Parts of human body (sealed and buried)

Danger box: needles and sharps

4.1.8 Electrical Safety

Staff needs more training regarding electrical safety. Wires in most of the departments are properly insulated. No concept of performing electrical work in a de-energized state. No use of EHS equipment while performing work for electrical maintenance.

Case Study: **Hospital B (PIMS)**

4.1.9 Fire Fighting and Emergency Response

There is a lack of proper division of fire extinguishers. No hot line to deal with any emergency situation. No staff training to combat emergency situation. There are no proper kits to aid the workers.

4.1.10 Hospital Design and Construction

There is no separate department for environmental health and safety (EHS). No concept of confined space. No measures to ensure good air quality via proper ventilation for the workforce. An incinerator is installed but it causes a lot of air pollution when used. No properly defined assembly areas in case of emergency evacuation.

4.1.11 General Safety at the Hospital

There is no use of personal protection equipment by the workforce. No emphasis on the importance of the use of personal protection equipment (PPE). The fire extinguishers in the labs are not placed in such a way that all the points are reachable with in fifty feet's. The wires are not properly insulated to avoid any electrical injury. Mandatory safety briefings are not given to raise the level of awareness of the workforce. No separate department for EHS to ensure proper training, maintenance and monitoring of the safe work practices in the hospital.

4.1.12 Electrical Safety

No Staff training regarding electrical safety. Wires are not properly insulated. No concept of performing electrical work in a de-energized state. No use of EHS equipment while performing work for electrical maintenance.

4.1.13 Waste Water Treatment

There is no waste treatment plant to treat the water coming from critical areas like operation theaters. No concept or effort for grey water reuse. No measures for rain water harvesting. No filtration plant to treat the water for drinking purposes. There are five tube wells along with CDA supply to cater for water needs.

4.1.14 Laundry

Working conditions are unsatisfactory. There is no staff for cleaning along with lack of proper division of workforce. Maintenance of machinery is absent. No implementation of proper mechanism or protocols to ensure smooth daily working.

Figure 4.2: Laundry of hospital B

4.1.15 Area Division

No proper division of area for the easy working of the hospital. It is overcrowded. No marking of exit ways. Some of the exit ways are blocked.

4.1.16 Waste Generation

No proper division of waste. No use of Personal protection equipment. Practice of waste segregation along with type of waste generated is absent. There are no pits or incinerator. Waste is transported via external contactor.

Figure 4.3: Waste Segregation and Collection at Hospital B

Case Study: **Hospital C (Polyclinic)**

4.1.17 Fire Fighting and Emergency Response

No proper division of fire extinguishers. No hot line to deal with any emergency situation. No staff training to combat emergency situation. No proper kit to aid the workers.

4.1.18 Hospital Design and Construction

No separate department for environmental, health and safety (EHS). No concept of confined space. No measures to ensure good air quality via proper ventilation for the workforce. An incinerator is installed that causes a lot of air pollution when used. No properly defined assembly areas in case of emergency evacuation.

4.1.19 General Safety at the Hospital

No use of personal protection equipment by the workforce. No emphasis on the importance of the use of personal protection equipment (PPE). The fire extinguishers in the labs are not placed in such a way that all the points are reachable with in fifty feet's. The wires are not properly insulated to avoid any electrical injury. Mandatory safety briefings are not given to raise the level of awareness of the workforce. No separate department for EHS to ensure proper training, maintenance and monitoring of the safe work practices in the hospital.

4.1.20 Waste Generation

No proper division of waste. Practice of waste segregation along with type of waste generated is absent. No pits or incinerators. Waste is transported via external contactor.

4.1.21 Waste Water Treatment

No waste treatment plant to treat the water coming from critical areas like operation theaters. No filtration plant to treat the water for drinking purposes. No concept of grey water reuse. No concept of rain water harvesting.

4.1.22 Area Division

No proper division of area for the easy working of the hospital. It is overcrowded. No marking of exit ways. Some of the exit ways are blocked.

4.1.23 Electrical Safety

No Staff training regarding electrical safety. Wires not properly insulated. No concept of performing electrical work in a de-energized state. No use of EHS equipment while performing work for electrical maintenance.

4.2 Discussion

There is no proper categorization of fire extinguishers. No hot line to deal with any emergency situation. No staff training to combat emergency situation. No proper kit to aid the workers. No separate department for Environmental, Health and Safety (EHS). No concept of confined space. No measures to ensure good air quality via proper ventilation for the workforce. Incinerator causes a lot of air pollution when used. No properly defined assembly areas in case of emergency evacuation. No use of personal protection equipment by the workforce. No emphasis on the use of Personal Protection Equipment (PPE). Wires are not properly insulated to avoid any electrical injury. No Safety briefings to raise the level of awareness of the workforce. No proper division of waste. Practice of waste segregation along with type of waste generated is absent. There are no pits or incinerator.

Waste is transported via external contactor. No waste treatment plant to treat the water coming from critical areas like operation theaters. No filtration plant to treat the water for drinking purposes. No concept of grey water reuse.

A visit was made to the major departments of the three hospitals. The table 4-1 below gives a comparison of their strengths and weaknesses.

Table 4-1: Comparison of strengths and weaknesses of the selected hospitals

Area Visited	Facility	Strengths	Weaknesses
House Keeping	A	• Proper well defined rooms • Proper labor division • Well maintained	• Use of a lot of liquid chemicals which might need treatment prior to disposal
	B	• Proper well defined rooms	• No proper labor division • Very unhygienic conditions resulting from lack of training and care • Machinery not well maintained
	C	• Proper well defined rooms	• No proper labor division • Very unhygienic conditions resulting from lack of training
Waste Water Treatment Plant	A	• Small water purifiers present all over the hospital for drinking	• No waste water treatment prior to disposal in the sewerage lines

... Continued

Area Visited	Facility	Strengths	Weaknesses
	B		• No Small water purifiers for drinking purposes
			• No waste water treatment prior to disposal in the sewerage lines
	C		• No small water purifiers for drinking purposes. • No waste water treatment prior to disposal
Hospital Design and Emergency Response	A	• Made a separate department for EHS • Proper area division • Well defined	
	B		• No separate department for EHS • No proper area division • No Well-defined assembly areas
	C		• No separate department for EHS • No proper area division • No Well-defined assembly areas
Fire Fighting	A	• Three different categories of fire extinguishers being used • Well maintained	
	B		• No categorization of fire extinguishers • Not well maintained

... Continued

Area Visited	Facility	Strengths	Weaknesses
	C		• No categorization of fire extinguishers • Not well maintained
General Safety	A		• Need to promote the use of personal protection equipment (PPE)
	B		• Need to promote the use of personal protection equipment (PPE)
	C		• Need to promote the use of personal protection equipment (PPE)
Waste Collection, Segregation, Treatment and Disposal.	A	• Proper differentiation via three color codes namely Blue, Red and Yellow • Separate rooms to store the bags till disposed • Using the method of incineration and pits for disposal	
	B	• Proper differentiation via three color codes namely Blue, Red and Yellow	• No separate rooms to store the bags till disposed • No incineration and pits for disposal • Transportation via external transporter in not satisfactory

. . . Continued

Area Visited	Facility	Strengths	Weaknesses
	C	• Proper differentiation via three color codes namely Blue, Red and Yellow	• No separate rooms to store the bags till disposed • No incineration and pits for disposal • Transportation via external transporter is not satisfactory
Signage	A	• Accessible spaces and facilities are identified	• No maps and information panels within easy sight lines of 36 in. and 72 in height
		• The signs are easy to understand • The signs can be read at night also	
	B		• No accessible spaces and facilities are identified with symbols • No maps and information panels within easy sight lines of 36 in. and 72 in. height
	C		• No accessible spaces and facilities are identified with symbols • No maps and information panels within easy sight lines of 36 in. and 72 in. height

4.3 EHS Management of the Organization

A set of three questioners were developed to highlight various issues of EHS and hospital management. The respondents from the three hospitals were asked to answer either as YES or NO. The figure 4.4 below shows the questions asked and percentage of response as YES or NO. Following questions were asked:

- *Is EHS a priority area in the hospital's management policy*

- *Does an EHS hierarchy exist*

- *What % of employees have a matriculation certificate*

- *Are the EHS plans developed in consultation with the staff*

It is evident from the figure 4.4 that the percentage varied over a wide range. It can be concluded that standards being practiced in Hospital A (Private) are far better than those of hospital B & C (Public).
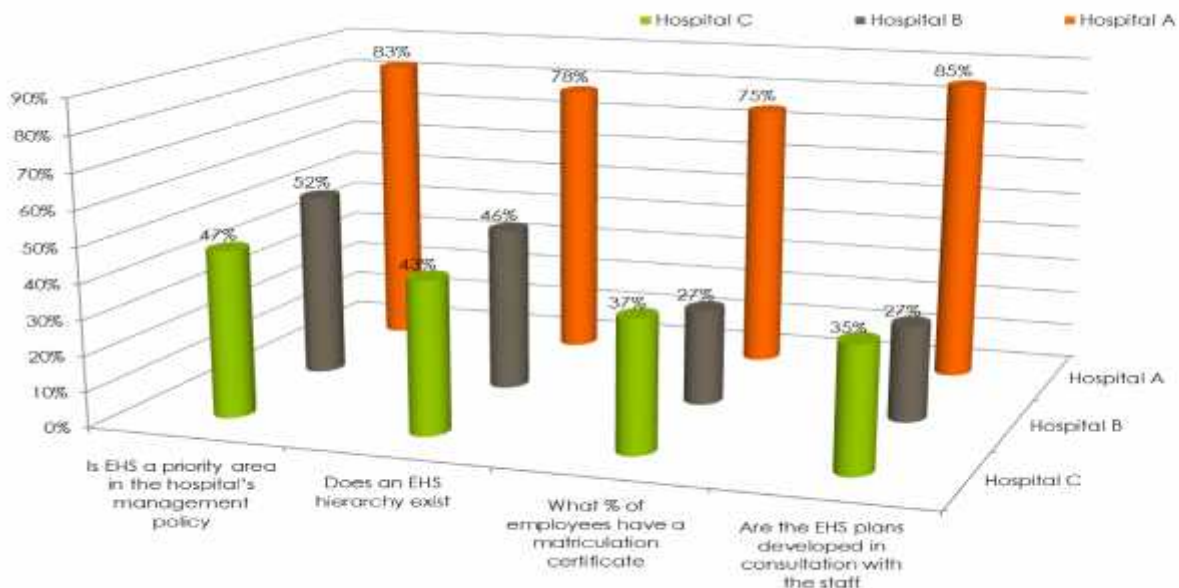
Fig: 4.4 (a): EHS Management of the Organization

- *Does an effective communication system exist*

- *Have someone been nominated as an EHS manager*

- *Is EHS a priority in the departmental functions*

- *Are EHS responsibilities clearly defined*

- *Are floors and washrooms cleaned on daily basis*

The practice of current organizational chart and communication of review of organizational chart is also lacking at hospital B & C (Public). On the other hand, internal and external communication mechanism also existed and was working in hospital A. Similarly, the staff of each section was informed for their duties well before time in hospital A. Another standard being met is the appointment of the qualified manager for most of the sections in hospital A, where as hospital B & C (Public) is not being run to the optimal potential.
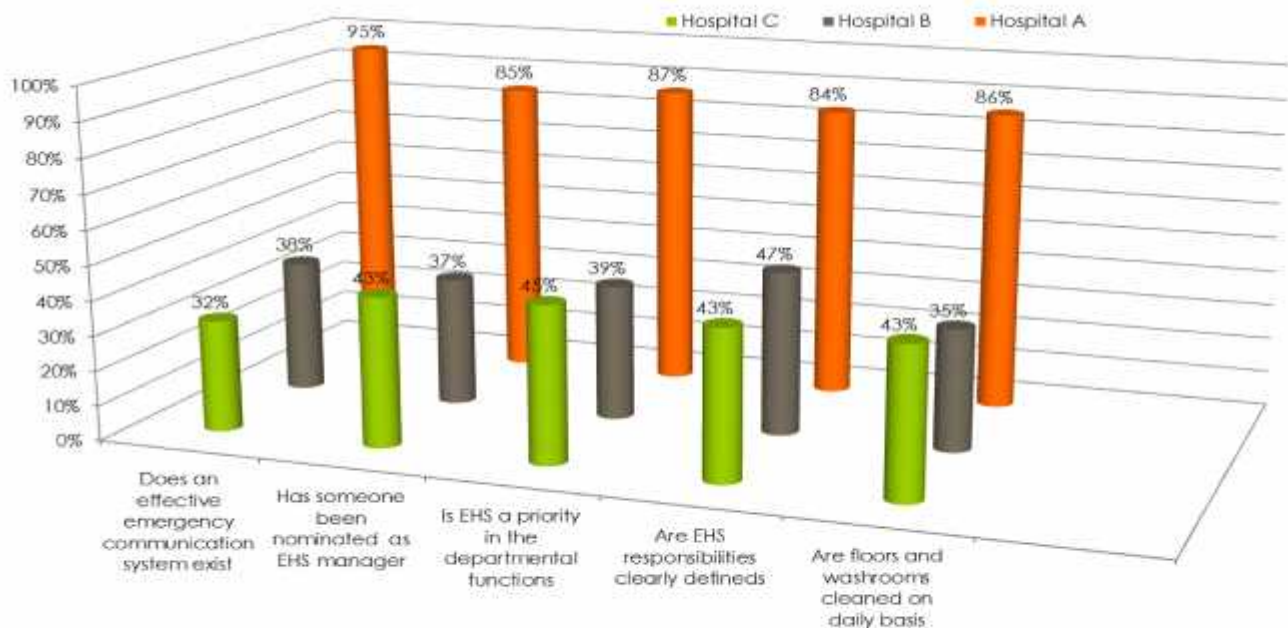
Fig: 4.4 (b): EHS management of the organization

4.4 EHS Communication, Training and Implementation:

EHS and human resource management is an essential component for the efficient running of an organization. Following questions were asked:

- *Is EHS training imparted to each employee in risk prone area*
- *Is the trained staff hired for risk prone area*
- *If the staff has a copy of responsibilities*
- *Is the staff identifiable via uniforms etc*
- *Are continuing education programs provided by the hospital*
- *Is there accurate and complete records keeping*

According to the results of this part, the job description in written form was not available to most of the employees for hospital B & C. In any organization, competition is the most important driving force to flourish. The high frequency of E H S trainings and appraisal along with refresher courses may serve the purpose. It was found that need for EHS training was neither assessed nor proper budget allocations were made in this head in hospitals B & C. Majority of staff personnel were scarcely aware of the detailed EHS induction training of the hospital.
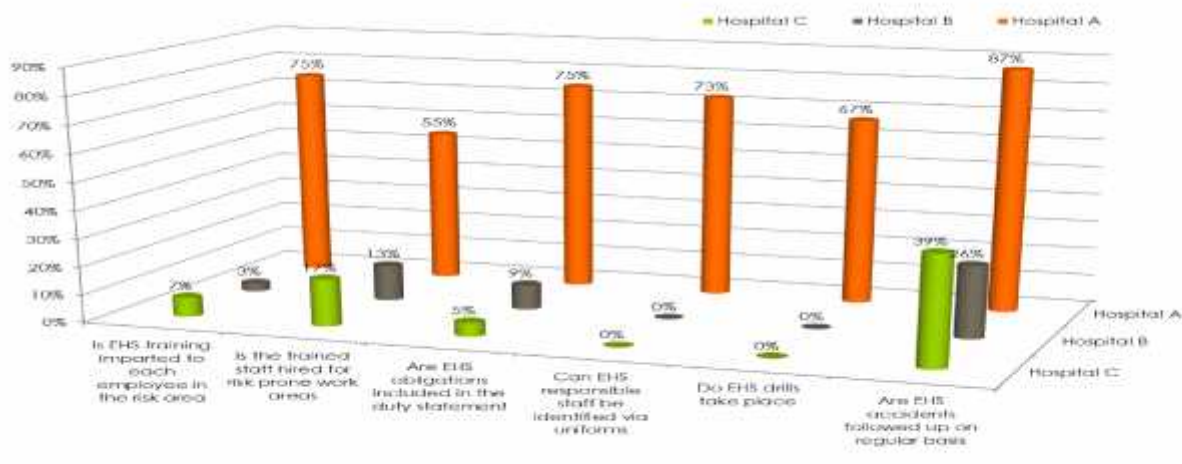
Fig: 4.5: EHS communication, training and implementation

4.5 Employee Perception on EHS Issues

4.5.1 EHS Dangers at Work Place

EHS danger is generally defined as employee's exposure to harm or injury that they may encounter at their workplace. In case of a hospital, these work places include different departments such as operation theatre, radiology, laboratories and handling of infectious wastes etc. Employee's such as doctors and nurses work in the operation theatre with chemicals and sharp tools infected with contaminated blood from the patients, radiations in the radiology department which are a leading cause of cell mutation resulting in cancer and contaminated sharps and needles in the infectious waste etc. Understanding the exposure to these dangerous situations, employee's of the three hospitals were asked if they considered their work place as dangerous. The seriousness of the situation is evident from figure 4.6 below.

A small group of respondents (Hospital A 3%, Hospital B 24%, Hospital C 18%) were not concerned with the dangers that come with their jobs. In hospital A 97% indicates an excellent level of awareness.
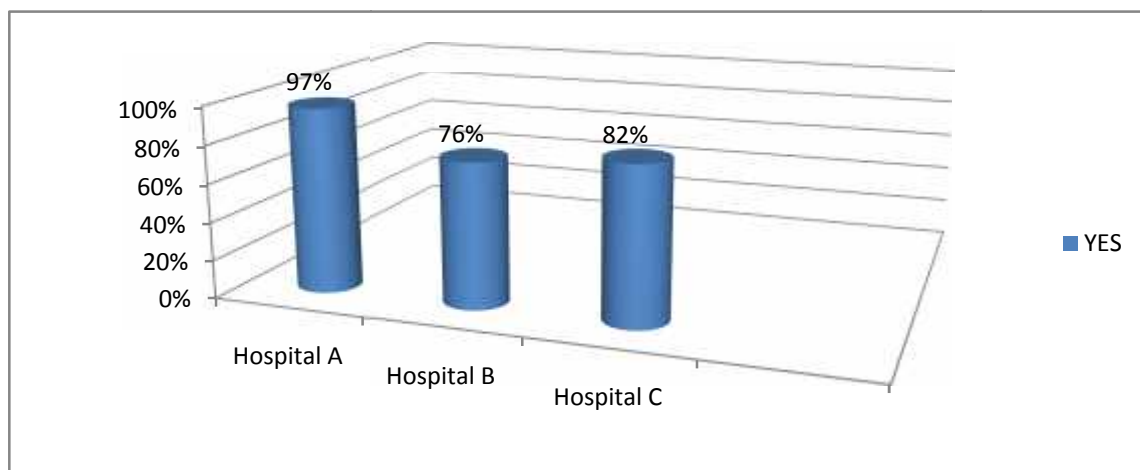
Fig 4.6: Employees due care for Dangers at Work Place

4.5.2 Hazards at Work Place

EHS hazards are unavoidable dangers or risks, even though often foreseeable. These hazards may include hazards like exposure to dangerous amounts of radiations in radiology that might cause cancer, infections from sharps and needles while performing infectious and non-infectious waste segregation and infections from cuts via surgical tools in operation theatres etc. Employees working in different departments of the three hospitals were asked if they were aware of the hazards at their work place. A majority of employees from the three hospitals (Hospital A 98%, Hospital B 83%, Hospital C 89%) considered their workplace as both dangerous and hazardous, especially those working in laboratories and handling infectious waste. In hospital A, 98% indicates an excellent level of awareness. This can be attributed to the fact that the employee receives safety briefings and monitored at work.
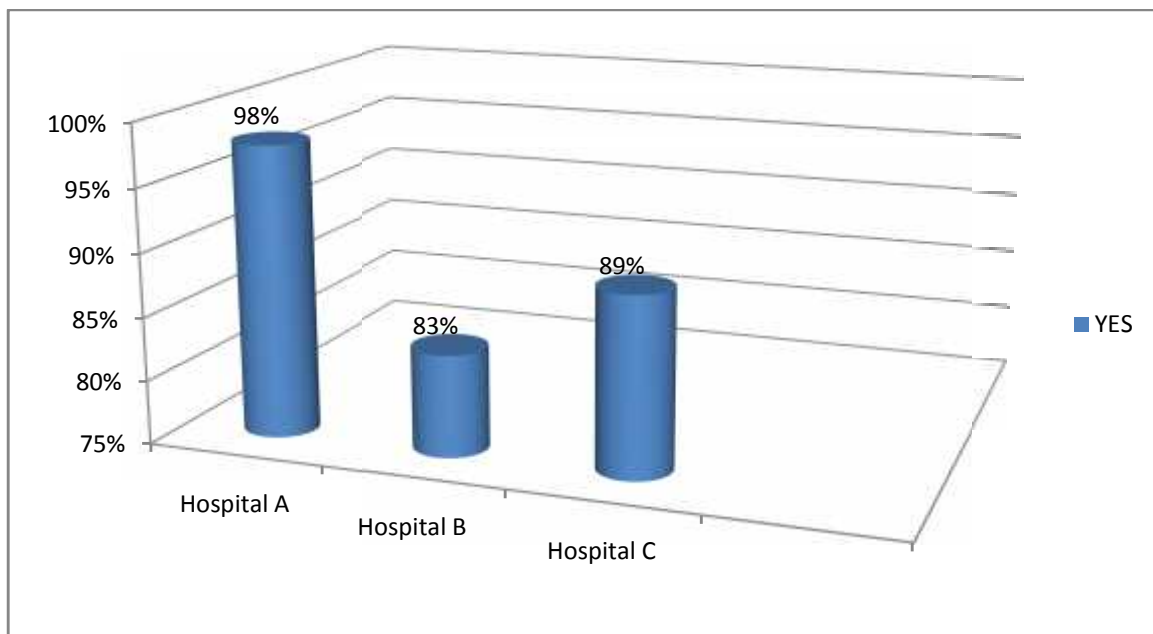
Fig 4.7: Employee's perspective of work place hazards

4.5.3 EHS Impacts on Employee's Wellbeing

Employees working in various departments of the hospitals were asked if they have concerns for their wellbeing (moral, motivation to work, fear of accident, chronic impacts of the surroundings, etc.) under the existing daily routines and functions. As compared to hospital A an overwhelming majority of hospital B & C considered their working environment as unhealthy and hardly acceptable on long terms (Hospital A 30%, Hospital B 87%, Hospital C 93%). It points at the lack of attention towards the issue. A majority of employee's at hospital A are satisfied with the training and safety measures adopted. This can be due to the fact that the management pays a lot of attention towards the working environment at the hospital. A team has been designated to monitor the working environment in every department, especially the critical areas. No such measures are taken at hospitals B & C.
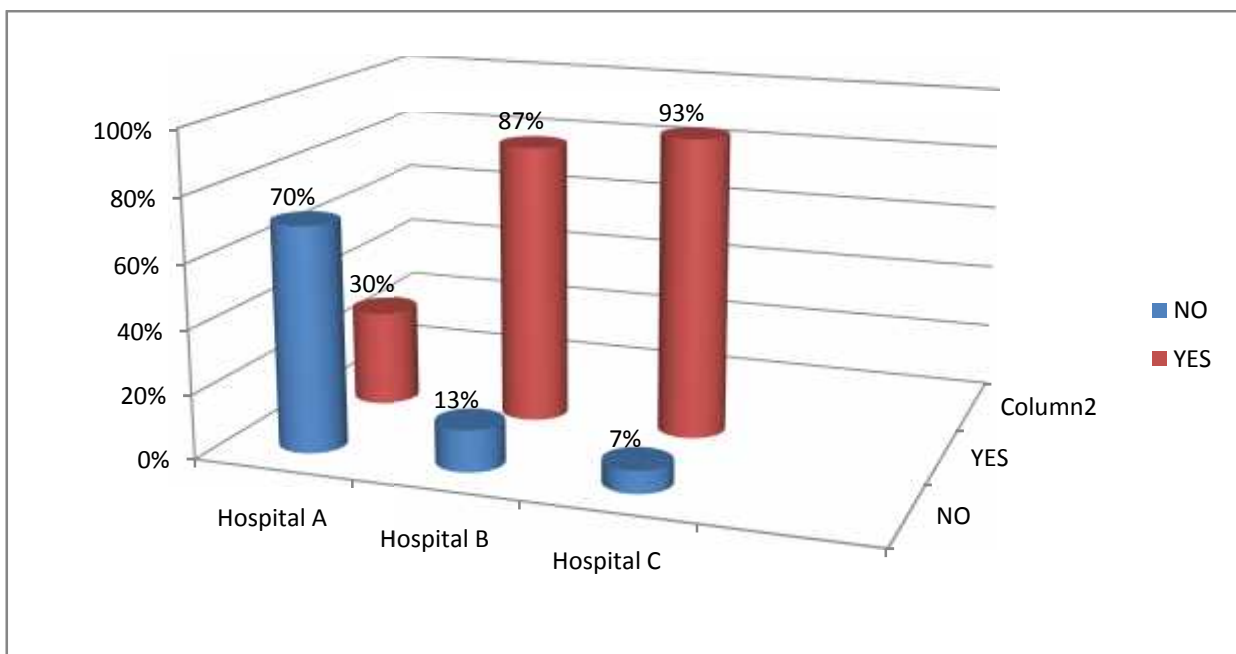
Fig 4.8: EHS impacts on employee's wellbeing

4.5.4 Employees Concerns Over Environmental Pollution

Employees from different departments of the three hospitals were asked whether or not they were working in a pollution free environment. A majority of respondents at hospitals B & C (Hospital B 79%, Hospital C 83%) disagree that they are working in pollution free environment. This is due to the fact that awareness via media and various socio-economic changes in our society are contributing towards the concept of clean, green and pollution free environment which is taking strong roots among the masses.
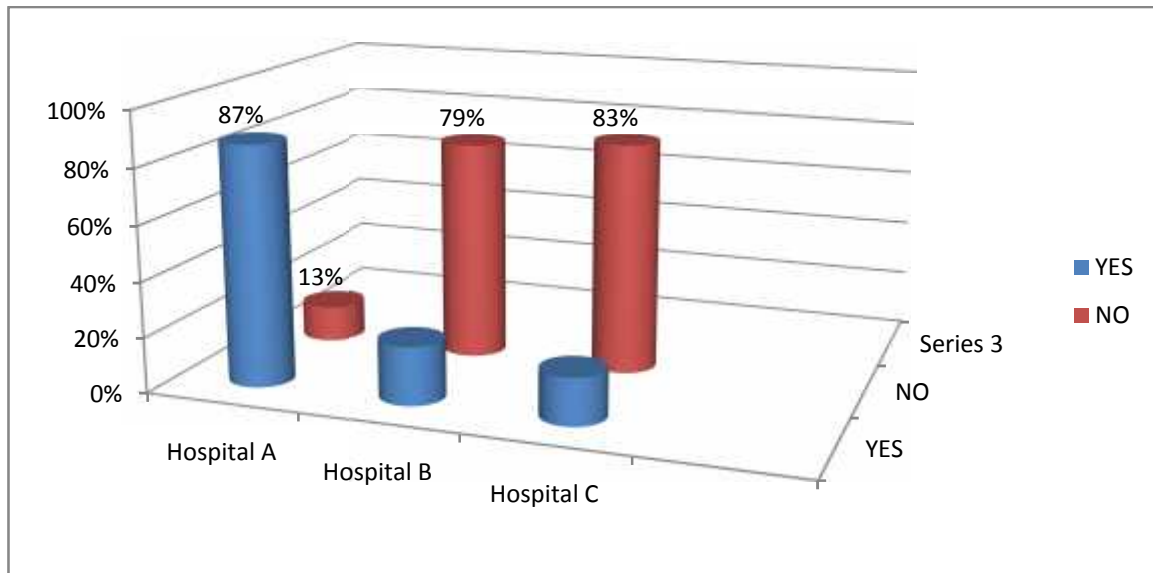
Fig 4.9: Employee's perception of environmental pollution at work place

4.5.5 Avaibility of Personal Protective Equipment (PPE)

Employees of the three hospitals were asked about availability of personal protection equipment such as gloves, glass, protective hats etc. In hospital A, majority of the employees are satisfied with the available equipment for the protection of their health and safety. The situation in hospital B and C is not very encouraging. The glaring reason for this is the lack of interest by the management towards the issue. At hospital A safety briefings and monitoring ensure a good awareness level and working.

Fig 4.10: Avaibility of personal protective equipment

4.5.6 EHS Communication Systems

Hospitals face many challenges when it comes to communication, both internal and external. These challenges might include:

- *Differences in culture*

- *The perceived roles and responsibilities of management and employees*

- *Defining and regulating the functions of each department*

- *Availability of action plan and its distribution to the working staff*

- *Defining a chat of accountability of the staff*

Differing notions of risk and environmental and safety priorities go beyond mere language barriers. The goal of an EHS communication system is to design and implement environment, health and safety training programmes to maximize the effectiveness of clients' EHS management systems. Employee's working in various departments of the three hospitals was asked questions which would indicate their level of awareness about EHS issues. These questions were as follows:

- *Does the hospital have defined procedures for training & promotion*

- *Is the staff qualified and experienced*

- *If the staff has a copy of responsibilities*

- *Is the staff identifiable via uniforms etc*

- *Are continuing education programs provided by the hospital*

- *Is there accurate and complete records keeping*

The employees at hospital A are well informed as compared to hospital B and C. The results deny the claims of the management at hospital B and C of keeping their employees well informed about safety measures. The employees do face numerous occupational health problems due to lack of proper training and information about their duties. This is a major concern in respect to optimal functioning of the hospitals and their productivity.
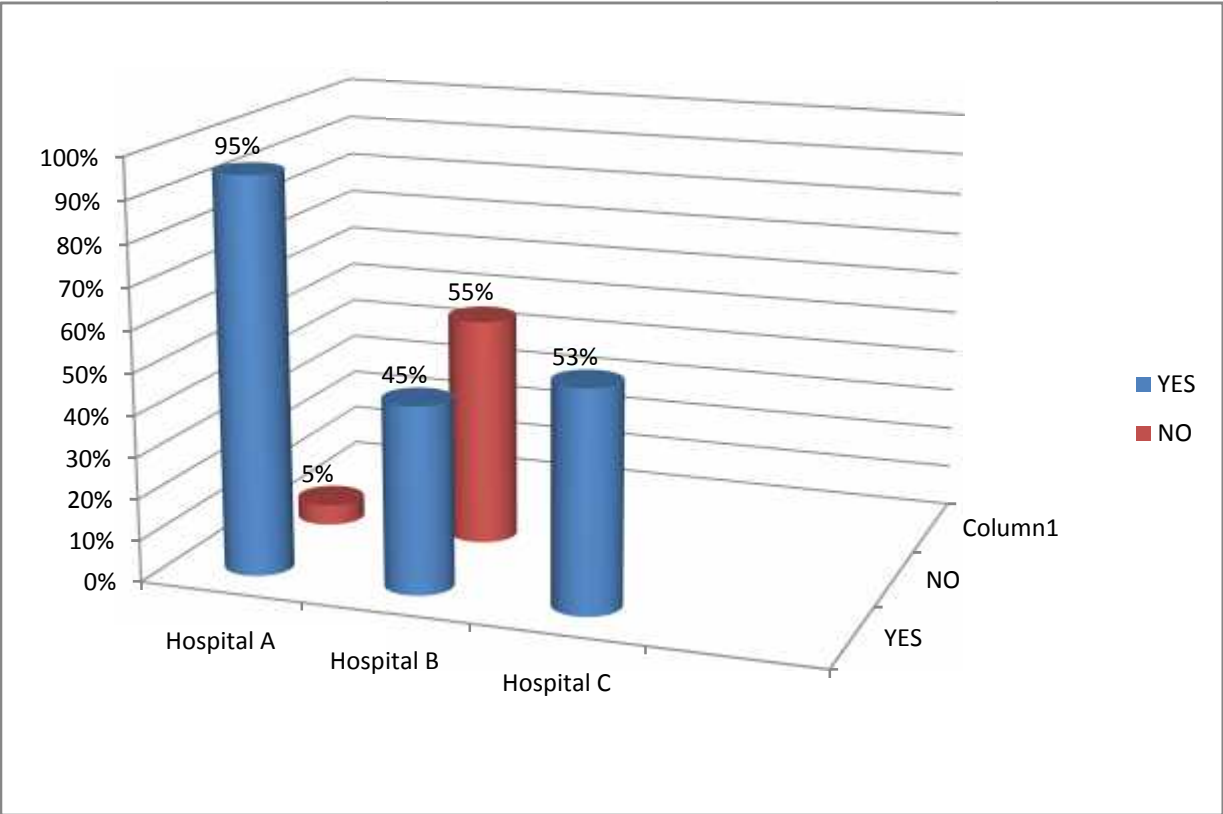
Fig 4.11: Employee's level of EHS awareness

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

It was observed that the level of awareness and standard of EHS practices being followed in a private hospital were much better than that of public hospitals. The hospital staff had some knowledge about the dangers and risks that prevailed by the lack of training and lack of interest to make the situation better. The situation analysis confirmed the earlier view that a proper EHS management programme should be implemented at these hospitals and an intensive training programme at all levels is required to deal effectively with the problem. A generic manual of good practices is attached in the appendices as the final outcome of this research. However specific conclusions are as mentioned below:

- Absence of a separate department for environmental, health and safety (EHS) issues

- No hot line to deal with any emergency situation

- Lack of proper staff training to combat emergency situation

- The concept of EHS requirement in confined space was absolutely missing

- No properly defined assembly areas in case of emergency evacuation

- Electrical wires not properly insulated or drawn to avoid any electrical injury

- No concept of emergency drills or frequent briefings

- Practice of waste segregation along with type of waste generated is absent

5.2 Recommendations

In the light of this study conducted and the analysis done the following recommendations are being suggested improve the current EHS and Management situation at hospitals in Pakistan.

- Create a separate department for environmental, health and safety (EHS)

- Properly categories different types of fire extinguishers

- Make a hot line to deal with any emergency situation

- Ensure proper staff training to combat emergency situation

- Provide proper kit to aid the workers

- Ensure measures to ensure good air quality via proper ventilation for the workforce

- Properly define assembly areas in case of emergency evacuation

- Introduce and ensure the use of personal protection equipment by the workforce

- Wires should be properly insulated to avoid any electrical injury

- Mandatory Safety briefings should be made to raise the level of awareness of the workforce

- Practice of waste segregation along with type of waste generated

- Make pits and ensure incinerator

- Make a waste treatment plant to treat the water coming from critical areas like operation theaters

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Environment, Health and Safety Questioner

Name……………………….   Designation…………………… Service…………………

Address…………………………………………………………………………………..

Contact No……………………………….Department…………………………………

EHS MANAGEMENT OF THE HOSPITAL

1. Is there a universal mission statement for the hospital, which also sets out principal aim of
    hospital in regard to EHS?

YES		NO	

2. The hospital is overseen by a governing board/ board of directors?

YES		NO	

3. Is EHS a priority area in the hospital's management policy?

YES		NO	

4. Does an EHS hierarchy exist?

YES		NO	

5. Are EHS responsibilities clearly defined?

YES		NO	

6. Are the EHS plans developed in consultation with the staff?

YES		NO	

7. Progress against the objectives and planned actions set out in EHS plan is reviewed quarterly according
    to a defined monitoring and evaluation process?

YES		NO	

8. What % of employees have a matriculation certificate?

YES		NO	

EHS COMMUNICATION, TRAINING AND IMPLEMENTATION

1. Clear and effective mechanism exists for internal and external communication.

   These include:-

   Two way communication between staff and between staff and management.

YES		NO	

   Communication between different departments and wards.

YES		NO	

   Communication with the press and media.

YES		NO	

   Communication with patients /care providers.

YES		NO	

   Communication with external organizations.

YES		NO	

2. Is the trained staff hired for risk prone work areas?

YES		NO	

3. Is EHS training imparted to each employee in the risk area?

YES		NO	

4. Are EHS obligations included in the duty statement?

YES		NO	

5. Do EHS drills take place?

YES		NO	

6. Are EHS accidents followed up on regular basis?

YES		NO	

7. Can EHS responsible staff be identified via uniforms?

YES		NO	

GENERAL SAFETY AT HOSPITAL

1- Is there any safety department or safety unit to coordinate safety in your Hospital?

- ☐ Yes
- ☐ No

2- Are your safety officers delegate the authority to suspend the work, if there are unsafe acts?

- ☐ Yes
- ☐ No

3- Is there any checklist for use by the safety officers to inspect the site safety?

- ☐ Yes
- ☐ No

4- What is the average accident rate of your hospital in year 2012?

- ☐ 0-10
- ☐ 10-20
- ☐ 20-30

5- Does your hospital punish those workers or sub-contractors who fail to observe site safety?

- ☐ Yes
- ☐ No

6- Are health and safety responsibilities clearly identified for all level of staff?

- ☐ Yes
- ☐ No

7- Has the hospital prepared safe operating procedures relevant to its operations?

- ☐ Yes
- ☐ No

8- Does your hospital emphasis on personal protection equipment's (PPE) at operating Site?

- ☐ Yes
- ☐ No

9- The major reason of accidents on site is that the workers are short of safety training's.

- ☐ Yes
- ☐ No

10- Does your hospital provide safety training / courses for shift workers?

- ☐ Yes
- ☐ No

11- Does your hospital emphasis on putting fire extinguishers at work place.

- ☐ Yes
- ☐ No

12- Detecting Potential Hazard is a major aim of the site planning exercise?

- ☐ Yes
- ☐ No

13- Does your hospital emphasis on identifying hazards at workplaces?

- ☐ Yes
- ☐ No

14- Does your hospital emphasis on having emergency access at workplace?

- ☐ Yes
- ☐ No

15- Does your hospital reward workers who exhibit safety?

- ☐ Yes
- ☐ No

16- Does the safe work procedure exist at your hospital?

- ☐ Yes
- ☐ No

17- Potential risks and consequences are identified prior to execution.

- ☐ Yes
- ☐ No

Proposed EHS manual for Public Hospitals in Pakistan

EHS AND HOSPITAL PLANNING

Design and construction of buildings are looked upon as symbols of progress and development, different simultaneous activities in hospitals pose a danger to health and safety of not only the builders but also the working staff at the construction site. It is therefore a duty of all the hospital departments including builders, vendors, staff a n d other workforce to work in accordance with the hospital EHS program. In this regard the EHS is responsible for enforcing the program. This manual is designed to serve as a guide by pinpointing some of the major EHS areas of concerns of a hospital and define protocols mandatory to be followed by all those working within the facility.

1.1 Environmental Health and Safety (EHS) Department

- To ensure awareness a n d training of the EHS control program
- EHS department should carryout regular review of the safety program
- Strictly investigate all incidents

1.2 Managers

- Regular monitoring should be done by them to make sure that all activities are in accordance with the policy
- They should provide staff with safety program
- They should ensure necessary training of the staff
- They should ensure that all legal formalities are met

1.3 Guidelines

1.3.1 Air Quality

- It is essential to ensure proper isolation of work site from adjoining areas

- Make necessary arrangements to keep dust of construction site from travelling outside the premises

- Sealing of all doorways using comparable material in order to mitigate the migration of dust from the work site

1.3.2 Hazardous Material

- In order to work safely it is the duty of the administration to provide EHS department with all applicable material safety data sheets (MSDS's)

- No storage of flammable chemicals at the work site

1.4 Personal Protective Equipment

The use of personal protective equipment is for improving the standard of individual safety while performing hazardous tasks. It consists of using gloves, hats, safety glasses and other equipment used to protect against injury.

1.4.1 Hats to Cover the Head

Wearing hats during construction is very important. They minimize possible danger of head injury.

1.4.2 Protection of Eyes with Safety glasses

This is to protect against dust particles. The safety glasses also ensure protection against harmful chemicals, acids, liquids and gases.

1.4.3 Protection Against Cuts and Punctures

This is to ensure protection against punctures, cuts, hazards of skin absorption by dangerous substances, burns, and harmful temperature. It is for this purpose essential to have proper hand protection.

1.4.4 Protection by Foot wear

Footwear that might expose skin are not desirable. In areas with potential of foot injury protective footwear must be worn in order to avoid from objects piercing the skin or from energized electrical conductors that might contact the feet.

1.5 Fire Extinguishers

- They are essential to include in the design for all spaces
- In areas with expensive equipment it is necessary to have a carbon dioxide extinguisher

1.6 Laboratories

- It is an international norm to put extinguishers in a way that no point in the laboratory is further than fifty feet from an extinguisher
- In the case of the use of alkali metals (e.g., metallic sodium) use a dry graphite extinguisher and not dry powder

THE EHS MANAGEMENT SYSTEM

2.1 Policy Formulation

It is the top most priority of any hospital management in the world to ensure the well being of its workforce and to make sure that none of them are exposed to risk. It is essential to recognize that in maintaining a healthy workforce with a healthy and safe working environment has a direct impact on hospitals proper functioning in provide its patients with good quality services. A healthy, well trained and skillful workforce that provides the best standards of healthcare. Only doing this will ensure the fact that proper resources are being allocated for maintenance and improvement of hospital's management in dealing with health and safety risks.

2.2 Scope of Policy

The application of this document is on all of those people who are employed by hospital which includes:

- Clinical and non-clinical staff
- Contract staff
- Students

2.3 Safety and Health Measures

The hospital should have an effective EHS management program. Only an effective EHS program will ensure a strong foundation and infrastructure for smooth working. It will also help in maintaining of EHS standards throughout the premises which includes safety and health risks.

These measures include:

- By considering and monitoring the behavior of individuals in relation to incidents at the hospital

- Only with a systematic approach aimed at maintaining quality EHS standards will ensure a good management in the hospital

- By careful evaluation of EHS relating issues in decision making

- Ensuring accountability and merit in decisions affecting EHS

2.4 EHS Management

It is important for the hospital t o develop its EHS management system comprising:

- Providing the managers with necessary documentation and EHS assessment tools which would enable them to identify and prevent safety risks of their concerned areas

- A robust audit system that would enable the hospital to monitor its EHS management

2.5 Highlighting EHS Management

An efficient organization is essential for the attainment of the goals set for its EHS management. This also includes the important task of defining responsibilities that would create strong working relationships needed to secure the commitment of staff working in collaboration for ensuring the EHS management.

2.6 The EHS Department

- Constituting the EHS committee and taking the necessary actions to address EHS related issues
- Communicating and reporting EHS issues to the administration
- Developing an effective audit programme
- Developing the EHS training programme
- Development of monitoring and review of the EHS policy
- To promotion a positive safety culture

2.7 Responsibility of Officials

2.7.1 Directors

They are most responsible for the EHS management of the workforce and other visitors to the hospital.

They are responsible for:

- To ensure the commitment of the senior management to EHS along with risk management
- Take steps to implement the hospital EHS plan.
- They should by lead by example

2.7.2 Managers

Managers should:

- Promote and support the EHS management policy

- They should make sure that their staff receives appropriate EHS information, and training

- They should make sure that all staff is aware of the EHS policy

2.7.3 Workers

They are responsible for:

- Reporting any dangers or concerns they have in respect of their work

- They should follow safe working procedures

- They must get used to the policy and procedures

- They should record incidents on the incident reporting register

- They should participate in the EHS risk assessment process

2.8 Supervision of Staff

Managers must supervise their staff effectively to carry out their role efficiently

This includes:

- Providing staff with proper EHS training

- Providing support to staff after an EHS incident at work

- To keep the staff informed of work place matters concerning their safety

2.9 EHS Briefings

Effective communication is an essential process and managers should provide regular briefings to ensure that the workforce remains efficient in the interests of EHS related issues. EHS issues should be included within manager's team briefings.

2.10 Safety Information for Staff

Staff must be encouraged to report EHS concerns. In this way early action can be taken to avoid an accident. As a basic step the staff should always speak to their manager about concerns they have. Should the need arise and where the manager cannot resolve concerns they can take advice from the relevant occupational health and safety support service.

2.11 Investigation of Incidents

When informed about an incident a manager must ensure that accurate details are provided for the investigation of the incident. The investigation will help managers to identify and counter the breaches in following the protocols.

2.12 Policy Monitoring

Ensuring EHS is vital for the hospital staff. It is also a legal requirement and the hospital may face legal action for failing to comply. It is for this purpose of utmost importance that senior managers monitor EHS regularly to ensure proper functioning of the hospital.

2.13 EHS Auditing

It is an essential part of the system. This is also true for EHS management system. Therefore EHS audit must be done to ensure that the hospital is meeting its legal responsibilities effectively.

2.14 EHS Review

The board is responsible for review on following basis:

- Effectively follow the publication of new EHS regulations

- After every three months

FIRE SAFETY AND EMERGENCY RESPONSE

In a hospital most of the patients are non-ambulatory while some are on life support systems. Whenever faced with a situation like this, it is important that the staff must be ready to contain and control the fire. The initial responsibility of containment and control of a fire lies with the hospital officials. This is why it is of utmost importance that the workforce is familiar with the hospital's fire plan. They should be very clear and well trained to take appropriate action if a fire occurs.

3.1 Environmental Health and Safety

- Its priority is to make sure that the fire safety plan is in place and being followed

- They should always review to make new plans as needed

3.2 Fire Management

It is a four-step procedure:

- Activate the Alarm

- Confine the fire

- Rescue

- Evacuate

1. Activate the Alarm

- Rush to the closest fire alarm and activate it

- Call rescue 15

2. Confine the Fire

Immediately disconnect any medical gas flowing in the room and also close all doors in the affected area. This is for the effective containment of the smoke and fire in the area while give everyone time to evacuate patients in to an area of safety.

3. Rescue those in Danger

Guide and carry anyone in immediate danger of smoke or fire to a place of safety.

4. Extinguish/Evacuate

If small make an attempt to extinguish the fire and when necessary, begin evacuation of the area.

BIOLOGICAL SAFETY

4.1 Blood borne Pathogens Exposure Control Plan

The aim is the minimization leading towards elimination of exposure from blood borne pathogens. Blood borne pathogens exposure is basically contact of skin either with blood or any other infectious material. Animals like domestic pets can also be a source of pathogens. The goal is to prevent spread of infection and eliminate the infection. The pathogens include hepatitis C, hepatitis B and the human immunodeficiency virus.

4.2 Environmental Health and Safety Department

- The EHS department shall make rules and regulations

- The EHS department shall give copies of the manual to all the other departments

- The EHS department shall provide proper training to the staff

4.3 Manager

- It is his responsibility to implement the manual

- He should carryout regular inspections to ensure compliance

4.4 Washing of Hands

- The facility must be available at work areas.

- It is important to wash ones hands with soap prior to and after completion of work in the lab

- If not possible the hospital shall provide an antiseptic hand cleanser

4.5 Needles and Sharps

- Use only when necessary

- Dispose in the puncture proof containers

4.6 Drinking and Eating at Workplace

- Eating, drinking, smoking are strictly prohibited in area of work.   .

- Inform administration EHS officer if there is no such area designated for

  this purpose

4.7 Storage of Food

- Do not keep them with in the area of work

4.8 Pipetting

- Use mechanical pipetting for handling liquids in the laboratory

- Avoid mouth pipetting

4.9 Handling of Specimen:

- Specimens should be kept in a leak-proof container

- The container should be labeled or colour coded and tightly sealed

- Place it within a secondary container in case of a danger that the specimen could

  puncture the primary container

- Secondary container must be leak proof

4.10 Labels and Signs

- It is important to affix labels to container which contain blood or other

  infectious waste

WASTE MANAGEMENT AND DISPOSAL

Hospitals, anywhere in the world are organizationally complex systems that employ a large number of workers from various professional streams. Because of the nature of their work it is essential to know that there are several types of wastes generated by a hospital. It is very necessary that these wastes must be managed and disposed properly, so that they do not become a concern for health and safety of the people or the surroundings. These waste disposal procedures have been established as part of the hospital environmental health and safety (EHS) manual so that they may provide guidance in the proper management of biological, chemical and universal wastes. Hospital staff needs to be informed and ensure wastes are:

- Properly classified as biological, chemical, radiological and universal waste

- Treat and decontaminate properly

- Collect, store and dispose all waste in according to these procedures

All this will ensure that waste is being disposed safely and in accordance with legal regulations and also within proper disposal locations so that it won't cause harm and injury.

5.1 EHS Department Responsibility

- The department would develop waste disposal procedures which comply with legal regulations

- The department is to train the hospital staff for waste disposal procedures

- The department shall make regular inspections

5.2 Management of Waste

Byproducts and chemicals from work activities are the major source of chemical wastes and they must be managed as a hazardous waste.

5.3 Types of Waste

The below mentioned are chemical wastes. Drain and trash disposal for chemicals.

- Sharps waste for non-acutely-toxic chemical waste

- Empty containers

- light bulbs and mercury lamps

- Recycling battery and disposal

- Electronics and computers recycling

- Waste that is acutely toxic for sharps and empty containers

5.4 Hazardous Waste

5.4.1 How to Select Containers

The reuse of empty bottles is desirable to collect chemical wastes

- Compatible containers for storing chemicals must be used

- Special care is necessary for corrosive wastes or the waste contents will dissolve the container

- Use separate containers to collect incompatible waste

5.4.2 Sealed Container

Chemical waste containers must be closed when not in active.

5.5 Biological Waste

These types of wastes are generated in research, testing of biologicals, diagnosis or production. Also included is the isolation wastes, animal wastes, infectious agents, cultures, human blood and products of blood. Human pathological waste and sharps are also included.

5.6 Regular Waste:

See if the biological waste belongs to sharps waste or red bag waste.

5.6.1 Needles and Sharps Waste

This type of waste includes any metal, plastic, glass or items with the potential to cut, puncture, scratch the skin. Sharps include:

- Medical needles
- Intravenous syringes to which a needle is attached
- Different types of blades
- Pipettes
- Blood vials
- Culture dishes
- Broken and unbroken glass and plastic

5.7 Disposal Procedures

5.7.1 Decontamination

Sometimes it is necessary to decontaminate biological waste prior to disposal.

5.7.2 Guideline

- Liquid waste is to be disposed through sink drain

- Dispose wastes mixed with radioactive wastes as a radioactive waste

- Dispose wastes mixed with hazardous chemical through EHS as a chemical waste

5.8 Procedures

5.8.1 Liquid Waste Disinfection

An effective disinfectant is bleach :

- Bacteria

- Fungi

- Viruses

- Mycobacterium

5.9 Use of Personal Protective Equipment (PPE)

- Laboratory coat

- Gloves

- Safety glasses

5.10 Autoclave

It is very effective in sterilizing liquid waste. It refers to the complete killing of all living microbial organisms. A biological indicator is used in autoclaving.

Contents of personal protective equipment (PPE):

- Laboratory coat

- Gloves

- Safety glasses

Restrictions:

- Autoclave should not be used for treatment of chemical waste

- Autoclave should not be used for treatment for treatment of radiological medical waste

- Autoclave should not be used for treatment of human body parts

5.11 Decontamination

Decontamination is for making infectious agents ineffective, so that they no longer pose a threat to health and safety. A few biological wastes may need other methods which may lead to decontamination.

5.12 Infection Causing Agent

They are organisms that can causes disease or effect health of humans or animals.

5.13 Chemical, Biological and Clinical Waste Management

5.13.1 Clinical Waste

A lot of drugs and chemicals are regarded as hazardous and for this reason also regulated by the environmental protection agency (EPA). Wastes from clinical areas must be collected and disposed by environmental health and safety (EHS).

5.13.2 Non-Hazardous Waste

Wastes from clinical areas include:

- Needles used for any non-hazardous chemicals

- Small containers can also be discarded in a sharps containers

- Disposal aqueous solutions through drain

5.14 Management and Disposal

5.14.1 Seal the Container

Collect wastes into containers with sealable lids.

5.14.2 Identification of Containers

Label containers with a hazardous waste label with the name of the chemical enclosed. Denote sharps on the label if syringes or other sharp wastes are inside the container.

5.14.3 Close and Seal Tightly

Close and seal tightly containers not in use and protect from exposure to people in the hospital.

5.14.4 Store

Store the container in a labeled chemical waste area with secondary containment to contain spills.

GENERAL SAFETY

6.1 Concept of Confined space

A confined space is defined by OSHA as space that is large enough so that an employee can enter and perform assigned duty or work. The entry or exit is restricted and it is not designed for continuous occupancy. It is important to meet these criteria for a space to be classified as confined, example of such spaces include utility vaults, tanks, certain tunnels, boilers and pits.

Sometimes there is a concern that confinement may pose hazards of entrapment. In other cases, the same confined space may keep workers closer to hazards, such as asphyxiating atmospheres. It is for this purpose that OSHA uses the term permit-required confined space in order to describe these spaces that meet both the definition of confined space along with posing health or safety concerns.

6.2 Environmental Health and Safety Department (EHS)

- Manage by developing the confined space protocol
- Issue permits for confined space
- label all the spaces in a hospital which require permit
- Provide training to staff who may work in confined spaces
- Make annual review

6.3 Departments Officials

- Confined space program implementation should be ensured by them

- They should demand training of staff from EHS as needed

- They should inform EHS department of any potential permit-required confined spaces

- They should inform EHS department when confined space entry work is to be performed

- They should notify EHS of any incidents that occur in connection with any confined space entry

6.4 Types of Confined spaces

Confined spaces can be divided into two types that are non-permit required and permit- required confined spaces.

6.4.1 Confined Spaces termed as Non-Permit- Required

- A large enough space to enter and perform an assigned task

- It is not designed for continuous occupancy

- It has limited or restricted means of entry or exit

6.4.2 Confined Spaces termed as Permit Required

- It contains hazardous atmosphere

- It also contains material with the potential to engulf someone who enters the space

- It can contains any other recognized serious safety or health hazards

6.5 Protocols for Confined Space

Those spaces that require permit also demand extensive training of the staff using them. It is therefore important that entry into those spaces requiring permit at the hospital is conducted by an authorized personnel. EHS department should inform of any hazards identified with the space. It is the duty of EHS department to coordinate entry operations whenever hospital personnel are working in or near the confined space.

6.6 Emergency Service

Non-Entry emergency operations shall be performed by officials in the event of an emergency. Arrangements must be made for rescue by emergency services team.

6.7 Hospital Ventilation

It is desirable to use forced air ventilation system in order to control atmospheric hazards of a confined space. It should only be used to control a hazard.

6.8 Hospital Staff Training

It is the duty of the EHS department to provide confined space awareness and training to hospital workforce who may use confined spaces during their duties. It is also important that supervisors who have employees working in confined spaces attend awareness training exercises.

6.9 Electrical Safety

The goal is to prevent exposure to hazardous electrical conditions and ensure compliance. Electrical shock and fire are the hazards associated with electricity. All work on electrical equipment needs be performed in a de-energized state.

6.10 Environmental Health and Safety Department (EHS)

- They are responsible to support the hospital community in implementing the program

- Maintain all records

- Perform regular reviews

- Evaluate work and ensure compliance with this programs

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