

## A Study on Hospital Waste, Quantity, Composition, Disposal and Its Management in District Quetta

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### **Abstract:**

*Hospital waste includes biological and non-biological waste which needs proper handling. The main objectives are to find out the total hospital waste generated from two government hospitals, its management and disposal mechanism. This research work is quantitative and qualitative in nature. The study is focused on two public hospitals i.e. BMC and Civil hospital. Total quantity of waste*

*generation and its composition is obtained through different questionnaires. Disposal methods, composition and management of solid waste are also observed. The data is collected from 27 departments in which 19 departments are selected from BMC and 8 from Civil hospital. There are totally 59 respondents in which two respondents are medical superintendent, two from management staff and 55 doctors, nurses and wards boys are from different wards of different departments. Regarding the question about segregation of hospital waste at hospital 85.5% respondent said yes, they segregate waste into different categories in hospital, 14.5% replied it no. About the question regarding safe disposal of liquid waste 72.7% respondents said yes, there was safe disposal of liquid waste but at the other hand it was observed that the liquid waste is directly drain to municipal liquid waste. Both hospitals generate 870kg waste per day and 6090kg waste per week, only 100kg waste per day are incinerated. The recycle wastes are solid in market by government employers and remaining waste is dumped in the premises of hospital. It is concluded that BMC and Civil hospital are operational in the town thus leading to environmental problem.*

**Key words:** Biological Waste; Environmental Hazards; Hospital Waste Management; incineration; Infectious Waste; Inorganic Waste; Organic Waste; Pollutants; Safe Disposal; Segregation

## **INTRODUCTION:**

In hospitals patients are treated, their diseases are diagnosed and treated. During all the process of treatments the solid waste is generated and that is unavoidable. The solid waste generated is called as hospital waste which is discarded so not to be used again as it is very harmful. These wastes are further divided into three main types such as medical Waste, infectious Waste, and domestic Waste [1]. It is a tradition that the waste comes out of hospitals are disposed of along with municipal wastes, whereas in the 1980s the human immunodeficiency

virus (HIV) and Hepatitis B raised the awareness of public towards concerning the disposition method related to medical waste. The proper management of medical waste needs special treatment like discarding waste in landfill. Previous studies show that the best method of disposing of medical waste is incineration. The appropriate accumulation related to hospital waste would decrease the level of contagious wastes and accordingly the cost related to the treatment. Generally the management of any hospital must synchronize collection related to infectious as well as other wastes discretely. An improved consideration related to combination of hospital waste is primary towards selecting preeminent disposition. The best method for disposition of medical wastes is incineration, it could not be done individually but it would be better to collect hospital wastes jointly from all hospitals. Because hospital waste creates a serious health related issues [2, 3]. The wastes which comes out from hospitals specially in developing countries is a raising and serious anxiety the reason behind is the inadequate treatment and disposing methods of medical wastes [4]. Any unsuitable treatment as well as absolute disposal of medical waste could impact negatively on health of people as well as on environment, as the medical waste is hazardous and if managed unsuitably might lead towards intra-hospital diseases. Similarly it would increase health risks and impact hazard on the life of patients, it could affect negatively on those who take part in managing disposals of hospitals waste. Throughout the world and every year there generated huge quantity of infectious wastes and unfortunately developing countries are having more issues and constraints in properly managing hospitals waste. Besides this there are various other difficulties such as those who deal with infectious waste are not very well trained and familiar about proper procedures of waste management and this job is delegated almost to poor and uneducated laborers without providing them

guidance which pose threat to their own life and other people life as well. The workers who are directly involved in the disposition of body fluids and other hospital wastes are exposed to infectious risks because of blood borne pathogens. Although there are various ways of transmitting diseases like percutaneous disease, fecal oral route like hepatitis, and airborne transmission like T.B and measles etc. It is proven that there exists no such even single method to treat disposal waste without elimination of any risk factor that could happen to human health of our environment. Generally it also depends upon the technology like transformation process of hazardous waste such as the process of incineration through which the waste is processed by a combustion method and converted into gases, those components which are not combusted remained ash. It is important that the destruction method must be treated in a technical way so to avoid air contamination or any threat to our environment [5, 6, 7, 8, 9, 10, 11].

It is now acknowledged that the waste of hospitals is a serious problem. It is having harmful impacts on humans as well as on environment, which can be made through direct or through indirect contact. The developed countries use different technological methods to collect, store or transport till secure disposition of hospital waste. As compare to developing countries they are not using sufficient methods mostly hazardous wastes are combined with domestic wastes thus create health risks for municipal staff as well as general public. Larkana district is the largest district of Sind and the Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU) hospital is a larger hospital which is comprised of four separate sections but unfortunately till yet no proper waste management system or strategy is adopted. The current system of managing hospital waste is comprised of five rudiments such as generation, handling on site, storage as well as processing, collecting of waste material, transportation of waste material

and its disposal. The hospital waste thrown in small size waste bins without having any cover as a result it produces unhygienic environment [12, 13, 14, 15].

## **RESEARCH METHOD:**

### **Method:**

This method is qualitative and quantitative in its nature.

### **Procedure:**

This study was conducted in two government hospitals such as BMC and Civil hospital. These both hospitals are located in Quetta city and cover at least 1 million populations. This study was based upon primary data and review of information regarding disposal method and hospital waste management. Total quantity of hospital waste generation and composition was obtained through questionnaires, disposal methods, composition and management of solid waste also observed. Internal transportation of solid waste, external transportation of waste and on side disposal was studied in both hospitals. These two hospitals were visited and management staff and medical superintendent were interviewed regarding hospital waste management.

The data was collected from 27 departments in which 19 departments were selected from BMC and 8 from civil hospital.

### **Research tool:**

Three different types of questionnaires were prepared. First one was for management staff, second for Medical superintendent and third for staff of the wards.

### **Population and sample:**

All government hospitals were total population and two hospitals for instance BMC and Civil hospital were sample size.

### **Respondents:**

There were totally 59 respondents in which two respondents were medical superintend, two from management staff and 55 doctors, nurses and wards boys were from different wards of different departments of both the hospitals.

### **Statistical analysis:**

The collected data was analyzed by testing SPSS software. The statistical technique used for data analysis was estimation of simple percentage.

### **RESULT AND ANALYSIS:**

Result and analysis are explained in tables from 1-7.

**Table 1: Shows segregation of medical waste in hospital**

	<b>Frequency</b>	<b>Per cent</b>	<b>Valid Per cent</b>
Yes	47	85.5	85.5
No	8	14.5	14.5
Total	55	100.0	100.0

**Table 2: Shows special place of storage**

	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>
Yes	37	67.3	67.3
No	18	32.7	32.7
Total	55	100.0	100.0

**Table 3: Shows separation of hazardous waste according to their categories**

	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>
Yes	47	85.5	85.5
No	8	14.5	14.5
Total	55	100.0	100.0

**Table 4: Shows Hospital Waste Quantity in BMC**

S#	Hospital	Department	Waste Generated/day	Waste Generated/week	Waste Generated/month
1	BMC	Cardiology	12kg/ day	84Kg/week	360Kg/month
2	BMC	Surgery	46kg/ day	322Kg/week	1380Kg/month
3	BMC	ENT	6kg/ day	42Kg/week	180Kg/month
4	BMC	Medicine	17kg/ day	119Kg/week	510Kg/month
5	BMC	Radiology	26kg/ day	182Kg/week	780Kg/month
6	BMC	Gynecology	52kg/ day	364Kg/week	1560Kg/month
7	BMC	Dental OPD	2kg/ day	14Kg/week	60Kg/month
8	BMC	Burn ICU	25kg/ day	175Kg/week	750Kg/month
9	BMC	Orthopedic	40kg/ day	280Kg/week	1200Kg/month
10	BMC	Endocrinology	20kg/ day	140Kg/week	600Kg/month
11	BMC	Neurology	28kg/ day	196Kg/week	840Kg/month
12	BMC	Gastroenterology	10kg/ day	70Kg/week	300Kg/month
13	BMC	Pulmonology	15kg/day	105Kg/week	450Kg/month
14	BMC	Nursery	24kg/day	168Kg/week	720Kg/month
15	BMC	Peads	8kg/day	56Kg/week	240Kg/month
16	BMC	Psychiatry	30kg/day	210Kg/week	900Kg/month
17	BMC	Anesthesia	20kg/day	140Kg/week	600Kg/month
18	BMC	Pediatrics	16kg/day	112Kg/week	480Kg/month
19	BMC	Oncology	8kg/day	56Kg/week	240Kg/month
<b>Total</b>		<b>19</b>	<b>405kg/day</b>	<b>2835kg/week</b>	<b>12,150kg/month</b>

**Table 5: shows Hospital Waste Quantity in Civil hospital**

1	CIVIL	Cardiology	34kg/day	238kg/week	1020kg/month
2	CIVIL	Surgery	70kg/day	490kg/week	2100kg/month
3	CIVIL	Medicine	40kg/day	280kg/week	1200kg/month
4	CIVIL	Gynecology	230kg/day	1610kg/week	6900kg/month
5	CIVIL	Neurology	12kg/day	84kg/week	360kg/month
6	CIVIL	Peads	19kg/day	133kg/week	570kg/month
7	CIVIL	Nephrology	30kg/day	210kg/week	900kg/month
8	CIVIL	Dermatology	30kg/day	210kg/week	900kg/month
<b>Total</b>		<b>8</b>	<b>465kg/day</b>	<b>3255kg/week</b>	<b>13,950kg/month</b>

**Table 6: Shows grand total of hospital waste generation**

Total Waste generation/day	Total Waste generation/week	Total Waste generation/month
870 kg	6090 kg	26,100 kg

**Table 7: shows Hospital Waste Composition**

S#	hospital	Department	Waste Composition
1	BMC	Cardiology	Injection, syringes, cotton, drips, vials, used burettes, removed dressing.
2	BMC	Surgery	Canulas, syringes, sharp blades, disposable gloves, surgical gloves, needles, drip set, bottles, injections,

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			urine bags, bandages, catheters, NG bags, cotton.
3	BMC	ENT	Drips, cannulas, drip set, syringes, gloves, nasal packing, cotton, injection vials, blood bags.
4	BMC	Medicine	Gloves, cannulas, drip sets, syringes, needles, cotton, injection vials, NG tubes, blood bags, catheters, urine bags.
5	BMC	Radiology	Needles, cotton, syringes, gel, gauze, bottles, disposable gloves, cannulas, injection.
6	BMC	Gynecology	Injection, cotton pads, injection vials, gloves, blades, blood bags, bottles, cat cut(stiches), visceral(stiches), EET tube, drip sets, cannulas, urine bags, drips.
7	BMC	Dental OPD	Needles, syringes, drip sets, gloves, mask.
8	BMC	Burn ICU	Dressing, drips, needles, gloves, injection vials, glass ampules, surgical knife, cotton, mask, cap.
9	BMC	Orthopedic	Cannulas, syringes, drips, drip sets, cotton, gauze, injection vials, plaster, gloves, urine bags, catheters, needles.
10	BMC	Endocrinology	Syringes, drips, injection, cannulas, drip sets, catheters, urine bags, needles.
11	BMC	Neurology	Syringes, drips, cannulas, catheters, NG tubes, vials, injections, urine bag.
12	BMC	Gastroenterology	Cannulas, drip sets, syringes, urine bags, catheters.
13	BMC	Pulmonology	Cannulas, syringes, catheters, urine bags, drip sets, injection, drips,
14	BMC	Nursery	Syringes, drip sets, catheters, gloves, NG tubes, cannulas, cotton, blood bags, drips, pampers.
15	BMC	Peads	NG tubes, drip sets, cannulas, syringes, injection vials, blood bags.
16	BMC	Psychiatry	Syringes, cannulas, drip sets, drips, injections, catheters, urine bags.
17	BMC	Anesthesia	Cannulas, syringes, catheters, injections, dressing, gauze.
18	BMC	Pediatrics	Cannulas, syringes, NG tubes, gloves, drip sets, blood bags, cotton, injections, drips.
19	BMC	Oncology	Drips, drip sets, syringes, cannulas, cotton, gloves, injections.
1	CIVIL	Cardiology	Syringes, drip sets, vials, sticking, cotton, drips, urine bags, catheters, cannulas,
2	CIVIL	Surgery	Drips, syringes, urine bags, needles,

Samina Gul, Muhammad Anwar Panezai, Jahangir Khan Achakzai, Abdul Manan Kakar, Nazima Yousaf Khan, Ajab Khan Tareen, Aziz Ahmed- **A Study on Hospital Waste, Quantity, Composition, Disposal and Its Management in District Quetta**

			bottles, drip sets, cotton, injection vials, bandages, gloves, catheters, cannulas, NG tubes,
3	CIVIL	Medicine	Syringes, drips, drip sets, catheters, empty infusion bottles, NG tubes, disposable gloves, cotton, urine bags, needles.
4	CIVIL	Gynecology	Empty vials, ampules, drips, drip sets, urine bags, blood bags, gloves, catheters, surgical gloves, discarded injections, cotton, gauze, syringes, cannulas, sticking, placenta, membranes, dignity sheets, cotton pads,
5	CIVIL	Neurology	Syringes, cotton, urine bags, drips, vials, cannulas, drip sets,
6	CIVIL	Peads	Drips, drip sets, cannulas, vials, cotton, syringes, urine bags, NG tubes, blood bags, gauze, needles.
7	CIVIL	Nephrology	Empty vials, drip, drip sets, syringes.
8	CIVIL	Dermatology	Drips, drip sets, syringes, urine bags, needles.

## DISCUSSION:

From the area perspective, Baluchistan is the biggest province of Pakistan with Quetta as its provincial capital. As per 1998 census Quetta consists of 1.8 million inhabitants. Quetta is divided into two towns, Zarghoon and Chilton town. There are to major government hospitals in Quetta city these includes BMC and Civil hospital. Zarghoon and Chilton towns are two biggest towns of Baluchistan. A number of government and private hospitals are operational in the town thus leading to environmental problem in form of gases, odor, liquid and solid hospital waste. Most of these wastes are not properly handled which lead to environmental hazards. Thus it becomes imperative to handle the problem properly so as to preserve the town from the hazards of hospital waste.

Waste in the form of paper, plastic, glass, horns, feather and hair are by products for agro industrial processes. Solid waste except hospital waste is very much valuable and

cooperation is necessary between producer and those who dispose them. Legally enforceable rules should be implemented. The intensification of the hospital waste over the past fifty years created an environmental management issue. So it is necessary for any government to save environment from the impact of hospital waste. Improper disposal management of hospital waste could be risk to environment and the pollutants present in water bodies generated from hospital are not well documented even in developed countries. Now the management of hospital waste is recognized as a serious problem. So further study is needed for safe management and disposal of hospital waste. Improper disposal and collection of waste can be serious health risk to people and cause to Environmental degradation in developing countries. Mostly waste is thrown into neighborhood this waste can attract rodents and other disease carrying vectors. Organic waste can pollute soil through leachate. So it is necessary to compose this waste through proper management system.

The improper disposal of hospital waste can be hazard to the environmental and also can be risk to animals and human health .There is need to aware the people associated with solid and liquid waste and hospital waste management. Through this people will be able to sound hospital waste management practices .improper disposal of hospital waste can create water pollution, manure gases and odor's.

Hospital waste generates many environmental problems. Solid and liquid waste consists of organic and inorganic matter. Large number of patients handled in hospitals left behind large amount of organic and inorganic waste. This waste if not properly handled can be the habitat of microorganism and these can be transferred from one organism to another. In developing countries most of the waste is thrown in neighborhood and this can attract diseases carrying vectors.

The government has still not developed strategy for disposal of hospital waste for many hospitals. The governments have not launched any awareness program among common people regarding the hazardous effect of hospital waste. So it is the need of time to conduct research work by government and non-government organizations to assess the environmental problems. The district government and non-government organizations should allocate special funds for the minimization of hospital waste

## **CONCLUSION:**

Regarding the question about segregation of hospital waste at hospital 85.5% respondent said yes, they segregate waste into different categories in hospital, 14.5% replied it no. It was observed that three different colors of dustbins were placed for the waste segregation the color of dustbins were red, black and yellow. This practice was same in both hospitals. About the question regarding safe disposal of liquid waste 72.7% respondents said yes, there was safe disposal of liquid waste but at the other hand it was observed that the liquid waste was directly drain to municipal liquid waste. The hospital wastes were mixed with municipal liquid waste through common sanitation system. Lymph, blood, cotton and disposable waste were seen in water channels and water bodies. This water directly runs towards the crops in the western side of Quetta city. The farmers used same water for their crops. This practice was risk for almost all population of Quetta city.

Both hospitals generate 870kg waste per day and 6090kg waste per week, only 100kg waste per day were incinerated. The recycle wastes were solid in market by government employers and remaining waste was dumped in the premises of hospital. According to respondent there was

sufficient place for waste storage. 54.5% respondents replied that there was protected wall around the storage place.

The handling, segregation and transfer of hospital waste from one place to another or from wards to storage site easily effect the hospital internal environment and human health. 78.2% peoples were special dress and glow while segregating and transfer of solid waste. The segregated waste were thrown and mixed in general garbage. The segregation of hazardous waste is very important and this practice must be obeyed by all hospital authorities but hazardous wastes were not segregated. Improper segregation and collection of hospital waste has a great impact on human health. Proper disposal and management of biomedical waste are important. In past there was no sufficient information on hospital waste management technologies but currently some new technologies are introduced. The practice adopted by hospital authorities regarding solid and liquid waste was inadequate. However there is a need to mobilize and aware the common people and government authorities on the safe and sound management and the risk associated with hospital waste.

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