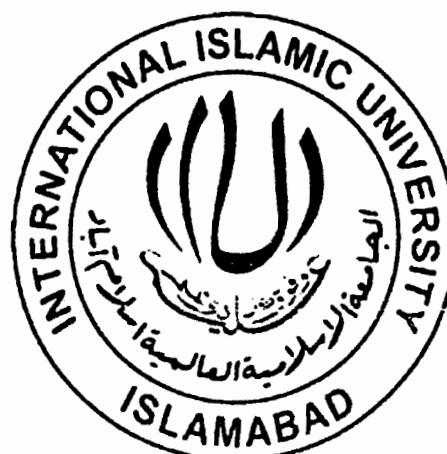


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# **ASSESSMENT OF OCCUPATIONAL HEALTH AND SAFETY MEASURES AMONG HEALTH CARE WORKERS WHILE DEALING WITH T.B PATIENTS IN FOUR GOVERNMENT HOSPITALS OF RAWALPINDI AND ISLAMABAD**



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AND ISLAMABAD**

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*A thesis submitted to international Islamic University Islamabad in partial  
fulfillment of the requirement of degree of Master of Science in subject of  
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Viva Voce Committee



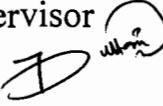
Chairman



Incharge



Supervisor



Internal

Dated 31-08-10

***IN THE NAME OF ALLAH, THE MOST MERCIFUL AND BENEFICIENT***

***Dedicated to my Lovely Parents and to my  
affectionate brother Fayyaz Ahmed***

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*Iqra Riaz*

## **Abstract**

An important aspect of the Environmental hazards is the Biological hazards. These are dangerous because these are transmitted through air born microbes. Among such diseases T.B (tuberculosis) is very important and rapidly spreading in the developing countries. Occupational health of health care workers becomes critical while dealing with T.B patients. They may become victim of this disease and can further spread it because health care workers are more vulnerable and prone to the infections in health care settings. According to WHO, 268,000 people develop T.B each year in Pakistan and 64,000 die because of it. TB is preventable and, in most cases, treatable. Infection control practices or occupational health and safety measures can help reduce the risk of TB transmission.

In this project the occupational health of workers will be explored while dealing with patients of T.B. their awareness about occupational health, the protective equipments they are using to keep themselves safe from T.B and the engineering and administrative control by high authorities of hospitals in order to prevent the spread of T.B. The study was conducted in the four government hospitals of Rawalpindi and Islamabad and data was collected through questioners, personal observation and patient's feedback. First of all it was found that there is no any separate TB ward in any of the hospital under study. The TB patient after examining and diagnosis is kept in the general ward. Where it becomes a source of infection for the other patients who are already weak and easily susceptible for all types of microbes. Our study and data analysis shows that 57 % workers were not familiar with the concept of occupational health and safety measures as no one has received formal training regarding occupational safety and health but the safety guidelines are provided to them which are not fully implemented.

Only the senior staff and some doctors were familiar with this concept of self care during working hours. It was found that the risk of infection is far above the ground in the health care settings as the mask type N95 and P2P3 which are specifically recommended by WHO to use while dealing with TB patients are not provided to the health care workers. It was observed and reported through survey that 4% use N95 mask and same case with P2and P3 mask. Most of the workers are neglecting the use of personal protective equipments. Only 56% of the workers were using the Personal protective equipments. This was still an exaggerated figure while through observation and feedback from patients it was found that most of the about 70% workers don't use mask and gloves.

Effective infection-control practices are critical to prevent the transmission and further spread of in health-care settings and other congregate settings. These control practices includes the proper use of personal protective equipments, engineering control and administrative control (Strict monitoring). Some long term planning and strategies must be required to control the transmission of T.B from patients to patients and from patients to health care workers. The conditions in the government hospitals can be improved by adopting the infection control guide lines defined by World Health Organization (WHO) and National Institute for Occupational Safety and Health (NIOSH).

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## **LIST OF ABBREVIATIONS**

**HCW's** Health Care Workers

**WHO** World Health Organization

**OSH** Occupational Safety and Health

**PPE** Personal Protective Equipment

**PIMS** Pakistan Institute of Medical Sciences

**BBH** Benazir Bhutto Hospital

**T.B** Tuberculosis

**ICUs** Intensive Care Units

**OSHA** Occupational Health and Safety Administration

**HEPA** High Efficiency Particulate Air

## CHAPTER 1

### INTRODUCTION

Diseases and accidents at work place are the major environmental factors. The prevalence of accidents is high in the working sectors of Pakistan. Pakistan lies in the list of developing countries, having less awareness about occupational health and safety among workers and due to the limited allocation of resources in health sector the Government is neglecting the sector thus causing billions of loss in the form of compensation cost. As no comprehensive occupational health and safety laws are present, the prevalence of illness and accidents is much higher in Pakistan as thousands of workers are routinely exposed to work place hazards. However no reliable data on occupational accidents and illness is present as most of the cases are not reported to regulatory authorities. The rate of illnesses, damages and deaths due to work place hazards is high in the hospitals of Pakistan. Due to increase of work place hazards in hospitals and their exposures both indoor and outdoor, various health problems among health care workers arise because of it. In hospitals where people visits for the treatment of diseases, health and hygiene among health care workers is of little consideration as they neglect the safety measures necessary for their healthy survival and are important for them against biological hazards as well.

Pakistan lies among third countries where health care facilities are mostly provided by the public hospitals. The Government hospitals provide complimentary medical facilities to public and to poor people. There is a need to improve the working condition of health care workers especially in the government hospitals, while dealing with the patients having infectious diseases. Infectious diseases like Hepatitis (A, B, C), HIV, and

T.B are very common in Pakistan. Pakistan has positioned 8th in the world in having T.B (USAID, 2009). It was estimated that each year 68,000 people develop T.B and 64,000 die because of it. (Iqbal, 2003). Pakistan accounts for the 44% world's T.B burden. The spolitical conditions, inadequate health care facilities, malnourishment, overcrowded living conditions and lack of administrative plus engineering controls. The working staff at hospitals is at great risk to Tuberculosis as they are in direct contact with the patients and lack of personal protective equipment makes them more vulnerable. Most of the hospitals lack sufficient ventilators and negative air pressure rooms to combat the infectious diseases are not properly installed as majority of hospitals are not following the laws and international standards. In this project the occupational health of workers will be explored while dealing with patients of Tuberculosis, their awareness about occupational health, the protective equipments they are using to keep themselves save from T.B and the administrative control and engineering controls by high authorities of hospitals in order to control the spread of T.B by defending the health care workers.

### **1.1 Objective of the Study**

- To assess the occupational health and safety measures among health care workers while dealing with tuberculosis patients in the four government hospitals of Rawalpindi and Islamabad.
- To assess the practical knowledge regarding occupational health and safety measures being adopted by health care workers in the four government hospitals of Rawalpindi and Islamabad.
- To refine the current understanding of the working conditions of health care workers

- To focus on the engineering and administrative control to manage the Tuberculosis and the working environment that has an effect on the working condition of health care workers.

## Chapter: 2

### Review Literature

Occupational health and safety measures generally include the safety measures to prevent any injury, disease and death to workers during working hours. Healthcare workers (HCWs) are at great risk of hospital related infection transmission (Menzies, et al., 1995).

The infection of *Mycobacterium* can be transmitted from patient to patient, patient to worker and from worker to worker in health care settings where no strategies are followed to control the transmission of infection. Tuberculosis is a chronic inflammatory disorder caused by *Mycobacterium* and transmits through air, ingestion of infected milk and direct contact with infected material. An infected patient can produce 3000 infectious droplet nuclei during coughing, talking for 5 min and many more while sneezing (Centers for disease control and prevention, 1994).

The air in the room remains infected even after his/her visit. The prevalence of Tuberculosis transmission from patients to health care workers ranges from 20 to 25 % in health care settings of Pakistan.

In countries like America and Europe various control measures i.e. ventilator system, use of personal protective equipment and individual protection of staff were introduced to defend the health care workers against acquiring T.B (Wenger, et al., 1995).

Despite the facilities provided to the health care workers by the high authorities, awareness about occupational health and safety measures and the use of personal protective equipments, the rate of infection transmission is still 10% in developed countries while in developing countries this rate accounts for 25% of infection transmission where limited budget is allocated for health sector (Damani, 2005).

Negligence in the use of protective equipments i.e. masks, gloves, gowns improper disposal of sharp materials and lack of hand washing facilities are major factors which contribute in the transmission of infection from patients to health care workers (Larson, 1995).

Biological hazards include pathogens that cause acute and chronic infections (Healthcare infection control practices Advisory committee, 2002).

Hand washing is considered to be the key component to control the infection control in health care settings (Guidelines for hand hygiene in health care settings, 2002).

The most important step in controlling the spread of infection is the protection of staff in hospitals (Bolyard, et al., 1998).

**CHAPTER 3****MATERIALS AND METHODS****3.1 Study Design**

To assess the knowledge of local workers about occupational health and safety measures, environmental hygiene and use of personal protective equipments is the central theme research methodology for this study.

Four government hospitals of Rawalpindi and Islamabad were selected to conduct this research. Research techniques mainly includes

- Questionnaires
- Interviews as required
- Personal observation and patient's feed-back.

**3.2 Experimental Area**

An assessment of occupational health and safety measures among health care workers was carried out in the months of April, May and June, at the four Government hospitals of Rawalpindi and Islamabad, as the health care workers are at great risk of tuberculosis transmission as compared to general public. Two hospitals of Rawalpindi namely Holy Family Hospital and General Hospital and Polyclinic Hospital together with PIMS hospital of Islamabad were selected for the study.

Islamabad hospital is the key element of Pakistan Institute of Medical Sciences which provides basic facilities to public and poor people. It is located in G-8 sector, near zero point of Islamabad. It is a 592 (or more) bedded hospital with 22 medical and surgical specialists. The hospital consists of various inpatient and outpatient units equipped with latest technology. Approximately 1800 health care workers are working in

the general wards. The daily work load is high in it as it serves the people coming from other cities also. Polyclinic hospital is among the busiest government hospitals of Islamabad having 6 medical and surgical specialists.

Holy Family Hospital is situated in satellite town of Rawalpindi. The hospital is fully equipped with advanced machinery and equipments. It is a 510 bedded hospital with various departments and wards all are up to date. Benazir Bhutto Hospital is located at Murree road, Rawalpindi and is a major teaching hospital. The hospital includes various inpatient and outpatient units.

All these hospitals lack isolation rooms and wards for T.B suspects so the general wards were visited for survey. The areas of survey includes

- 6-8 general wards
- 2 intensive care units (ICUs)
- An emergency ward

### **3.3 Sample Size**

Overall 30 health care workers from each unit were randomly selected and processed from same procedure; overall 120 health care workers were selected from all hospitals.

### **3.4 Data Collection**

The data was collected by distributing the questioners (annex 1) among health care workers (includes doctors, nurses, patient attendants, ward attendants and sweepers having direct contact with T.B patients) by taking interviews from them and by personal observation. Each questionair comprised of 25 questions. The four units were audited in one day starting from first one and then visiting others numerically up to eight. At the visit permission was requested from the head officers to conduct the survey. Questions

regarding awareness about occupational tuberculosis, environmental cleaning and disinfection, hand hygiene, use of N95 and P2P3 mask, use of personal protective equipments i.e. gloves, gowns, disposal of waste materials and sharps, ventilators, prohibition of smoking areas, isolation of T.B suspects were asked. In each unit, the HCW were directly observed for compliance with hand hygiene recommendations while performing patient care. Hand hygiene facilities and the use and supplies of personal protective equipment were audited (Baqi, 2009). The use of N95 respirators as a T.B control measure was evaluated in health care setting with limited resources. The administrative control and engineering control was also assessed.

### **3.5 Data Processing**

For the present study, the data collected was processed with the help of MS Excel software. All the information was classified and tabulated according to the nature of data. MS Excel was also used to draw charts and graphs.

The risk of infection is far above the ground in health care settings as most of the workers are neglecting the personal protective equipments, most of the workers are illiterate (sweepers) and no training is provided to them. Pakistan lags in forming the rules regarding occupational health and safety measures and no action is taken by the government of Pakistan to improve it.

## CHAPTER 4

### RESULTS AND DISCUSSION

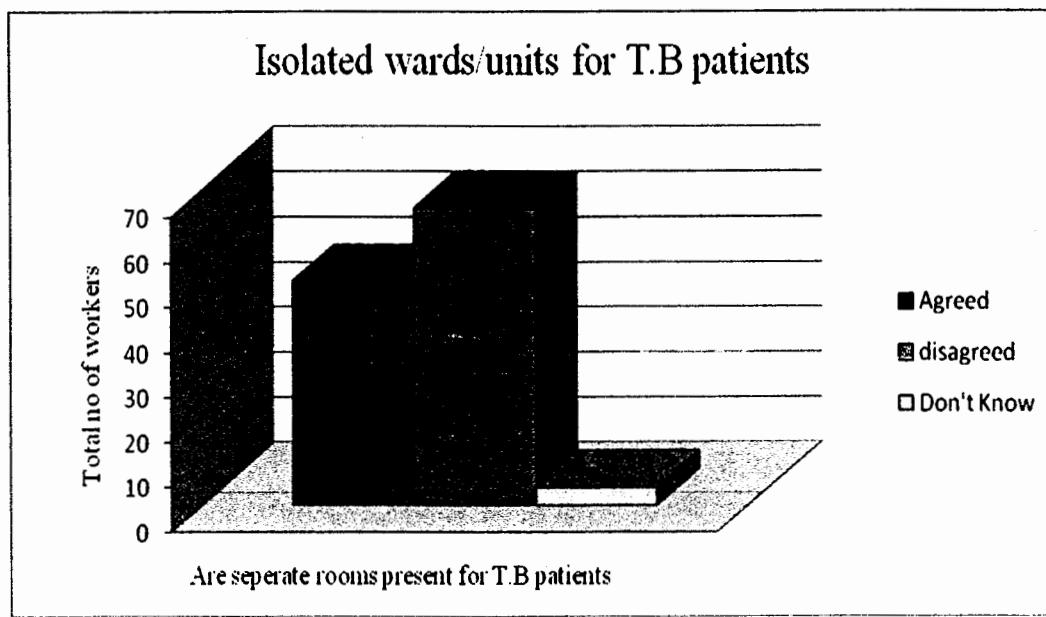
The occupational risk of tuberculosis has been recognized in health care settings over the past few years. It has been recognized that in developing countries 25% health care workers develop T.B in health care settings and the trend continues to rise. Several factors during the patient care, that facilitate the transmission of T.B, include negligence in use of personal protective equipments, lack of administrative control and engineering control. Overall 120 health care workers were interviewed encompassing 11 units from each hospital and a sample of 30 health care workers from 4 hospitals (*PIMS, Polyclinic, Holy family, and Benazir Bhutto Hospital Rawalpindi*) was interviewed. The list of corresponding health care workers is shown in table 4.1. It was observed that even the basic facilities to combat the infectious diseases are not provided by the high authorities and the workers are not satisfied with the current conveniences. The circumstances of hospitals were quite disappointing regarding TB patients care and conditions of wards. The results obtained are discussed as follow.

Position Held	Total HCW's
<b>Ward attendants</b>	10
<b>Health officer</b>	46
<b>Charge nurse</b>	12
<b>House surgeon</b>	1
<b>Patient attendants</b>	18
<b>Senior registrar</b>	3
<b>Medical officer</b>	9
<b>Sweeper</b>	4
<b>Student nurse</b>	17
<b><i>Total</i></b>	120

#### **Isolated departments and wards for T.B patients:**

All the hospitals lack isolation rooms and separate wards for T.B patients. The negative air pressure rooms and double door rooms were not available in any of these hospitals thus it was clear that the hospitals lack engineering control to combat the spread of tuberculosis. The figure 4.1.1 illustrate that 66 workers were disagreed in

having isolated wards and rooms for T.B patients, 50 workers told that separate rooms for T.B suspects were present while 4 of them don't know anything about it.



**Fig 4.1.1 Response of workers about existence of separate wards for T.B patients**

The ventilators were scarce in the wards with high burden of patients and no isolation precaution was implemented on patients having pulmonary tuberculosis. It was told by the doctors that the ventilation system should be present in health care settings although due to low allocation of budget on hospitals one can't structure the separate cabins and isolation wards but ventilators can be formed easily with less budget allocation.

#### **Awareness about occupational health**

Our study and data analysis shows that 57 % workers were not familiar with the concept of occupational health and safety measures as no one has received training regarding occupational safety and health. Except of senior staff and some doctors who

were familiar with this concept of self care during working hours. According to the personal observation and patients feed-back no protective measures are adopted by them to keep themselves safe from T.B and no one has adopted the precautionary measures in order to avoid the spread of tuberculosis when asked about any written guidelines it was found that there were no such strict instruction of "Dos" and "Don'ts" to control the spread of T.B from patients to workers and from patients to patients. But regarding the survey we dealt with the constraint of biased answers in each case. Workers were so frightened of administration that they hesitated to give correct answers. So our graphs show reasonably good percentage of awareness and use of gloves and masks.

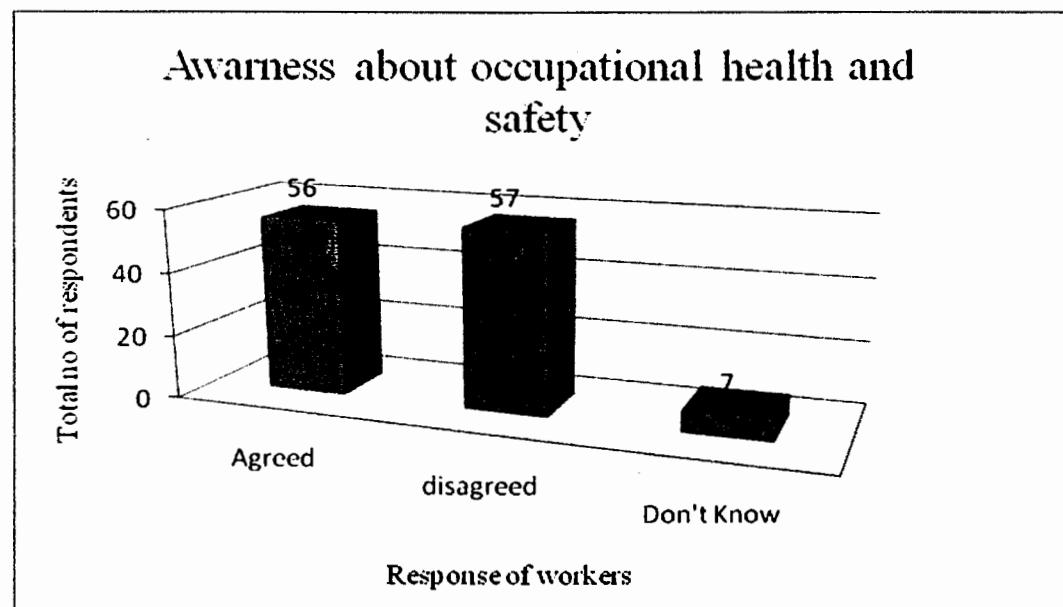


Fig 4.1.2 Awareness about occupational health and safety among workers (According to the survey)

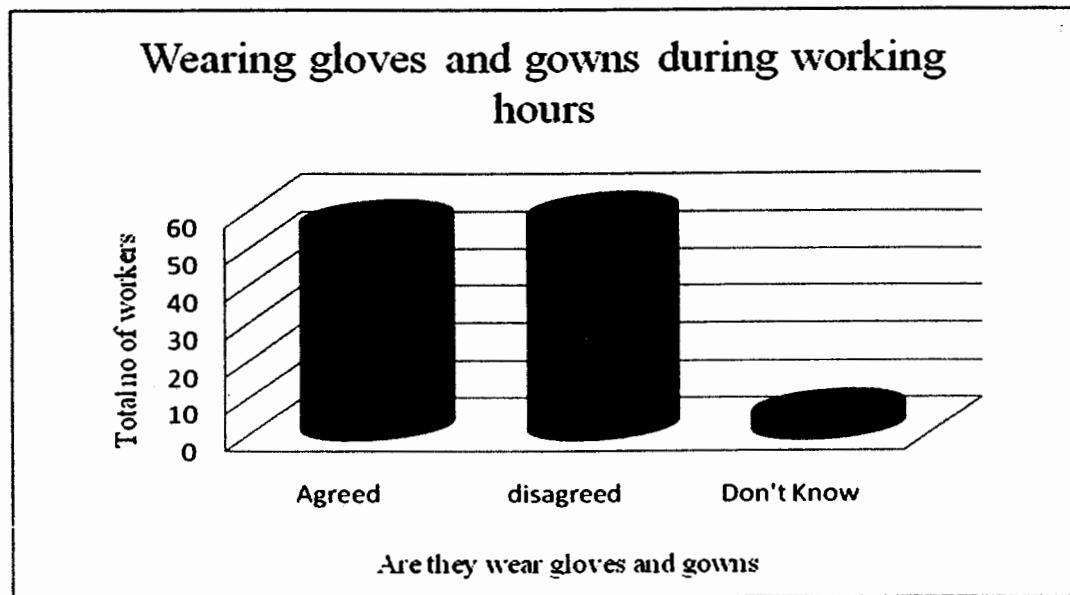
In intensive care units however workers were using the protective tools and were conscious about the health of workers and patients because it was strictly monitored

by senior doctors and high officials in this unit, while in emergency wards care is taken by the paramedical staff but no safety measure were seen in case of patient attendants and sweepers.

#### **Use of personal protective equipments:**

The units and wards lack policies regarding the use of personal protective equipments. The facilities were inadequate in this case. The workers at intensive care units and emergency wards were paying attention in the use of protective equipments while the patient attendants and ward attendants neglect the facility. When asked about the supply it was told that

- i. **Gloves:** The polythene gloves (PE) are used excessively due to having low cost while the sterile gloves are used in ICUs and in operation theaters. So the sterile gloves were present in the wards of intensive care units and to some extent in the emergency wards of PIMS and Holy Family Hospital.
- ii. **Gowns:** Not any disposable gowns were present in each hospital. The same gowns were shared between the health care workers and are washed on alternative days. Some workers use their personal gowns owned by them



**Fig 4.1.3 Response of workers in the use of personal protective equipments**

iii. **Masks:** It was reported that 92% of health care workers use sample pack while performing duty, 4% use N95 mask and same case with P2and P3 mask. But when data was cross checked through observation and feed back of patients about health care workers attitude we found that only 10% health care workers use the masks regularly.

Thus it was observed during survey that 56 workers wear gloves and gowns during working hours, 58 workers denied to wear it while 5 of the workers don't know anything about wearing gloves and gowns (majority of them consist of sweepers)

#### **Use of N95 mask**

N95 mask and P2P3 mask are specifically made to protect from the droplet nuclei exhaled by the TB patients. In areas where the concentration of droplet nuclei can't be reduced through other factors, the use of N95 masks can play an important role and can be recommended to the patients in order to reduce the risk of T.B transmission

during coughing. Because N95 filters 95% of the air borne droplets and P2P3 filters 99% of air born droplet nuclei. In these hospitals such masks were restricted to the areas having high prevalence of T.B infection and to the surgical wards.

All the 11 units ensured that the sample packs were used frequently by the workers but N95 mask and P2P3 mask for air born precaution were not present even most of the medical officers did not know anything about these masks. Most of the workers show negligence in the use of mask (sample pack) even during the duty hours and the people not using the sample pack were more as compared to those who use to wear the mask. The use of N95 mask is important as it reduces the risk of T.B transmission especially in hospitals which lack isolation wards and units.

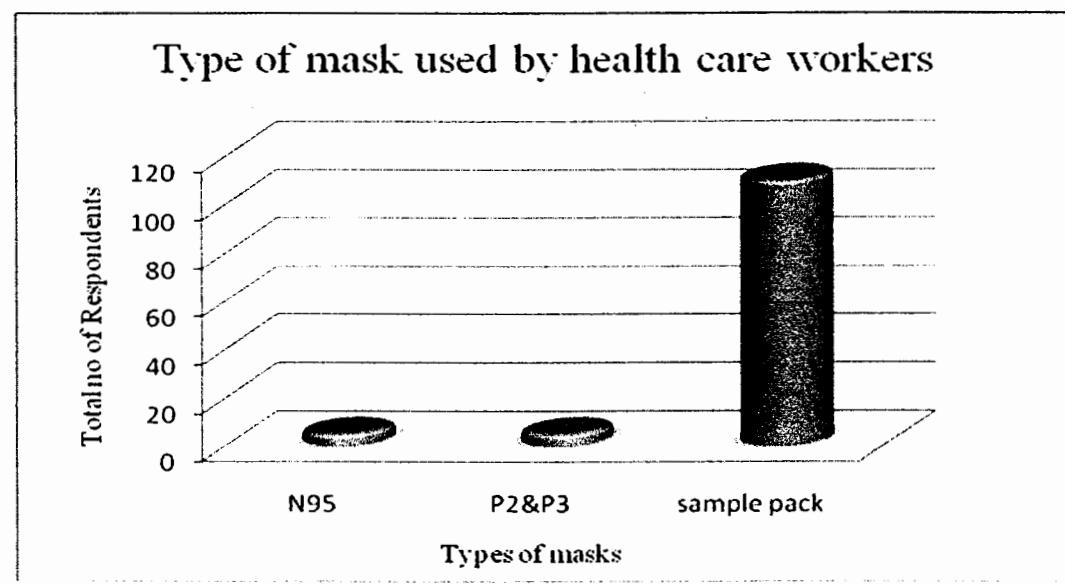
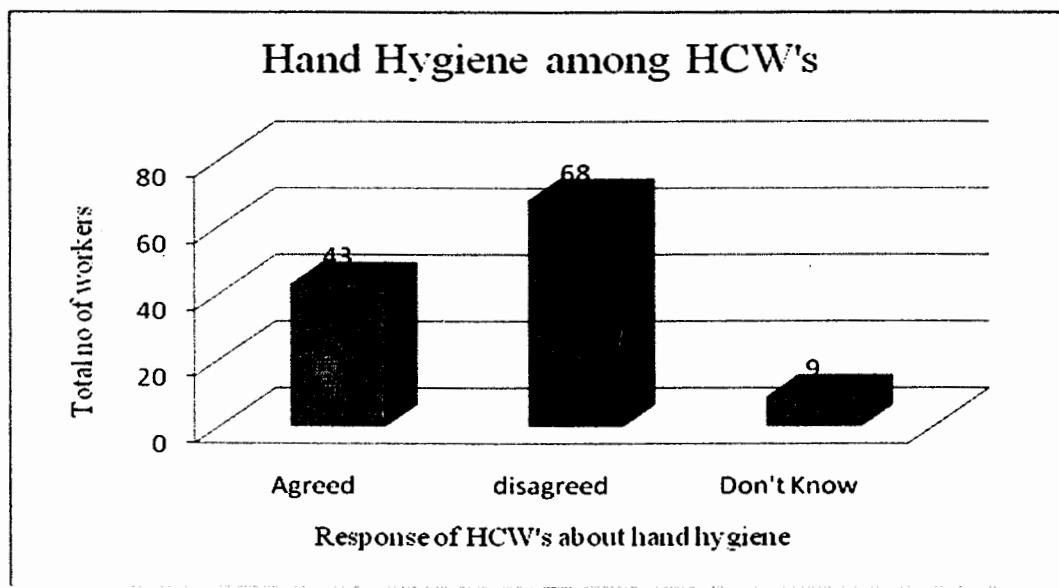


Fig 4.1.4 Types of mask used by HCW's during working hours

The figure 4.1.4 represents the response of workers in the use of masks most of the workers were aware of this type during the hours of contact with T.B patients Although it was observed that only 15% workers were using this sample pack.

### Hand hygiene

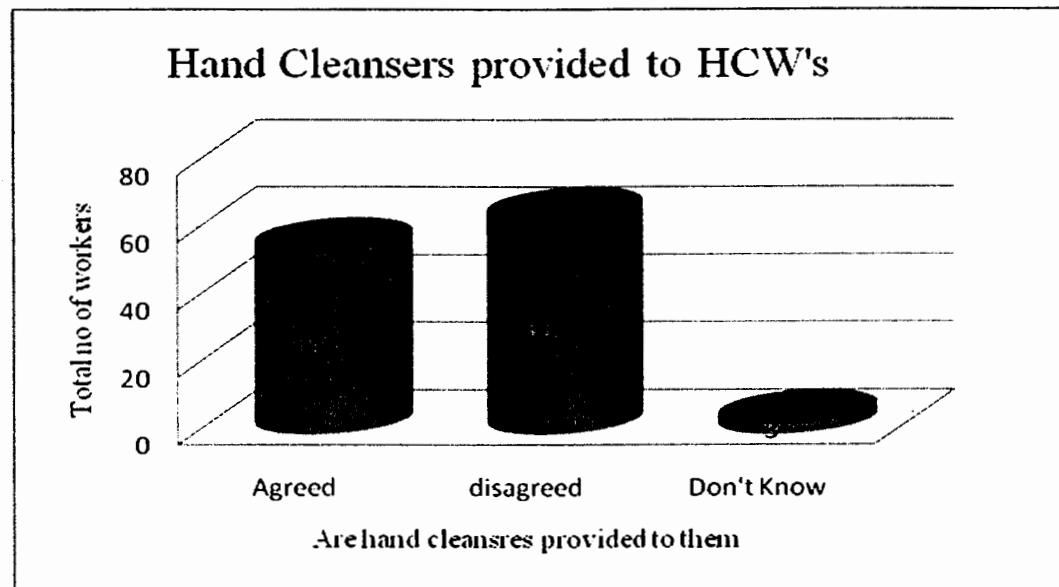
None of the units had a specific Hand Hygiene Policy however infection control guidelines were present but not followed yet. Hand washing sinks and hand cleansers were found in the emergency wards and intensive care units on direct observation of the health care workers during patient care in each unit, none of the health care workers practiced hand washing after dealing with a TB patient. Some of the wards had hand washing facilities for the health care workers but no consideration was given to such practices.



**Fig 4.1.5 Response of workers about hand hygiene**

The study reports that 68 workers don't wash up their hands as soon as they leave the patients, 43 workers used to wash their hands and 9 were unaware of it. Most of the workers wash their hands with simple water no matter which activity they have performed. According to the health care workers of Benazir Bhutto hospital, proper wash rooms for health care workers are not available and proper place to offer prayer

is also lacking in this hospital. In Poly clinic hospital the elementary step to prevent the spread of infectious diseases is lacking in the hospital that the hand hygiene facilities were not provided and that the hand cleansers or solutions were not provided to them. When asked about the supply of hand cleansers and towels it was told that 54 workers were agreed upon the supply of hand cleansers, 63 were not while rest of the 3 don't know anything about it.



**Fig 4.1.6 Hand cleansers provided to health care workers**

Health care workers were not satisfied with the hand hygiene facilities and were appealing from the Government to improve the condition of hospital.

#### **Disposal of waste materials and sharp instruments:**

In health care settings only the waste disposal practices were satisfactory in ICUs. In small hospitals i.e. Poly clinic and Benazir Bhutto hospital the waste that is collected in yellow bags were not properly covered and there was no chemicals sprayed to kill the pathogens. The needle cutters were present in every unit and ward while sharps

were disposed off in containers but the person collecting the waste was not using any personal protective equipment. It was assessed (figure 4.1.7) that 14 health care workers don't know anything about it while 39% workers told that the waste is disposed of properly and 67 workers reported that the needles and sharps were not discarded in approved containers.

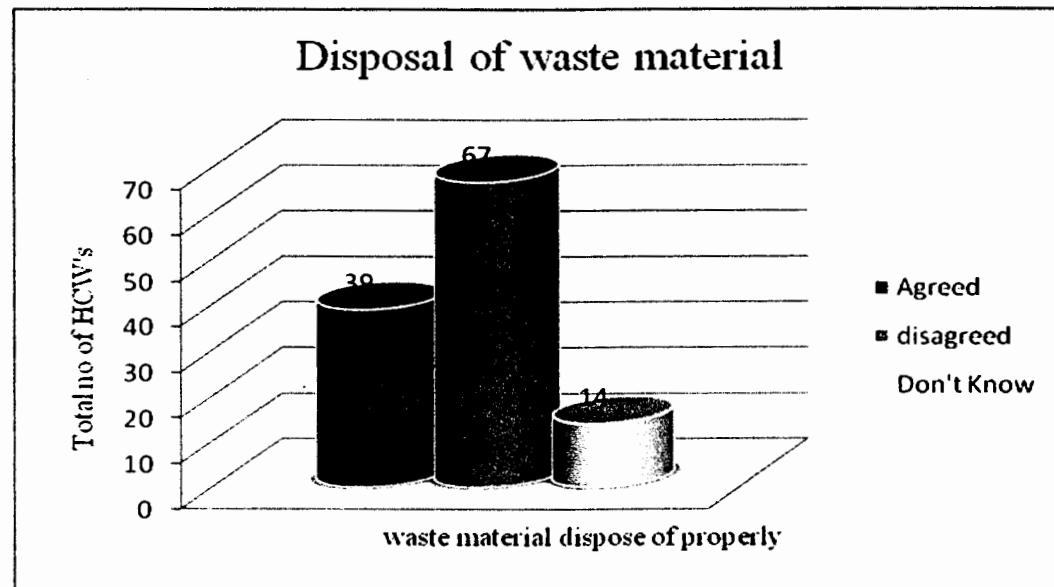
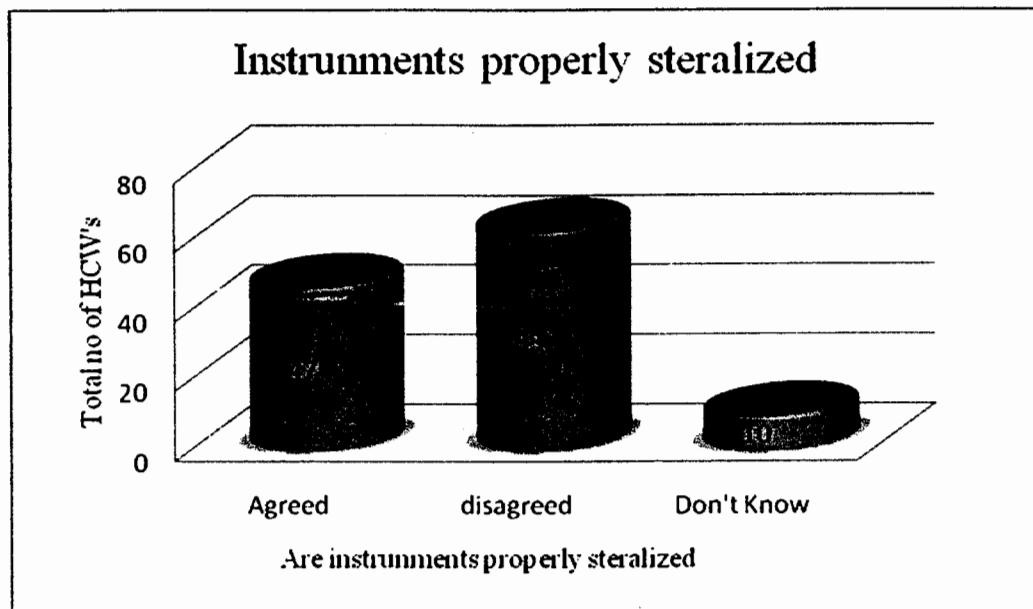


Fig 4.1.7 Response of workers about the disposal of waste material

#### Sterilization of instruments:

According to the HCW's all the instruments were properly sterilized but the thermometers were washed with simple tap water as observed and oxygen masks were not disinfected. However no proper system was present to sterilize the instruments and the ovens present to sterilize the instruments are in awful condition. In Poly clinic hospital the working environment was worst in this hospital with improper sterilization process and lack of proper provision of facilities. The figure 4.1.8

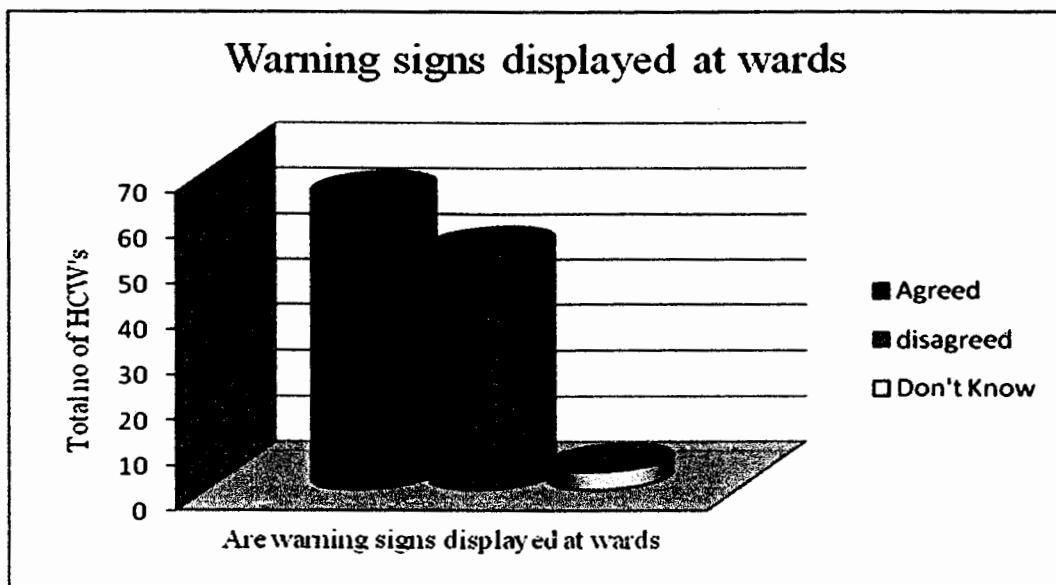
represent the response of workers regarding sterilization of instruments that 47 workers were agreed upon the proper sterilization of instruments, 63 workers were disagreed while rest of 10 doesn't know anything about it.



**Fig 4.1.8 Response of workers about sterilization of instruments**

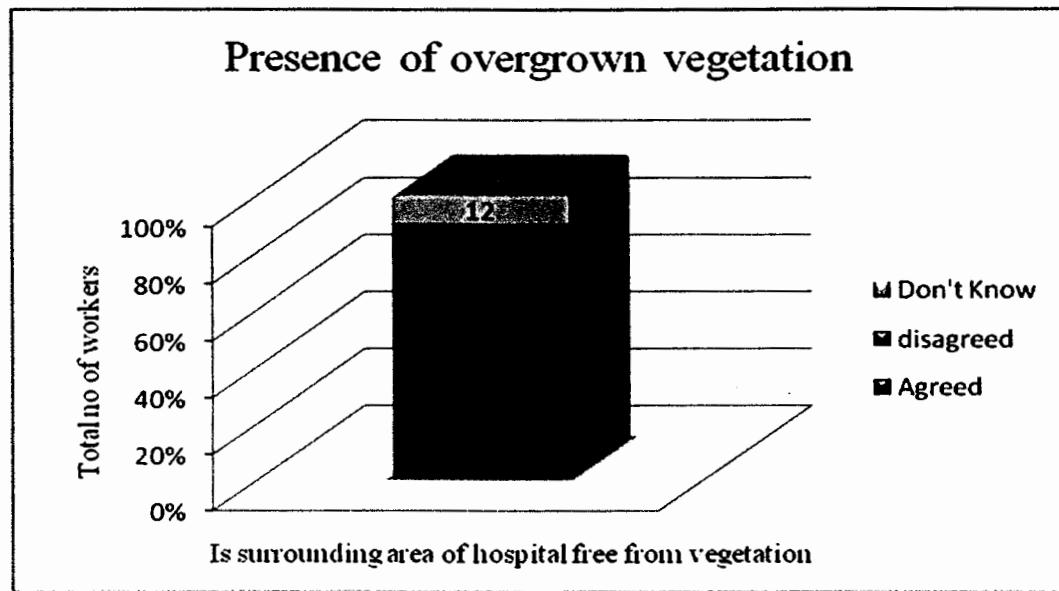
#### **Environmental hygiene:**

Environmental hygiene provides all the facilities essential for healthy environment and includes safety, environmental comfort and infection control. In health care settings environmental hygiene is one of the important dynamic to control the infection and growth of micro organisms. The conditions concerning to environmental hygiene is adequate. The floor is swept with broom and mopping was done with disinfectants regularly. Special care is taken in case of ICUs and wards but lacks proper handling of waste. The phenol disinfectants were used in most of the wards. After the discharge of patients bed covers were changed and sent to the laundry section for washing purpose.



**Fig 4.1.9 Response of workers about the presence of warning signs**

It was observed that no warning signs and notices were displayed on the areas where chances of infection may occur and that the children were also visiting the wards which is great threat for the upcoming generation as figure 4.1.9 illustrates. In holy family hospital generally the condition was much better from other hospitals in the sense that the infection control team was present which visits the wards and check the cleanliness and arrange meetings for this purpose regularly. It was noted that the hospitals were surrounded by green belts and by the over grown vegetations and animals were also present there and often chance of occurrence of wild animals is also be there. In the green belts pigs usually used to reside which acts as a vector and is a source of spreading the infectious diseases.

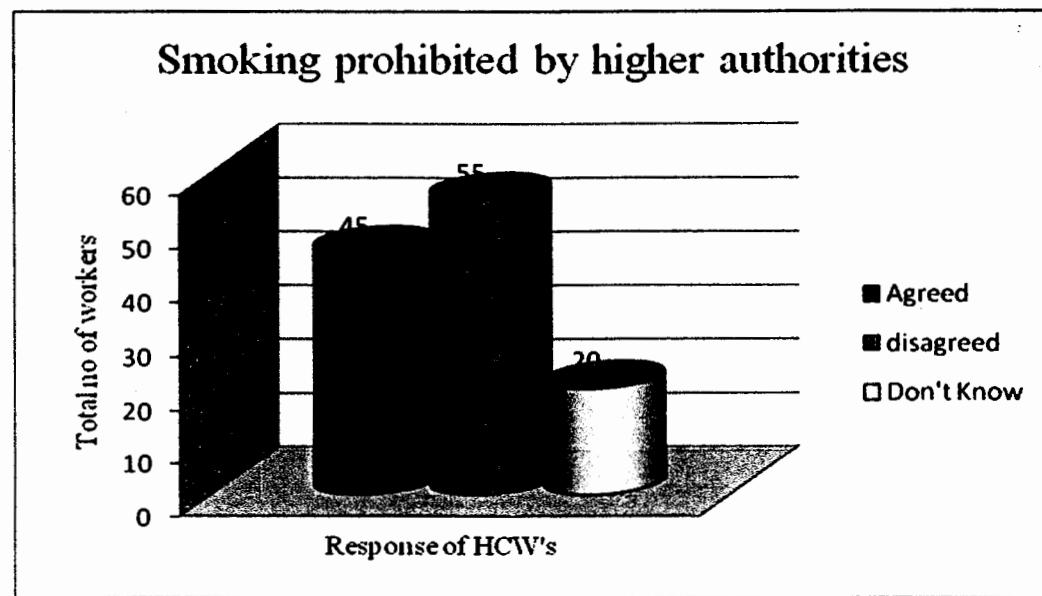


**Fig 4.1.10 Do the surrounding area is free from vegetation**

The one side of PIMS is totally surrounded by the green belt and the front area consist of overgrown vegetation. Although the presence of trees and plants provide fresh air for the surrounding area but the areas should be properle inspected that they are free from pigs and other wild animals.Cats were found in hospitals as observed and usually used to visit the wards.

#### **Prohibition of smoking area:**

The smoking was not prohibited by the high authorities in the hospitals and at the surrounding areas even people were smoking at the time and place which suits them and no one was there to ask or restrict them. The wards were full of visiting peoples and people were smoking in the wards without caring the patients and surrounding people, there is a need to restrict the smoking area by higher authorities a medical officer says.



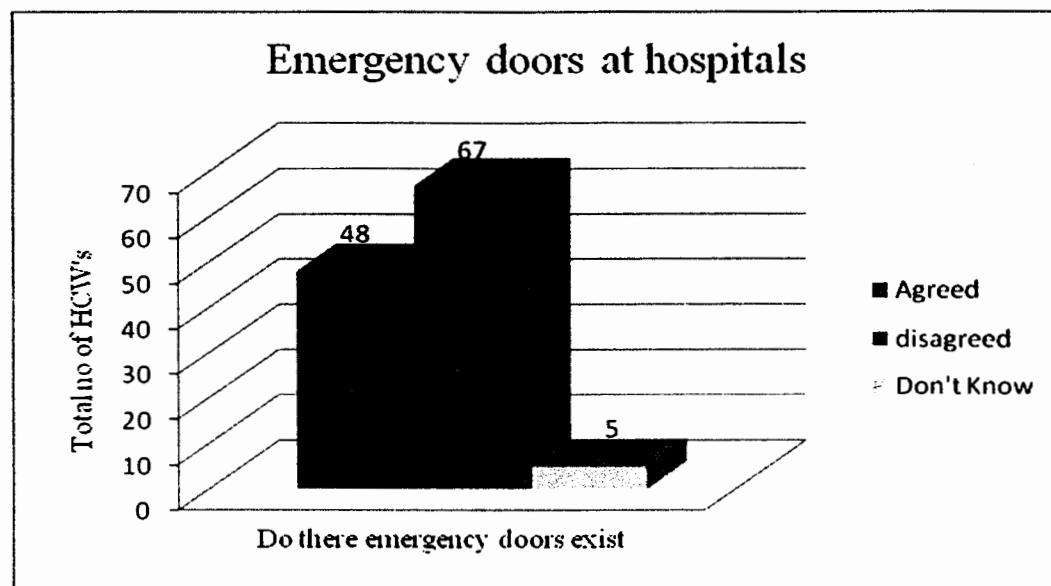
**Fig 4.1.11 Response about prohibition of smoking areas**

The figure 4.1.11 represent the response of workers about the prohibition of smoking area that 45 workers told the smoking is prohibited by high authorities, 55 workers were disagree while rest of 20 workers told that they don't know anything about it. Although rules are present to restrict the smoking but none of the hospitals are following it.

#### **Emergency doors (in case of accidents):**

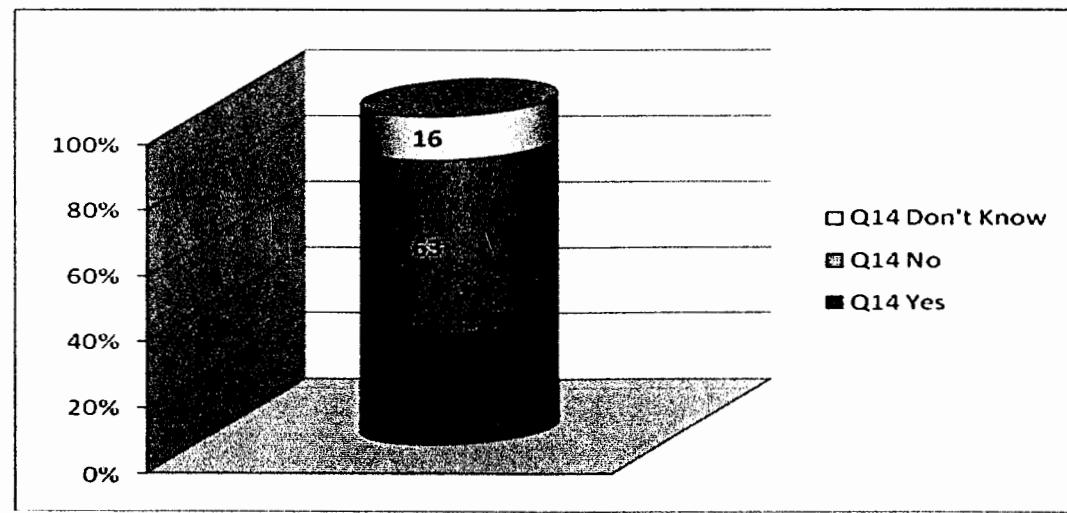
All these hospitals lack safety program regarding fire and electric safety. The emergency doors were not present in any of these hospitals and if few were present workers were not aware of it. In some cases the emergency doors were present with lock on them or the doors were present but not marked with warning signs and notices. So the presence of such doors without marking is of no concern. The response of workers was quite satisfactory in the sense that the 56% of the health workers were aware of them while 40% were not. Some of them told that the emergency doors were

not present in the hospitals. About 48 workers were in the favor of doors which are without marked signs and notices while 67 says that the doors are marked with appropriate signs and 5 don't know anything about it.



**Fig 4.1.12 Response about the presence of emergency doors**

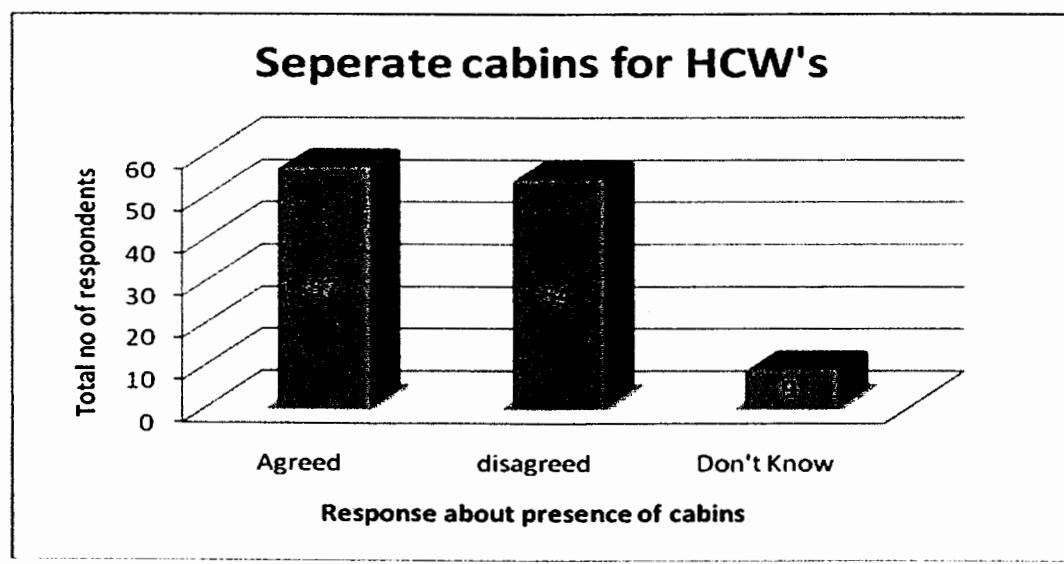
The response of workers regarding emergency doors are given above. The figure 4.1.13 shows that the health care workers were not aware of them.



**Fig 4.1.13 Response about the presence of marked emergency doors**

### Staff rooms for HCW's:

The staff rooms must be present for the workers as it provides them the comfort and the environment free from stress and noise. Such rooms must be present because these are useful for the workers to combat stress and fatigue. It was noted that the staff rooms were provided in all hospitals and other facilities for rest were also present together with attached baths and bed rooms. There present two staff rooms near wards, one is for medical officers and other is for nurses while patient attendants and ward attendants were present at reception and no rooms are provided to them. However a separate room for ward attendants and patient attendants was present in Holy family hospital and PIMS. In others conference rooms were present which act as a staff room and as a conference room, along with computers where the facility of online research was present for the doctors. Some says that appropriate sitting arrangements must be done for the working staff and an awareness scheme should be devised which help a lot to figure out this problem.



**Fig 4.1.14 Response about the presence of separate cabins for health care workers**

The figure 4.1.14 represents that 57 workers were pleased to be having separate cabins for rest, 54 workers were disagreed while 9 of the workers don't know anything about it.

**Clean drinking water for HCW's:**

Clean drinking water is an essential component to be present at places where workers are working under stressful condition. In some cases water coolers are present but the care is not taken about the cleanliness of water. In hospitals only few of the water coolers were present which were not meeting the needs of people nor of health care workers. The filters attached with water coolers were not clean and are very less in number. The quality and quantity must be ensured in case of water coolers for both the patients and health care workers. Fresh air is also an important component which plays an important role in providing relief to workers and patients, the workers feel comfortable while breathing in fresh air and the bad air comes out because of it thus making environment free from odor and microorganisms. In hospitals the lack of ventilators make environment so congested and complicated that it acts as a reservoir for the microorganisms and microbes. The aisles were so narrow and lack of proper ventilation system make it stinking as it allows no fresh air to come in. The workers were working in the environment having poor facilities. It was noted that the facilities provided to workers in PIMS were not satisfactory the health care workers work in very stressful conditions. When asked about the faculties from doctors they told that the health care workers should be provided with facilities and at least a holiday each week which will improve the care of patients.

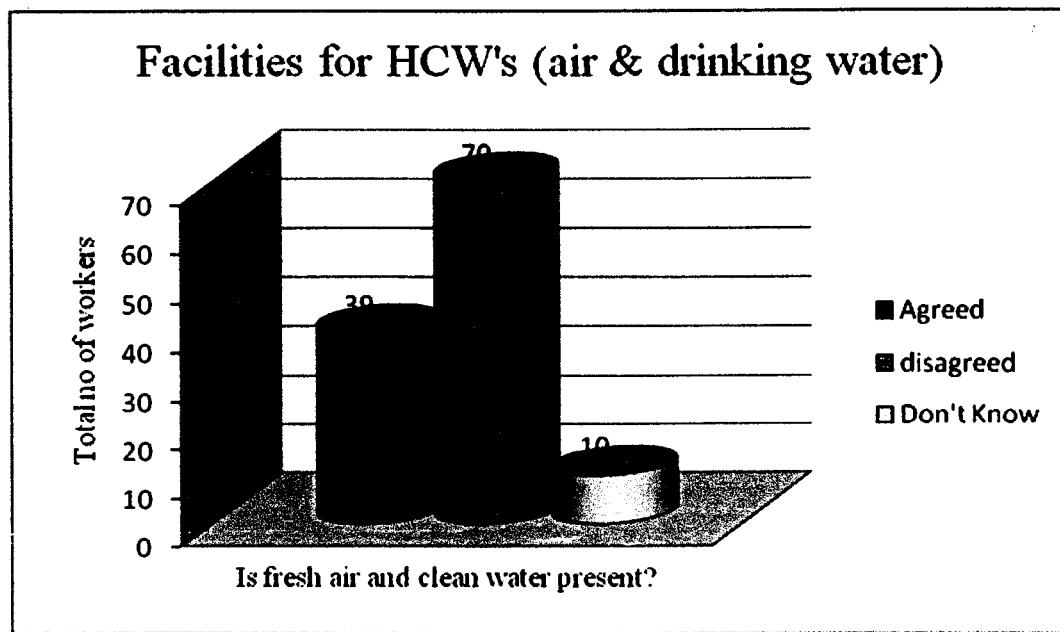
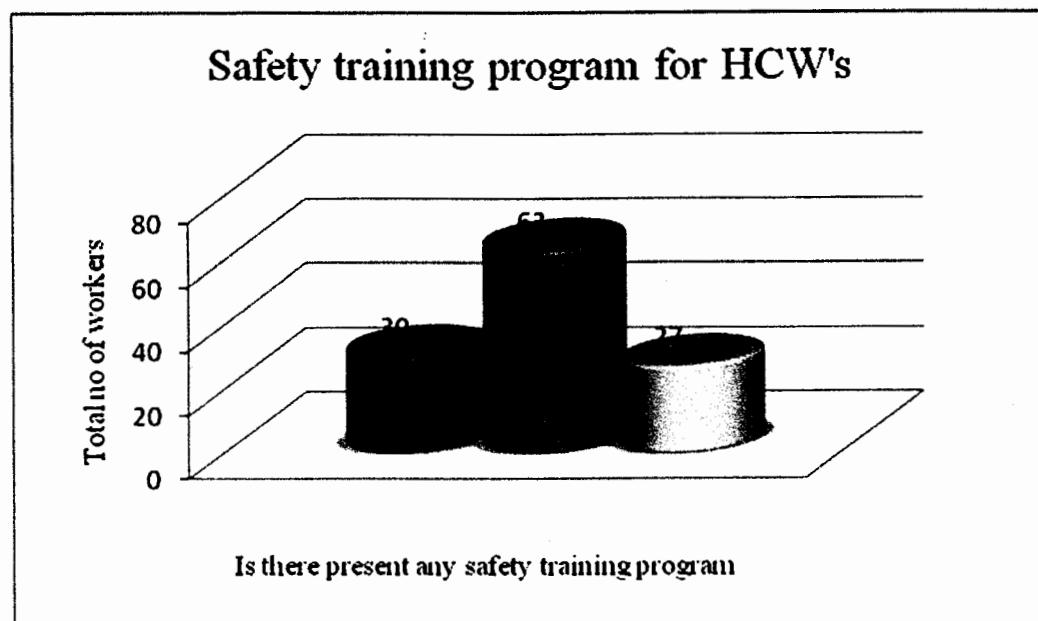


Fig 4.1.15 Do clean water and fresh air provided to HCW's

Health ministry should take immediate action in this regard to improve the condition of hospitals at least in capital city.

#### Safety training program for HCW's:

In all Government hospitals of Islamabad and Rawalpindi there held no monthly, annual and biannual safety training program for the health care workers. Majority of workers were conscious about their health especially while dealing with the patients having infectious diseases. There is a need for training program and health care workers require more education regarding occupational health and safety measures and proper measures should be taken to promote the occupational health. The response of workers about the existence of safety training program is shown in the figure 4.1.16.

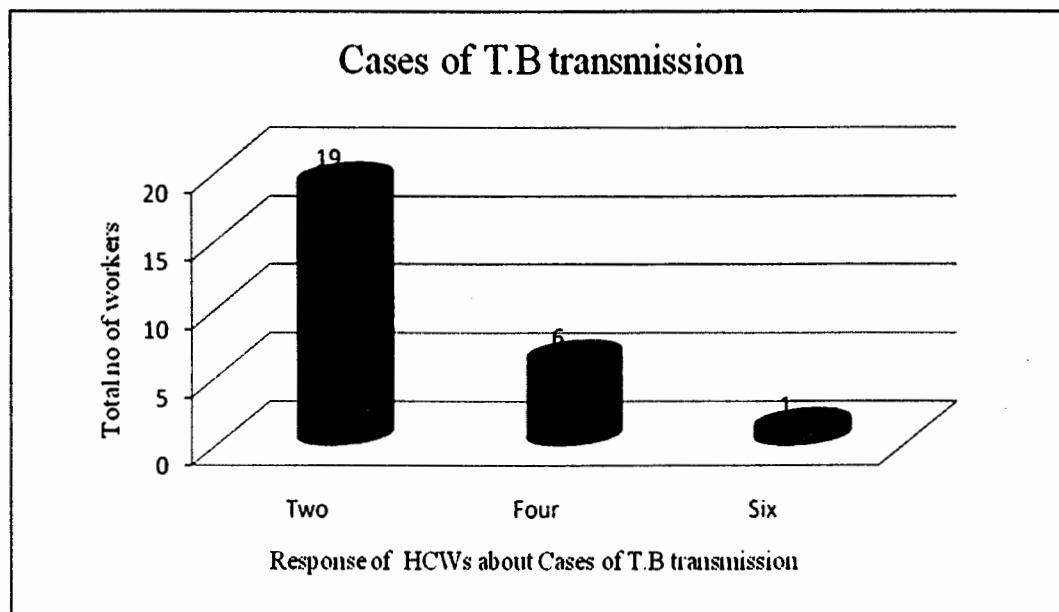


**Figure 4.1.16 Response about existence of safety training program**

It was observed that 30 workers were agreed in having safety training program, 63 workers oppose it while 27 workers told that they don't know anything about the presence of safety training program.

#### **Cases of tuberculosis transmission:**

As it is stated earlier that the government hospitals lack isolated departments and wards for the tuberculosis patients and there is no concept of negative air pressure rooms and double door rooms. The lack of these resources and other basic facilities and less awareness among people about the transmission makes them more vulnerable to the infectious disease and other chances to spread the tuberculosis in health care settings where very less consideration is given to control the diseases. It is noted that majority of workers are in favor of improving the condition and are appealing from the government to improve the condition in hospitals that can control the spread of tuberculosis by allocating more budget and investing in the health care settings.



**Fig 4.1.17 Ratio of patients acquiring T.B from nearby patients**

The spread is more in such settings because infected air is present in the wards due to lack of ventilation system and as the other patients around the tuberculosis patients also don't adopt any safety measures so the transmission of tuberculosis from patients to patients is found. The figure 4.1.17 shows the response of health care workers in the transmission of tuberculosis from patients to patients in the wards and in hospitals. It was told that 70% of health care workers were aware of the two cases in which tuberculosis is transmitted from nearby patients, 22% of HCW's told that four patients were affected and 8% were in the favor of six such cases. It was noted that the rate of tuberculosis transmission ranges from 2-8 patients per wards while most of the health care workers don't like to disclose this figure and tried to keep it confidential.

## CHAPTER 5

### RESULTS AND DISCUSSIONS

#### 5.1 Conclusion

The overall situation of hospitals regarding environmental health or occupational health and safety is not up to mark as no safety rules regarding occupational health of workers is present although according to the workers a guide lines of general prevention of infection was present but was neither been displayed nor been implemented in the four government hospitals. No Occupational health and safety committee or team was present in any of these hospitals.

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The working environment is worst and not only represents the condition of hospitals in twin cities but also represent the situation of all government hospitals in Pakistan (Baqi, 2009). The workers were working in an environment having poor facilities where the emergency facilities were barely provided. The awareness about occupational health or environmental health was lacking among the health care settings and among people of Pakistan. The working condition of government hospitals is alarming as having limited resources, lower socio-economic strata and lack of compliance with international standard. Both US and WHO has issued the guidelines to control the transmission of T.B in hospitals (MMWR, 1994., Jensen, et al. 2005., WHO, 1999) and there is a need to adapt such strategies.

Building the ventilators in health care facilities could prevent the spread of T.B and it is the most important engineering control in the prevention and control of T.B in hospitals. Moreover health care workers are in the favor of this system as it is inexpensive and effective. The ventilators can be effective only when they are constructed in the direction of air flow where fresh air can mix with ambient air in the hospitals. The air currents can transport the infected air out and allows fresh air to come in. The out flow must be such that it doesn't flow towards other patients or doesn't mix with fresh air. The engineers should be consulted for the construction of effective ventilators along with OASH requirements. Negative air pressure rooms are the other means to control it in which isolation wards or rooms are constructed and infected air is exhausted safely. As the T.B spreads through air and to protect the health care workers and other patients it is necessary to have the negative air pressure rooms. In negative air pressure rooms the exhaust air is normally filtered through a HEPA (High Efficiency Particulate Air) filter before being exhausted to the outside, where it is considered to be harmless by natural elements. In the hospitals surveyed no such facilities were present, even some of the health care workers were unaware of these terms. There is a need to allocate a lot and lot of budget on health care sector to improve the conditions and engineering control should be designed for all the government hospitals of Pakistan.

#### **Personal Protective Equipment**

Personal protective equipments are instruments designed to protect the workers in health care environment. These are the instruments or clothes especially designed to protect the

workers from infectious material (Occupational Safety and Health Administration). Personal protective equipments (PPE) are effective even in the absence of engineering control and administrative control. Their use depends upon the biological hazards and environmental conditions present in the hospitals. In the 4 government hospitals of Rawalpindi and Islamabad misuse of PPE is due to the inadequate facilities, lack of awareness, informal behavior and absence of monitoring and evaluation process etc. The health care workers should be provided with PPE and such equipments should not be shared among them. Supply of gloves and gowns must be ensured and N95 or P2-3 mask must be provided to the medical officers and specialists that remain in direct contact with T.B patients. Instruments like thermometer, oxygen masks and others are disinfected from patients to patients. It was observed that hand hygiene practice is lacking among health care workers and there is a need to improve it by providing hand cleansers and solutions to them. Program to compliance with hand hygiene must be taken in the government hospitals of Pakistan. International standards must be followed and priority is given to sterilization and disinfection of instruments. The system of immunization should be devised for the health care workers and proper screening system should be devised. Smoking should be controlled as it accounts for the lung diseases and becoming common among youth also. Tobacco control strategies must be followed and implemented even in the areas of general public to control it. Various methods to control the smoking in public and close place have been defined but no significant change has been seen.

The incidence of tuberculosis is high in Pakistan and due to the presence of limited health care facilities it is spreading among the health care workers also. Tuberculosis is the main cause of death among infectious diseases in Pakistan, it is estimated that 10% of workers from the sample of 120 are affected each year because of T.B. It carries a social stigma because it is directly linked with poverty overcrowded living condition, illiteracy, malnourishment and absence of government support. However Dots (directly observed therapy short) was devised to control the spread of T.B although none of these hospitals except Benazir Bhutto hospital has adopt the dot strategy. The guide lines "cleaner care is safer care" are also defined by World Health Organization to protect the health care workers of hospitals. Government hospitals can control the spread of T.B and occupational health of workers should be improved through the participation of hospitals in international campaigns, forming occupational health and safety administration, proper use of PPE and designing engineering and administrative control in the hospitals. Some long term planning and strategies are needed to improve the condition along with awareness campaign in public and private sector.

## References

**Baqi, S., N, Damani., S, A. Shah., and R. Khanani.** 2009. Infection control at government hospitals of Pakistan., International Journal of Infection Control, Karachi, Pakistan, 5(10):2-7

**Bolyard, E. A., Tablan, O. C., and Williams, W. N.** 1998. CDC guidelines for infection control in health care personnel., American Journal of Infection Control, New York, 26(3): 289-354.

**Damani, N.** 2005. Simple measures save lives: An approach to infection control in developing countries, Journal of Hospital Infection, Smolensk State Medical Academy, Russia, 65(S2): 151-154.

**Iqbal, N.** 2003. Curable T.B kills in Pakistan., Health and Science., Islamabad, Pakistan, [http://www.islamonline.net/servlet/Satellite?c=Article\\_C&pagename=ZoneEnglishHealthScience/HSELLayout&cid=1157962493497](http://www.islamonline.net/servlet/Satellite?c=Article_C&pagename=ZoneEnglishHealthScience/HSELLayout&cid=1157962493497)

**Jensen, PA., Lambert, LA., Ladmarco, M.F., Ridzon.** 2005. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health care settings., Morbidity and Mortality Weekly Report, United State of America. 54:1-141.

**Larson, EL.** 1995. Guidelines for hand washing and hand antisepsis in health settings., American Journal of Infection Control, APIC, Washington, 23: 251-69.

**Menzies, D., Fanning, A., Yuan, L., and Fitzgerald, M.** 1995. Tuberculosis among health care workers., New England Journal of Medicine, Montreal, QC, Canada.332: 92-8.

**Morbidity and Mortality Weekly Report.** 1994 . Guidelines for preventing the transmission of mycobacterium tuberculosis in health care facilities., Center for Disease Control and Prevention, Burlington, Connecticut, 43: 1-132.

**Morbidity and Mortality Weekly Report.** 2002. Guidelines for hand hygiene in Health -Care settings., Health care infection Control Practices Advisory Committee, Lebanon, Proehl, 51(rr-16):1-45.

**USAID.**2009.InfectiousDiseases.,[http://www.usaid.gov/our\\_work/global\\_health/id/tuberculosis/countries/asia/pakistan\\_profile.html](http://www.usaid.gov/our_work/global_health/id/tuberculosis/countries/asia/pakistan_profile.html)

**Wenger, P,N., Otten, J., Breeden, A., Orfas, D., Sague, C. M., and Jarvis W.R.** 1995. Control of nosocomial transmission of multidrug-resistant Mycobacterium tuberculosis among health care workers and HIV infected patients, Lancet, Atlanta, 345: 235-40.

**World Health Organization.** 1999. Guidelines for prevention of tuberculosis in health care facilities in resource limited settings: WHO/ CDS/TB/ Geneva, Switzerland, 99-269.



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## Annexure 1

## Assessment of Occupational Health and Safety Measures among health care workers in Govt. Hospitals of Islamabad & Rawalpindi

Name: \_\_\_\_\_

Hospital/Institution: \_\_\_\_\_

Position held: -----

Duty Shift: \_\_\_\_\_

- 1) Are you familiar with occupational health and safety?  
Yes                    No                    don't know
- 2) Are the enough ventilators present in the wards and rooms?  
Yes                    No                    don't know
- 3) Do the health care workers wear Masks during working hours?  
Yes                    No                    don't know
- 4) Which type of mask is used by HCW's?  
N95                    P2 and P3                    Sample pack
- 5) Are Gloves and gowns used by the health care workers while dealing with the patients?  
Yes                    No                    don't know
- 6) Do all health care workers including doctors wash up as soon as they leave the patient?  
Yes                    No                    don't know
- 7) Are the hand cleansers and towels provided to the HCW's?  
Yes                    No                    don't know
- 8) Does all waste material dispose off properly?



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Yes	No	don't know
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9) Are needles and other sharp materials discarded in approved containers?  
Yes                    No                    don't know

10) Are the instruments properly sterilized after dealing the patients?  
Yes                    No                    don't know

11) Are there warning signs and notices displayed at wards and concerned areas where the chances of infection may occur?  
Yes                    No                    don't know

12) Do there emergency doors exist?  
Yes                    No                    don't know

13) Are they marked with warning signs and notices?  
Yes                    No                    don't know

14) Are all HCW's aware of them?  
Yes                    No                    don't know

15) Is smoking strongly prohibited by higher authority?  
Yes                    No                    don't know

16) Are there separate cabins or rooms besides ward available to HCW's?  
Yes                    No                    don't know

17) Have HCW's access to clean drinking water and fresh air to combat the stress?  
Yes                    No                    don't know

18) Is there any action plan exist for occupational safety and health in hospital?  
Yes                    No                    don't know

19) Does there exist monthly, biannual or annual safety training programmes for HCW's?  
Yes                    No                    don't know

20) Is surrounding area of hospital free from overgrown vegetation and wild animals?  
Yes                    No                    don't know

21) Does there exist any isolated department or ward for the check up and treatment of T.B Patients?  
Yes                    No                    don't know

22) Do you think that surrounding patients are conscious from nearby patients having T.B?  
Yes                    No                    don't know



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23) Any safety measure taken by the surrounding patients and doctors in order to avoid spread of T.B?

24) Any case in which patients got T.B from nearby patients?

25) If yes than how many?

2 4 no case

## General Comments

