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RESEARCH PAPER

A Comparative Study of Hospital Waste Management at Public and Private Hospitals of Quetta City, Pakistan

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ABSTRACT

Hospital waste has potential to affect the human health, environment, community, animals even a person at home. Both infectious and non-infectious exposure to hospital waste may prove fatal for humanity. Objective of the present study is to evaluate the existing hospital waste management (HWM) practices in different public and private hospitals of Quetta city, Pakistan and comparing it to the hospital waste management rules, 2005. Findings revealed that existing practices are not up to the guidelines at every phase of the hospital waste management, from segregation, collection to final disposal. The study identifies huge gap for improvement especially in private sector hospitals. Awareness raising, appropriate training and skills, stringently following the hospital waste management rules are highly recommended for future betterment.

KEYWORDS Hospital Waste Management Rules, Hospital Waste, Private Hospitals, Public Hospitals

Introduction

Hospital waste is hazardous in nature, thus its extreme side effects to man and its environment cannot be denied (Habib et al., 2016; Tarvadi, 2018). The culture of segregating hazardous hospital waste from other municipal waste is not much common in developing countries like, Pakistan, which poses serious threat to not only man and its environment but also to the flora and fauna of the concerned community (Bokhoree et al., 2014; Kwikiriza et al., 2019; Shareefdeen, 2012). Direct and indirect impacts of mishandled hospital waste are also evident in the form of hurting with sharps, pollution (soil, water, air) and waste borne diseases etc. (Anwar & Shahid, 2021; Bokhoree et al., 2014; Kwikiriza et al., 2019; Shareefdeen, 2012)

The hospital waste often mix-up with domestic waste and handled in a very normal way (Bokhoree et al., 2014; Kwikiriza et al., 2019; Shareefdeen, 2012). Undoubtedly this practice is a persistent risk to human health and environment due to its hazardous nature (Ali et al., 2015; H. W. Anwar & Shahid, 2021; Bokhoree et al., 2014; Mukhtar et al., 2018; Shareefdeen, 2012). It not only threatened the human health and environment but also affect the whole community, animals even person at home (Bokhoree et al., 2014; Kwikiriza et al., 2019). Besides being hazardous, hospital waste may cause damages in non-infectious way too like hurting with sharps. Medical staff, janitors, patients and even visitors are at-risk to fatal effects of medical waste. (Anwar & Shahid, 2021; Bokhoree et al., 2014; Shareefdeen, 2012). The possible exposure pathways include direct contact, airborne transmission, contaminated water sources and environment. Thus not only the relevant staff but the whole community is vulnerable to this persistent risk (Shareefdeen, 2012).

Literature Review

Hospital waste is a broader term including all that waste generated by hospitals comprising infectious, non-infectious, hazardous, non-hazardous and general waste (Amin et al., 2013; Mukhtar et al., 2018). World Health Organization described this categorization as 85% non-hazardous and 15% is hazardous (this 15% further categorized as 10% non-contagious and 5% contagious) (Mukhtar et al., 2018). Medical waste is the subcategory of hospital waste including potentially infectious or hazardous waste generated at health care institutions like; hospitals, clinics, laboratories, research centers etc, during examination, diagnosis, treatment, immunization or research is included in medical waste, see fig 1 (Amin et al., 2013; Kanyal et al., 2021; Shareefdeen, 2012). Generation of hospital waste is closely linked with population growth, because growing population demands for much specialized health care facilities (Ali et al., 2017; Arshad et al., 2011; Bokhoree et al., 2014; Kwikiriza et al., 2019).

People can be affected by hospital waste both directly (by direct contact with the waste) and indirectly (through contaminated air, water, soil or effected animals) (Kwikiriza et al., 2019). Infectious medical waste is the source of spreading diseases like Hepatitis, AIDS, Typhoid etc. (H. W. Anwar & Shahid, 2021; Kwikiriza et al., 2019; Mukhtar et al., 2018) as 1980s and 1990s evident the increasing concerns of being exposed to HIV and HBV just due to medical waste (Bokhoree et al., 2014). Medical waste contains variety of plastic materials such as Polyvinyl Chloride (PVC) which has great potential of emitting toxic air pollutants e.g. carbon monoxide, particulate matter (PM), hydrogen chloride, different metals (mercury, lead, arsenic and cadmium), poly-cyclic aromatic hydro-carbons (PAHs), dioxins and furans while being improperly managed (Bokhoree et al., 2014).

Annual generation of hospital waste is over 250,000 tons in Pakistan (Anwar & Shahid, 2021). It is an estimate that each occupied bed in the hospital generates 1.35 kg waste per day (Ayub et al., 2021; Hani & Sarfaraz, 2021). Number of studies are there in Pakistan which thoroughly elaborate the hospital waste management like; Anwar & Shahid., (2021) clarified that the approach of disaster risk reduction is the best guiding principle for sustainable hospital waste management in Pakistan. Hani & Sarfaraz., (2021) identified gaps at every phase of hospital waste management in Pakistan; collection, segregation, storage, transportation, treatment and disposal. Ayub et al., (2021) checked out the doctor's perception regarding hospital waste management in the Ghurki Trust Teaching Hospital Lahore. Alvi et al., (2021) surveyed four public hospitals of Gujranwala city and checkout the awareness of waste management among the doctors, nurses, sanitary workers and paramedical staff. Anwar et al., (2013) targeted sanitary workers of eight major public and private hospitals of Faisalabad city to find out their level of awareness regarding hospital waste management. There are numerous studies which thoroughly observed the implementation of the HWM rules 2005 in different cities of Pakistan (Ali et al., 2017, 2015; Amin et al., 2013; Arshad et al., 2011; Kumar et al., 2010; Mukhtar et al., 2018; Rasheed et al., 2005). In line with these studies, present study also made an attempt to find out the current status of HW Management Rules, 2005 in Quetta city in the form of identifying the existing hospital waste management practices during collection, segregation, storage, transportation, treatment and disposal in selected public and private hospitals of Quetta city. So that a comparative approach provides a thorough guideline to understand the implementation of the said rules and existing gaps to the sustainability. The study is different from other works in a sense that, to the best of author knowledge, public private comparative study on hospital waste management only in Quetta city is lacking. This comparative analysis is the actual novelty of the study.

Material and Methods

Study Area

Quetta city is selected as study area as it is the provincial capital of Balochistan province. According to census 2017 the population of Quetta city is 2.26 million whereas the total population of Balochistan is 12.34 million. City is the center of urban services including healthcare facilities. People from all over the province and even from Afghanistan approach this capital city for healthcare amenity. About 378 tons of solid waste is generated on daily basis in Quetta city, out of which only 51-69% waste is collected while the remaining proportion is left unchecked (PESA, 2015). Both public and private healthcare facilities are serving in the study area. Details are in Table 1;

Table 1
Public and private healthcare institutional infrastructure in Quetta city

Public sector	Private sector
7 hospitals (bedding strength is 2,243)	49 hospitals (bedding strength is 1,592)
3 Rural Health Clinics (RHCs)	2 Maternal and Child Health Clinics (MCHs)
30 Basic Health Units (BHUs)	None
9 Civil dispensaries	None
16 Mother and child healthcare centers	None
1 TB clinic	None

Source: (PESA, 2015)

Study Design

This is descriptive and cross-sectional study on hospital waste management in selected public and private hospitals in Quetta city. A comprehensive study was conducted from August to October, 2022 in two public and five private hospitals in Quetta. All of these hospitals are located in residential area of the city and are well known to common people.

Data Collection and Analysis

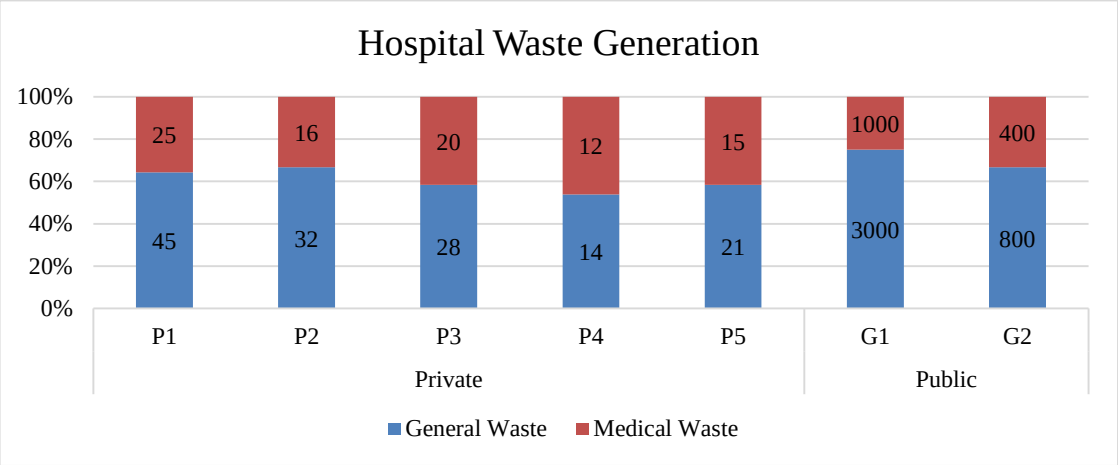
Prior to the data collection, some legal formalities are followed by the author, like getting ethical approval from the author's institution and necessary permission approval from concerned hospital administration. Data regarding hospital waste management is collected through structured questionnaire, prepared in the light of Hospital Waste Management Rules (HWM), 2005. This questionnaire comprised of questions regarding general information of hospital waste, its collection, storage, transportation, treatment and disposal practices which are currently in practice. Structured questionnaire is filled during face to face interview from the personnel directly related to hospital waste management (e.g. head of the hospital, waste management officer or member, head of the hospital administration). Besides this questionnaire, site survey and field observation also assist the researcher simultaneously. Collected data were then analyzed through MS Excel and SPSS.

Results and Discussion

There is comprehensive guidelines available at international, national and provincial level for sustainable and environmental friendly hospital waste management. Study tries to highlight the hospital waste management practices in both public and private hospitals, made a thorough comparison and then gaps and deficiencies brought to the front for further improvement. As per data provided by the hospitals and researcher's observation, major findings are:

Hospital Waste generation

Waste generated at hospital can broadly categorized as general waste and medical waste (Ali et al., 2017). Each hospital; public and private, asked about the general and medical waste generation in their hospital premises. Findings revealed that in each hospital, general waste production exceeds to medical waste, as stated by Amin et al., (2013). But due to hazardous and contagious nature, the handling of medical waste is really challenging. On an average, public hospital generate 71% general waste and 29% medical waste whereas the similar figures for private hospitals are 60% and 40% for general and medical waste respectively. Overall waste generation in public hospitals is greater than private hospital, this finding is in line with (Mukhtar et al., 2018). Fig.1 shows every single hospital waste generation (general and medical waste) in kg/day.



*All the figures show waste generated in Kg/day. "G" and "P" are abbreviated as "Government" and "Private" hospitals

Fig.1 Hospital Waste Generation in Public and Private Hospitals in Quetta city (Source: Survey results)

Hospital Waste Management Team and Plan

The response regarding waste management team and plan is much positive in both public and private surveyed hospitals. But during face to face interview and field observation, it was evident that this team was not in accordance to the team suggested in the HWM rules, 2005. Half of surveyed public hospital response is according to the rules, their waste management team comprised of bio-medical engineer, pharmacist, pathologist, waste management officer etc. but other public and all private hospitals consider janitors and their supervisory staff as waste management team. Findings are in line with (Ali et al., 2015) which states that no private hospital have designed their waste management team. Number of the team members show this fact clearly, that highest no of team members in private hospitals is only four. Same is the case with waste management plan, all public and private hospitals respond that they have well maintained waste management plan, but this plan is only limited to assigning duties to the janitors, marking the waste collection shifts and handing over the collected waste to Municipal Corporation Quetta (MCQ). Waste management plan is also not in accordance with the HWM rules, 2005. Plan revision and updating only include changes in waste collection timings, staff and their shifts.

Hospital waste segregation and collection

Responses of both hospitals are much positive regarding waste segregation. But during field visit, author hardly seen any color coded bags or container for waste segregation as prescribed in HWM Rules, 2005. Similar finding are reported by Ali et al., (2015) and Amin et al., (2013). Hospitals are using local polythene bags which are liable to damage or tear easily. Similarly, using personal protective equipment (PPE) is common in both hospitals. It includes leg protector, face mask, gloves, although the hospitals were much optimistic while responding to this query, but researcher hardly seen the sanitary workers equipped with these PPEs. They wore pervious gloves and mask, this finding is in line with (Kumar et al., 2010). One of the public hospital (50%) collect their waste on weekly basis, all other public and private hospitals daily collect waste, as recommended in HWM Rules. Waste from each ward and room is collected shift wise in each hospital. Usually waste is collected in two or three shifts (morning, afternoon and night shifts) according to the decision taken by hospital administration. Insufficient staff is a common problem of both public and private hospitals. Besides one public (50%) and one private (20%) hospital, all other hospitals are lacking enough staff for not only collecting, but managing the hospital waste. Hospitals administration (either public or private) is much optimistic while providing data, but real situation is not much satisfactory. They responded that properly segregated data is collected and handed over to the MCQ. But this proper segregation is totally missing throughout the field visit. Similar findings are observed by (Ali et al., 2015; Anwar et al., 2013; Kumar et al., 2010), highlighting the lack of awareness and training of staff about proper segregation at the point of production as a basic reason behind this practice. Alvi et al., (2021) reported the fact that most of the time hospital staff perceive the segregation as an extra workload, and not follow the proper guidelines.

Hospital Waste Transportation, Treatment and Disposal

For onsite transportation, public hospitals have vehicles as their land area is much larger than the private hospitals. In private hospitals, janitors or sanitary staff manually transport the bag filled with waste to the point where it is handed over to the MCQ, similar finding is observed by (Ali et al., 2015). Unsafe transportation is evident in both sectors hospitals as reported by (Anwar et al., 2013). According to the rules, transportation of waste must be properly documented by mentioning day, date, ward no. hospital name etc on the bag or the container, this practice is also followed by one public (50%) and three private hospitals (60%). Waste treatment is strongly suggested in HWM Rules, 2005. As the treatment processes may successively reduce the hazardous nature of medical waste. But not a single hospital either public or private is following this. Unsegregated hospital waste is handed over to the MCQ. One public hospital has the facility of incinerator, as in accordance with the finding of (Kumar et al., 2010), that single incinerator incinerate not only the waste which is generated in its premises but also the waste produced in other hospitals too.

Other Hospital Waste Practices

There is extreme need of raising awareness and providing necessary skills and training to the hospital staff regarding the severity and management of hospital waste. Training, skills and refresher courses are strongly suggested in HWM Rules, 2005. But this practice is followed by 50% of the public and 40% of the private hospitals. Developing contingency plans for waste management in emergency situations is recommended in rules. These contingency plans provide alternative solutions when usual waste management practices could not be followed. Only one public (50%) and one private (20%) hospital design this plan for their hospitals. Waste minimization and reuse is the most significant practice suggested in HWM Rules, 2005. This practice may reduce the cost, labor and resources throughout the other stages of waste management; collection, segregation, transportation and disposal. But not a single hospital is following this practice. Health

department on and off visit hospitals for inspecting ongoing hospital waste management practices. They impose fines and penalties on violating the rules. All these findings are summarized in table 2.

Table 3 depicts detailed comparison of public-private hospital waste management practices with the national guidelines of Hospital Waste Management Rules, 2005. This thorough comparison clarifies the existing hospital waste management situation in public and private sector hospitals, so, developmental gaps for future betterment may be brought on front. After defining essential terms used in the rules, guidelines bounds every hospital for managing its waste and constitute waste management team, comprising of medical superintendent, heads of all hospital departments, pharmacist, radiologist, hospital engineer, head of sanitation and administration, any public representative etc. According to the rules, this waste management team is responsible of developing, revising, monitoring, implementing and updating the waste management plan. Findings of the study revealed that most of the public and all private hospitals did not have this team.

Rules clearly mention the responsibilities of each and every member of waste management team. According to the rules, waste management officer is responsible for preparing waste management plan keeping in view the national and international environmental standards. This plan consists of allocating enough staff for waste management, estimating and allocating the finances for different waste management activities, designing waste collection timetable, developing waste treatment and disposal methods and contingency plans for emergency situations. Rules suggest that waste management team should monitor, review, revise and update this plan regularly. In public and private hospitals of study area, this WM plan is just limited to waste collection and handing over this collected waste to the MCQ. Other waste management activities are totally overlooked in this plan. Rules directed to segregate the hospital waste into risk and non-risk waste. Different color coded waste bags or containers are suggested for different waste types; yellow bag for risk waste and white bag for non-risk waste. This risk waste includes various medical waste types like sharps, chemical, pharmaceutical, radioactive waste etc. This practice of waste segregation is not followed in true sense by the surveyed hospitals. Common polythene bags are in use for waste collection, and risk and non-risk waste is often mixed up.

Guidelines regarding waste collection includes; specified waste collection schedules per day, proper use of PPEs by sanitary staff and sweepers, proper labelling of waste bags indicating point of production, ward, hospital name and type of waste. Studied hospitals follow the specified waste collection schedules as per shifts. Using of PPEs and labelling of the waste bags are not in practice as prescribed in the rules. In both public and private hospitals violation of these instruction are clearly observed.

Rules described waste transportation in two ways; on-site transportation and off-site transportation. For on-site transportation of waste, specialized trolley is suggested in the rules, which must be of three or four wheeled, free of sharp edges and easy to load and unload. The risk and non-risk waste must be collected and transported in separate trolleys. The collection route should be most direct one from point of collection to final designated area. The off-site transportation is the responsibility of local council. The transportation of waste must be properly documented by mentioning day, date, ward name, waste type, hospital name etc. Both public and private surveyed hospitals are following these recommendations of the HWM Rules, 2005 except the waste transporting documentation. Public hospitals owned such specialized trolleys/vehicles for on-site waste transportation within the hospital premises, whereas private hospitals, due to smaller land area and absence of central storage facility, does not need this practice. They transport the waste manually to the point where it handed over to the MCQ. The off-site transportation of public sector hospitals are also done by MCQ. Difference is because of availability of central storage facility within the hospital premises. This facility is linked with land area, as public hospitals

are built on comparatively larger land area than private hospitals, so enough space is available for managing central storage facility within hospital premises. HWM Rules clearly mention that this storage facility is only for storing risk waste. Time limit for storing waste is twenty four hours.

Different guidelines are available for storing different type of medical waste like; radioactive, chemical waste. These waste storage guidelines are followed by public hospitals. Rules highlight the significance of type and nature of hospital waste while deciding about waste disposal method. Disposal method should be in accordance with national environmental quality standards. Environmental examination in terms of environmental impact assessment report is mandatory for each hospital waste disposal method. Incineration, landfilling, encapsulation or any other chemical, thermal, irradiational or filtration process may consider for disposing the waste. In the surveyed hospitals, only one public hospital is facilitated with incinerator, with proper approval of provincial environmental protection agency. All other public and private hospitals handed over the waste to the MCQs for final disposal. Before waste disposal, waste treatment process is also recommended for reducing the reactive nature of compounds present in the waste and render it safe. But this is not practiced in any hospital regardless public or private. Similarly waste minimization and re-use may act as an essential guideline for avoiding the waste production reported in HWM Rules, 2005, but this recommendation is also not followed by any hospital. Strict inspection of hospitals and disposal sites is suggested in the said rules, for which a health officer is authorized. Similarly Hospital Complaint Scrutiny Committee and Hospital Waste Management Advisory Committee are suggested for periodically monitor, review and revise the said rules, and made all the possible ways to ensure the effective and sustainable hospital waste management practices throughout the country.

Table 2
Hospital Waste Management Practices in Public and Private Hospitals of Quetta

Hospital Waste Segregation and Collection							
Hospitals*	**G1**	**G2**	**P1**	**P2**	**P3**	**P4**	**P5**
Waste Collection frequency	Weekly	Everyday	Everyday	Everyday	Everyday	Everyday	Everyday
Waste Collection timing	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Staff Sufficiency	No	Yes	No	No	Yes	No	No
Segregated Waste Collection	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Color coded bags/container	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Using Personal Protective Equipment	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hospital Waste Transportation, Treatment and Disposal							
Segregated Waste Transportation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Documentation of Waste Transportation	Yes	No	Yes	No	No	Yes	Yes
Waste Treatment Facility	No	No	No	No	No	No	No
Method of Waste Disposal	Incineration	MCQ	MCQ	MCQ	MCQ	MCQ	MCQ
Other Hospital Waste Practices							
Staff Training Regarding HWM	Yes	No	Yes	Yes	No	No	No
Contingency Plan for Emergencies	No	Yes	Yes	No	No	No	No
Waste Minimization and Re-use	No	No	No	No	No	No	No

Inspection Of Management Practices	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly	Monthly

*here "**G**" is abbreviated as "Public" and "**P**" is "Private"

Source: Key informant interview

Table 3
Comparison of public and private hospital waste management practices with Hospital Waste Management Rules, 2005

Practices	Recommended practices	Public hospital Practices	Private hospital Practices
Waste Management Team	Comprises of chairperson (MS of the hospital) and other members (experts of different specialties like radiologist, pathologist, pharmacist etc.)	Full fledge team is working in half surveyed hospitals	Waste management team comprises of only sanitary staff, including sweepers and sanitary workers
Assigning responsibilities to waste management team	In written form	Both oral and written form	Both oral and written form
Frequency of waste management team meeting	At least once in a month	Once in a month	Not in practice
Waste management plan	Prepared by hospital, approved by waste management team, and shall be based on international practices inconsistent with EP Act	Not in its original form; considering HWM rules, 2005	Not in its original form; considering HWM rules, 2005
Monitoring, reviewing, revision and updating HWM plan	Responsibility of hospital waste management team	Not practiced in prescribed way	Not practiced in prescribed way
Waste collection timetable	Proper timetable for each ward and department	Waste is collected shifted wise	Waste is collected shifted wise
Availability of contingency plan for waste storage and disposal	For the time of emergencies, and avoidable circumstances	Not practiced in prescribed way	Not practiced in prescribed way
Training programs for sanitation staff	Strongly suggested	rarely followed	rarely followed
Training program for other hospital staff	Strongly suggested	Organized sometimes	Organized sometimes
Segregation of hazardous and general waste	Just at the point of generation	In practice but sometimes staff do not follow the guidelines for which ward incharge is responsible	In practice but sometimes staff do not follow the guidelines
Usage of different color bag / container for different waste type	Yellow color bag and container for hazardous waste and white color for general waste	In practice but sometimes staff doesn't cooperate	Color coded waste bags are in use but not in all private hospitals
Labelling of waste bag	Labeling the point of production, ward, date, hospital name and contents	Half surveyed hospital is doing so but not the all	Some hospitals are doing so but not the all
Wearing protective clothing	Mandatory for sanitary staff and sweepers	Not practiced in prescribed way	Not practiced in prescribed way

Frequency of waste collection	At least once daily	Shift wise collection	Shift wise collection
Cleaning of container	Removal of waste bags and container immediately and cleaning of container for further use	Removal of bags is in practice but not the cleaning on regular basis	Removal of bags is in practice but not the cleaning on regular basis
Type of vehicle for on-site waste transportation	Trolley which is free of sharp edges, easy to load and unload, stable three or four wheeled design with high sides	Trolleys with lid is used for on-site transportation	Not needed as there is lack of central storage facility. Waste is stored in larger waste bags
Separate transportation of hazardous and general waste	Highly recommended along with marking with corresponding colors	hazardous and non-hazardous waste is transported separately	hazardous and non-hazardous waste is transported separately
Availability of central storage facility	Only for hazardous infectious waste prominently displaying the biohazard symbol	within the hospital premises	Not available
Keeping waste in central storage facility	Not more than 24 hours	Waste is stored here for 12 hours	Not in practice
Off-site waste transportation	Responsibility of local council	Health department and municipal corporation Quetta is responsible for it	The transportation facility/vehicles are provided by MCQ
Documentation of waste transportation	Proper documentation including the consignment note from the collection point to the destination is necessary	Practiced in selective hospitals	Practiced in selective hospitals
Waste treatment before final disposal	Important for inactivation or rendered safe	Not practiced in prescribed way	Not practiced in prescribed way
Hospital waste disposal method	Incineration, landfill or any other approved method	Incineration in 50% public hospitals	Hospital waste is handed over to the Municipal Corporation Quetta
EIA report of the disposal method	Mandatory from provincial environment protection agency	In practice due to availability of incinerator	Not in practice
Waste minimization and re-use	Avoid overstocking of date limited products, return the unused stuff and Sterilization process is recommended for reuse	Not practiced in prescribed way	Not practiced in prescribed way
Frequency of inspection	Health officer inspects not only hospitals but disposing sites too	It is not scheduled. At least twice in a month health department may visit	It is not scheduled. Health department may visit any hospital anytime

Source: Survey data

Conclusion

Quetta is the provincial capital and hub of the urban amenities for the whole province. There should be strong network of healthcare facilities to support the huge number of patients. Unluckily, situation is contradictory. Hospital waste management

practices in different public and private hospitals of Quetta city are not according to the set rules. At every phase of waste management; from collection to final disposal, violation of rules has been observed. Situation is worst in private hospitals as compared to public.

Waste management team and waste management plan is poorly handled which should be top priority of the hospital administration. Waste segregation, color coded waste bags and container, specialized vehicles for waste transportation, waste treatment before final disposal and waste minimization and reuse are those areas which needs much attention and improvement in all the hospitals of Quetta city. Lack of awareness, training, ignoring the environmental concerns while disposing and treating the hospital waste, proper budgeting & financing for waste management activities are some key factors behind the poor condition of hospital waste management in the city.

Study strongly recommends self-sufficient hospital waste management system for each hospital individually. It means beside totally relying on Municipal Corporation Quetta, hospitals should incorporate the safe, cheap and easy means of handling hospital waste at each stage of the waste management (from generation to final disposal) on their own. Some of these means may include; Ensure waste segregation just at the point of production, awareness raising in the form of introducing refresher courses, training and skills among the hospital staff regarding adverse effects of hospital waste, design contingency plan for emergency situation, initiate waste treatment before final disposal and most importantly pay due attention to waste minimization and reuse, as it is the best strategy to avoid the generation of hospital waste in bulk. Additionally Hospitals should be quite larger that central storage facility may occupied within the hospital premises.

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