A scenario of healthcare waste management in Chikkaballapura, Karnataka

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In Chikkaballapura, most of the doctors won't go through the Bio-Medical Waste (Management and Handling) Rules, 1998 once in their life and Guideline on Bio-Medical Waste Management issued by KHSGRP. According to consequence, only educated and punishing regarding healthcare waste management program cannot be successfully implemented without the good Samskar (honesty, enthusiasm, dedication, self-motivation, cooperation and the participation) of all sections of the workers of healthcare centers. If the present generation wants to protect our future environment and health of the community, we must sense us to this important issue not only in the curiosity. Wastes from the 30 PHCs, 1 CHC, 5 THs and 1 DH in the district is being collected, transported, treated and disposed by CBMWTF. But due to the lack of common sense and irregularity of BMWCTF healthcare waste is unable to collect and manage properly in the HCFs. Generated wastes from remaining 25 PCHs are being disposed in DBPs and SPs and LDUs provided within the premises, but due to lack of Operation Theater (OT), Laboratory facilities, Healthcare building facility under the construction as well as shifting to new building, 37.09% of the LDUs in HCFs were not working and not installed.

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1. Introduction

It is very unfortunate to know that in Chikkaballapura, most of the doctors do not go through Bio-Medical Waste (Management and Handling) Rules, 1998, even once in their life as well as guideline on Bio-Medical Waste Management and Handling issued by Karnataka Health System Development and Reform Project (KHSWRP), Bangalore (Annexures 1, 2 and 4). Then how these doctors are going to give guidance to other healthcare workers for healthcare waste handling and disposal? Remember, healthcare waste management should be maintained with a complete awareness of regulations, good Samskar (honesty, enthusiasm, dedication, self-motivation, cooperation and the participation), appropriate education, training, commitment, and understanding between each other’s.

Karnataka State Government have to assist the health care facilities (HCFs) or institutions if they come forward, for the establishment of Deep Burial Pits (DBPs), Sharps Pit (SPs) and Common Bio-Management Waste Treatment Facility (CBMWTF), by identifying suitable land for it. It is the responsibility of the local bodies to treat and dispose the healthcare waste generated in the healthcare establishes at a safer place (Chitrulekha and Sudhir, 2010).

Healthcare waste management is a concern for every HCFs in the present scenario. The healthcare waste management is a process that helps to ensure proper hospital hygiene and safety of healthcare workers and communities (Carmen et al., 2008). Healthcare workers have an important roles and responsibilities to manage the environmental effects and health hazards with their practices. Their efforts may seem small, but each step builds a base of ‘Sound Samskar’ and ‘Positive way of life’ that are essential for the victory of the entire (Mcveigh, 1993 and Shalini Sharma, 2010). Healthcare is vital for all life’s, health and well being. But the healthcare waste generated from medical activities can be hazardous, cytotoxic, lethal and even radioactive because of their high potential for diseases transmission. The hazardous and toxic part of healthcare wastes from healthcare establishments comprising infectious and radioactive material as well as sharps constitute a grave risk, if these are not properly treated or disposed or is allowed to get mixed with other municipal wastes (BekirOnursal, 2004). Investigate the medical officer and staffers about the awareness of Bio-Medical Waste (Management and Handlings) Rules, 1998 (Annexures 1, 2 and 4) and whether the HCFs being used have the color coded bins and segregation as well as the DBPs and SPs being used is as per the guidelines and Liquid Disinfection Units (LDUs) of the healthcare centers and functional are the main concentration in this first round study.

2. Study area

2.1. Territory and demography

Chikkaballapura is a newly created district, carved out of the existing Kolar district, located at 130 19” to 130 39” North Longitude and 770 35” to 770 52” East Latitude with geographical area of 404501 hectares in the southern part of Karnataka, India and 56km distance from Bangalore. It is a key transport link to North Bangalore due to origin of several national highways and is a regional transport and educational hub.

The Chikkaballapura District includes the taluks of Bagepalli, Chikkaballapura, Chintamani, Gowribidnur, Gudibande and Siddlaghatta (Fig. 1). As of 2011 India census Chikkaballapura had a population of 191,122. Males constitute 51% of the population and females 49%. Chikkaballapura has an average literacy rate of 64%, higher than the national average of 59.5%. Eleven percent (11%) of the population is under 6 years of age (Census of India, 2011).

2.2. Geo-hydrology

The highest temperature is 32oC while the lowest is 21oC and the average rainfall is 750.3mm and Papagni, Chitravathi and Pinakini rivers flow in Chikkabalarpa district. Chikkaballapura has a high elevation located in the center of the Nandi hills region. “Panchagiri” is a common descriptor of Chikkaballapura as it is surrounded by 5
picturesque hills (Nandi Giri, Chandra Giri, Skandagiri, Brahma Giri, and HemaGiri) among which Nandi hills is the famous one. The Kalavara hall is becoming famous because of the trekking involved to reach the top of the hill. The north-south Six-lane National Highway-7 as well as the East-West State Highway-58 goes through the city. The city is also a transportation hub comprising a new major bus terminus and train station headquarters. It is well connected to important towns by the state run buses as well as private taxis and autos. The nearest airport is at Bangalore International Airport at a distance of 20 kilometers.

2.3. Health and family welfare

Chikkaballapura district have established 1 District Hospital (DH), 5 Taluk Hospitals (THs), 1 Community Health Center (CHC) and 55 Primary Health Centers (PHCs). There are 85 private healthcare facilities (including all nursing homes, pathological laboratories and clinics registered under Karnataka Private Medical Establishment (KPME), Act 2007) also established.

2.4. Methodology

Instantly list out the number of government healthcare centers established in Chikkaballapura district. This study involved all 62 government healthcare centers of Chikkaballapura. A monthly circulation of district consultant advance tour program was sent to each of the healthcare centers to participate the on hand training, awareness and discussions about healthcare waste management. The circulation was sent specifically to the medical officer with that responsibility then the district consultant started the field visits.
When the first round field visit was done with an updated guideline for segregation, management and disposal of infectious healthcare waste and the check list report was collected and prepared through the investigations (Annexures 3 and 4). Concentrated on particular aspect of healthcare waste management like personal observations of the waste management and disposal practices, evaluation of knowledge, attitude and practices of medical officers as well as staffers and evaluate the bio-medical wastes weighing record (Linde, 1993; Sharma et al., 1993; Al-Zahrani et al., 2000; Cisse et al., 2000; Dilly and Shanklin, 2000 and Kishore et al., 2000).

Further, documented the physically verifications done, materials and equipments inventory and answers from doctors, laboratory technicians and other staffers that included knowledge regarding awareness about Bio-Medical Waste (Management and Handling) Rules, 1998, waste segregation, collection, labeling, disinfections, transport and disposal. The observations and suggestions of workers over accessible environment or methods of healthcare waste management in the HCFs were also recorded.

Accordingly data from the first round field visit was finally interpreted, discussed and the HCFs were differentiated with grades as well as improvements needed among them were also found out (Fig. 4).

3. Results and Discussion

In this investigation, many medical officers, doctors, staff nurses, auxiliary nurse and midwifery (ANMs), health assistants, laboratory technicians, pharmacists and group-Ds were observed who do not have sufficient knowledge in this field. Most of the medical officers and doctors were observed to have poor practical knowledge of healthcare waste management and handling and their attitude towards healthcare waste management was casual. While, in the case of nurses and paramedical staffs the reverse was true, i.e., though their theoretical knowledge lagged behind that of doctors, their practical knowledge regarding healthcare waste management was better and more meticulous and careful.

The knowledge of the nurses and paramedical staff was better for the practical aspects of healthcare waste management, categories of bio-medical waste, color coding system, methods of segregation, methods of waste dispose and waste should not be stored for more than 48 hours. Awareness of the existence of Bio-Medical Waste (Management and Handling) Rules, 1998, able to identify Bio-Hazard Symbol as well as diseases spread by improper waste management.

Further, if it is possible, healthcare wastes should be disposed everyday or in every alternate days. But this BMWCTF does not collect the wastes on Saturday and Sunday after collecting Monday, Wednesday and Friday’s. Every HCFs (24x7) dedicate whole year for 24 hours. Saturday and Sunday are the busiest and the most healthcare waste generated days as these days are off in most offices. But due to the lack of common sense and irregularity of BMWCTF healthcare waste is unable to collect and manage properly in the HCFs. On the other hand, the collections in the weekdays are not regular so does on (weekends) Saturday and Sunday. With the calculation of three times in week, the complete stop of collection for 2/3 days is encountered after collecting 2/3 days continuously. According to LOK ADALAT, DHs, THs and CHCs should tie-up with BMWCTFs. If possible, PHCs too should be tied-up. But without seeing the capacity of this BMWCTF is tied-up more number of HCFs with following particular agreements. And it is unable to collect in a particular timing and days as the BMWCTF is tied-up. Wastes are collected sometimes at 6.00 a.m. or at 9.00/10.00 p.m. in some HCFs. And sometimes comes back idly as an advance information is not given, thus the place remains closed. The collected wastes are not weighed properly as well as are not check whether they are segregated or not. Further, due to the lack of vehicle facility and manpower, and the distance, BMWCTF is unable to collect wastes from many PHCs since the agreement had signed. The wastes are not collected so does the information of unable to come is given. This is not a matter of once or twice but for months and years even after the agreement is written.

On the other hand, infectious plastics, non-plastics and sharps healthcare wastes are stored within the campus in the open space of most HCFs. These potentially harmful wastes are also being kept bundled together in open spaces between the wards for months and years expecting the BMWCTF. The government PHCs can adjust as they have their own DBPs and SPs but as the private HCFs do not have these facilities dump the wastes in to the school premises, empty wells, open fields, beside the road, rivers and lakes seeking advance moments as they can’t keep storing the wastes for a long time. But, in spite of the best efforts being made to follow the laid down norms of disposing healthcare waste strictly, problem still exist due to lack of adequate number of manpower.
facility, knowledge as well as negligence of doctors and other workers. It is well known to us the harmful diseases and consequences going to be occurred if the healthcare waste is dumped for many days. And excuses aren’t the best way to cover up faults.

Medical officers and other medical staffs of entire HCFs of Chikkaballapura complain lack of information regarding waste management, confusion about segregation in rule, color coding bucket and others equipment shortage as well as finance as the major cause for not following the Bio-Medical Waste (Management and Handling) Rules, 1998. But after the first round field investigation as well as on hand training, Chikkaballapura district, having superior indication of proper mechanism of managing and disposing of healthcare wastes in the Government HCFs, serious untroubled health hazards from these healthcare wastes are not scattered around the HCFs. Color coded bins were kept as per healthcare waste management norms in the entire HCFs and the workers were putting the waste category in their particular color bins. Per day average of 31.07, 22.70, 21.86 and 11.18Kgs of anatomical (Yellow); 29.27, 24.68, 21.59, and 10.84Kgs of infectious non-plastic (Red); 30.13, 29.03, 21.96 and 6.72Kgs of infectious plastic (Blue), 27.75, 27.61, 21.20 and 8.37Kgs of infectious sharps (White) and 79.22, 61, 47 and 33Kgs of general solid wastes are generated from DH, THs, CHC and PHCs respectively (Fig. 2). Further, per day average of 65.75, 53.93, 28.59 and 3.26Liters of infectious liquid waste are generated from DH, THs, CHC and PHCs respectively (Fig. 3). But, due to the lack of Operation Theater (OT), Laboratory facilities, Healthcare Building facility (Practice in Pvt. Building) as well as shifting to new building, 37.09% of the LDUs in HCFs were not working and not installed.

At present all the infectious solid bio-medical wastes generated from Government 30 PHCs, 1 CHC, 5 THs and 1 DH in the district are being collected, transported, treated and disposed by ‘M/S; MEERA ENVIROTECH PVT. LTD., in Kolar, a CBM WTF and solid and liquid healthcare wastes generated from 25 (out of 55) PCHs are being disposed in DBPs, SPs and LDUs provided within the premises.

Based on the data’s collected during the present course of investigation, it was found that conditions of healthcare waste management and disposal in Bhatalahalli CHC and Burudugonte and Idagor PHCs, are better as compared to others. And these healthcare centers personnel were trying to meet the district consultant and searching the current needs and standards. These are the only government HCFs in Chikkaballapura which were taking good segregation within healthcare center itself.

All waste handlers, who responded to the questionnaire in each of HCFs, reported that only gloves are available as Personal Protective Clothing’s (PPCs) or Personal Protective Equipments (PPEs) during handling waste and stated that they do not use any type of PPCs like apron, long boots and mask etc. In the present investigation it
is observed that most of the medical officers, doctors and other healthcare staff do not worry about the hazards to health and the environment around them due to inappropriate handling and disposal of healthcare waste.

Fig. 3. Generated Liquid Healthcare waste from DH, THs, CHCs and PHCs in Chikkaballapura.

Fig. 4. Percentage of graded healthcare centers in Chikkaballapura.

During the investigation in all healthcare established with various questionnaires, have found out that 12 healthcare centers have scored the marks ranging between 284-355, 33 centers have scored between 213-283, 11 centers have scored between 117-212 and 6 center have scored <116. According to the Marks they have scored and the respective percentage they have got i.e. 19.34, 53.22, 17.74 and 9.67%, grades have been given to them as A, B, C and D respectively (Fig. 4).

4. Conclusion
Before the appointment of consultant in Chikkaballapura, poor healthcare waste minimization, proper segregation, store and disposal ware had happened. After the appointment and consultant first round field visit regarding healthcare waste management in the entire Chikkaballapura, more than 75.12% and 96.74% of waste ware in most of the healthcare established had been properly minimized and segregated respectively. Clarifications has been done by consultant to all the healthcare established workers regarding their confusions and misunderstandings on Bio-Medical Waste (Management and Handling) Rules, 1998 through on hand trainings, awareness, discussion in medical officer meetings and seminars. Circulation has been done of the various categories of color printed wordings, poster in both English and Kannada having bio-hazards logos according to KHSDRP manual, which can be easily seen, read and be aware to all the healthcare established workers as well as the public. Directions had been given practically face to face to the persons who were performing wrong healthcare waste management and disposal in various healthcare centers and the general public regularly and clearing their confusions trying to put a good Samskar in their heart and forward the best of the best healthcare waste management. From the investigation consultant conclude that the knowledge and the practice of healthcare waste management were reasonable mainly among the healthcare providers.

Nurses and paramedical staffs now have more practical knowledge regarding healthcare waste management and are better and more meticulous and careful. Color coded bins were kept as per healthcare waste management norms and the workers were putting the waste category in their particular color bins, when the consultant direct them.

Information’s about the risks linked to healthcare waste can be displayed by poster exhibitions in healthcare centers, at strategic points such as waste bin locations, giving instructions on waste segregation. These posters should be explicit, using diagrams and illustrations to convey the message that could be understood by all people who make regular visits to healthcare establishments, even by the illiterate people.

Acknowledgements

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References


Annexure 1
Categories of Healthcare waste (Schedule 1 and See Rule 5).

<table>
<thead>
<tr>
<th>Option</th>
<th>Waste Category</th>
<th>Treatment &amp; Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category No. 1</td>
<td>Human Anatomical Waste, Human tissues, organs, body parts.</td>
<td>Incineration @/deep burial*</td>
</tr>
<tr>
<td>Category No. 2</td>
<td>Animal Waste, Animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals colleges, discharge from hospitals, animal. houses</td>
<td>Incineration @ / deep burial*</td>
</tr>
<tr>
<td>Category No. 3</td>
<td>Microbiology &amp; Biotechnology Waste, Wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biological, toxins, dishes and devices used for transfer of cultures.</td>
<td>local autoclaving / micro-waving / incineration@</td>
</tr>
<tr>
<td>Category No. 4</td>
<td>Waste sharps, Needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps.</td>
<td>disinfection (chemical treatment @ 01/auto claving / micro- waving and mutilation/shredding”)</td>
</tr>
<tr>
<td>Category No. 5</td>
<td>Discarded Medicines and Cyto-toxic drugs, Wastes comprising of outdated, contaminated and discarded medicines.</td>
<td>Incineration @/destruction and drugs disposal in secured landfills drugs disposal in secured</td>
</tr>
<tr>
<td>Category No. 6</td>
<td>Solid Waste, Items contaminated with blood, and body fluids including cotton dressings, soiled plaster casts, lines, beddings, other material Contaminated with blood.</td>
<td>Incineration @ autoclaving / micro-waving</td>
</tr>
<tr>
<td>Category No. 7</td>
<td>Solid Waste, Wastes generated from disposable items other than the waste sharps such as tubing’s, catheters, intravenous sets etc.</td>
<td>disinfection by chemical treatment @ @ autoclaving/micro- waving and mutilation/shredding##</td>
</tr>
<tr>
<td>Category No. 8</td>
<td>Liquid Waste, Waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities.</td>
<td>Disinfection by chemical treatment@@ and discharge into drains.</td>
</tr>
<tr>
<td>Category No. 9</td>
<td>Incineration Ash, Ash from incineration of any bio-medical waste.</td>
<td>disposal in municipal landfill</td>
</tr>
<tr>
<td>Category No. 10</td>
<td>Chemical Waste, Chemicals used in production of biological, chemicals used in disinfection, as insecticides, etc.</td>
<td>chemical treatment @@ and discharge into drains for liquids and secured landfill for solids</td>
</tr>
</tbody>
</table>

@@ Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.
## Mutilation/shredding must be such so as to prevent unauthorized reuse.
@ There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.
0 Deep burials shall be an option available only in towns with population less than five lakhs and in rural areas.
+ Options given above are based on available technologies. Occupier/operator wishing to use other State-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down to enable the prescribed authority to consider grant of authorization.

Annexure 2
Colour Coding and Type of Container for Disposal of Bio-Medical Wastes (Schedule 1 and See Rule 5).

<table>
<thead>
<tr>
<th>Colour Coding</th>
<th>Type of Container –I</th>
<th>Waste Category</th>
<th>Treatment options as per Schedule I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Plastic bag</td>
<td>Categories-1, 2, 3 &amp; 6.</td>
<td>Incineration/deep burial</td>
</tr>
<tr>
<td>Red</td>
<td>Disinfected container/plastic bag</td>
<td>Categories-3, 6 &amp; 7.</td>
<td>Autoclaving/Microwaving/ Chemical Treatment</td>
</tr>
<tr>
<td>Blue White</td>
<td>Plastic bag/puncture proof Container</td>
<td>Categories-4 &amp; 7.</td>
<td>Autoclaving/Microwaving/ Chemical Treatment and destruction/shredding</td>
</tr>
<tr>
<td>Black</td>
<td>Plastic bag</td>
<td>Categories-5, 9 &amp; 10. (solid)</td>
<td>Disposal in secured landfill</td>
</tr>
</tbody>
</table>

Notes,
Colour coding of waste categories with multiple treatment options as defined in Schedule I, shall be selected depending on treatment option chosen, which shall be as specified in Schedule I.
Waste collection bags for waste types needing incineration shall not be made of chlorinated plastics.
Categories 8 and 10 (liquid) do not require containers/bags.
Category 3 if disinfected locally need not be put in containers/bags.

Annexure 3
Check list for evaluation the healthcare established.

<table>
<thead>
<tr>
<th>SL.</th>
<th>OBJECTIVE</th>
<th>YES / NO (IF YES 5 MARKS/ NO 0 MARKS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Does the HCF have a copy of BMW (Management &amp; handling) rules 1998, of India?</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Is she/he aware of BMW circular issued by department?</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Has the MO obtained Consent / Authorization from district pollution control board?</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Has the MO conducted a meeting regarding BMW management? (if so collect proceedings)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Is solid waste segregated at source?</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Whether waste is disposed within 48 hours? (Within 48 hrs=5marks, After 48hrs=0 mark)</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Does the Class IV (Group D) wear protective gear?</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Is disposal of waste supervised?</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Are Sharps cut and put into 1% Sodium hypochlorite solution?</td>
<td></td>
</tr>
</tbody>
</table>

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10. Are the plastic syringes disinfected before mutilation?
11. Any syringes boiled and reused? (Yes=0mark, No=5marks)
12. Are syringes mutilated or shredded after disinfection?
13. Is the plastic waste stored in a secured manner?
14. Is the mutilated plastic handed over to authorize recycler/CTF?
15. Where is the broken glass/vial/ampoule discarded? (Sharp pit-5 marks, Others-0marks)
16. Deep burial & sharp pit functional as per design issued by the department?
17. Is soil covered over waste periodically?
18. Is bleaching powder stored in a closed container?
19. Is the disinfectant solution freshly prepared daily?
20. Is the Inter-vie were aware of risks involved in his job?
21. What is the protocol in case of needle prick/cuts while working in the PHC? (Informing concerned person-5marks, Not aware-0marks)
22. Is the general waste composed or handed over to municipal bin?
23. Are there display posters about BMW management?
24. Does the Medical Officer inspect the hospital at least once a day

SCORE/TOTAL /125

INTER-VIEW OF LABORATORY TECHNICIAN, OBJECTIVES

1. Is he aware of BMW circular issued by department?
2. Has the MO conducted a meeting regarding BMW?
3. Is the technician aware of the risks involved in his job?
4. Are there color coded bins in the Lab as prescribed in the circular?
5. Does the technician wear glove before drawing blood?
6. Is solid waste segregated at source?
7. When is the waste disposed? (Within 48 hrs=5marks, After 48hrs=0mark)
8. Are the needles and syringes re-used? (Yes=0 mark, No=5 marks)
9. Are the slides washed before disinfection?
10. Is the lab provided with a needle burner?
11. Where is the broken glass/vial/ampoule discarded? (Sharp pit-5 marks, Others-0marks)
12. Is the Inter-vie were aware of risks involved in his job?
13. Sputum cups are disposed after disinfection (If PHC is designated microscopic centre).

SCORE/TOTAL /65

INVENTORY, ITEM (IN SUFFICIENT QTY.)

1. Bleaching Powder (5kgs);
2. Needle burners (5 nos.) (OPD, Lab ,Inj. room, Ward, 1 spare);
3. Plastic Tubs (6 nos.);
4. Utility Gloves.(2 gloves);
5. Plastic Apron.(exclusive for waste disposal);
6. Boots;
7. Cap and Mask;
8. Chloro-scope;
9. Colored bins;
10. Plastic liners;
11. Weighing machine;
12. Big Scissors to mutilate IV bottles/IV drip sets;
13. Hammer to mutilate plastic syringes;

SCORE/TOTAL /65

PHYSICAL VERIFICATION BY THE VISITING OFFICER/CONSULTANT, DESCRIPTION

1. Clean surroundings of health care facility;
2. Safe Portable drinking water;
No signs of burning within the premises;
No scattered syringes or needles in injection room/wards;
Bleaching powder stored correctly;
Liquid disinfection units installed;
Records of waste generated, accident reporting register;
Clean Toilets with continuous supply of water;
Autoclaved dressing materials availability;
Protective gear for Class IV;
OPD has wash basin & soap/lotion bowl;
Reuse of syringes not done;
Functioning needle cutter/burner;
Presence of color coded bin with same colored liners;
BMW storage room;
Training of HCF team;
Utilization of Deep burial pit;
Utilization of Sharp pit;
Land filling site for general waste and
Segregation of solid waste.

SCORE/TOTAL
Total Grading Marks, 355,
100-80%= [355-284] = A grade, 79-60%= [283-213] = B grade,
59-50%= [212-117] = C grade, Below 50%= [116] = D grade.

Annexure 4
Guideline of Healthcare waste Management issued by KHSDRP.

<table>
<thead>
<tr>
<th>COLOUR</th>
<th>CONTAINER</th>
<th>WASTE CATEGORY</th>
<th>TREATMENT OR FINAL DISPOSAL OPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW</td>
<td>Plastic bin (with bio hazard logo) with yellow bag/liner (non chlorinated)</td>
<td>Anatomical waste, human anatomical waste and animal waste.</td>
<td>Hand Over to CBMWTF Or Disposal Through Deep Burial</td>
</tr>
<tr>
<td>RED</td>
<td>Plastic bin (with bio hazard logo) with red bag/liner (non chlorinated)</td>
<td>Infectious (solid and non plastic) waste, cotton, dressing bandage, plaster and caste etc.</td>
<td>Hand Over to CBMWTF Or Disposal Through Deep Burial</td>
</tr>
<tr>
<td>BLUE</td>
<td>Plastic bin (with bio hazard logo) with blue bag/liner (non chlorinated)</td>
<td>Contaminated plastic, syringes, intra-venous fluids sets/bags, blood bags, catheters, cannula, gloves and corrugated rubber drains etc,</td>
<td>Hand Over to CBMWTF in the absence of service of CBMWTF disinfects and mutilate/deform before discarding/handed over to recycler.</td>
</tr>
<tr>
<td>WHITE</td>
<td>Punure proof container with lid (PPC) file 3/4th with freshly prepared bleach solution.</td>
<td>Sharps waste, Needles, broken glass pieces, cut ampoules, glass slides, broken blades, scissors and aluminium foils of vials etc.</td>
<td>Disinfection and put contents in sharp pit (needle pit)Hand Over to CBMWTF Or Disposal Through Deep Burial</td>
</tr>
<tr>
<td>BLACK</td>
<td>Plastic bin (with bio hazard logo) with black bag/liner (non chlorinated)</td>
<td>Cytotoxic waste, Discards medicines* (after expiry</td>
<td>Hand Over to CBMWTF Or secured land fill</td>
</tr>
</tbody>
</table>
date), waste solid and liquid chemicals*/containers storing them containers of silver nitrate*

GREEN Plastic bin (without bio hazard logo) with green bag/liner (non chlorinated)

General waste Hand Over to Municipality Or secured land fill

*Should be handed over to pharmacist to store in black bin and handed over to CBMWTF.