CHAPTER -IV

DATA PRESENTATION, ANALYSIS AND INTERPRSENTATION

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In this chapter the researcher has presented the collected data in the form of graphs and tables. Analysis of data is done by using statistical instruments like percentage, mean, chi-square test and correlation. Researcher has collected the data from different 64 hospitals and hospital waste collecting agency that is Surya Treatment Facility Centre. As the sample for research study is heterogeneous researcher made different strata of the hospitals like surgical hospitals, maternity hospitals, orthopedic hospitals etc The mean of the data had analyzed by the researcher. Graphical representation has also made Hypothesis has tested by using chi square test and correlation technique Interpretation of data is done based on the graphs and tables information and the secondary data collected by the researcher. Also it is based on the observations of the researcher while collecting the data.

Hypothesis testing of mentioned hypothesis is carried out with the help of Excel. Chi square test and correlation has been used to prove the hypothesis given by the researcher.

This chapter contains various aspects of hospital waste management in sangli city such as total number of hospitals, numbers of beds and waste generated. The waste segregation, collection, storage and handling of hospital waste are presented by the researcher. Transportation of HW, agency collecting hospital waste, personnel involved in management of HW is discussed. Hospital waste policies, safety measures of waste handling, use of color code for the segregation of waste is focused in this chapter. The attitude and the awareness level towards hospital waste is also analyzed.

Types of Hospitals:

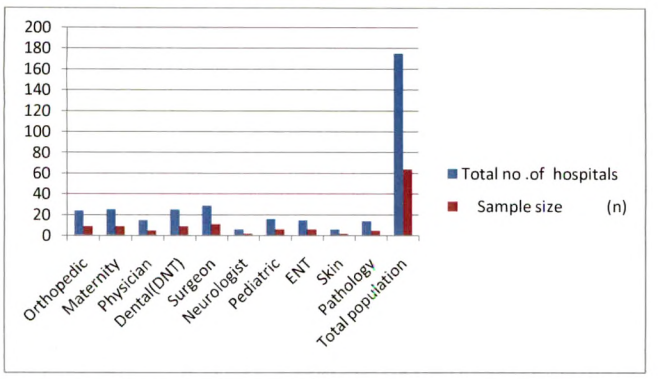
Table no.4.1 Classification of Hospitals

Types of Hospital (Strata)	Total no .of hospitals	Sample size (n)
Orthopedic	24	9
Maternity	25	9
Physician	15	5
Dental(DNT)	25	9
Surgeon	29	11
Neurologist	06	2
Pediatric	16	6
ENT	15	6
Skin	06	2
Pathology	14	5
Total population	**175**	**64**

(Source: field data)

Graph no.4.1

NUMBER OF HOSPITAL AGAINST STARTA



Graph no 4.1shows the total number of registered hospitals which generates the considerable waste and sample size of the selected hospitals in Sangli city. There are 175 registered hospitals out of which researcher have selected 64 hospitals as a sample for the study. The 64 hospitals are classified into different strata such as Orthopedic, Maternity, Physician, Dental (DNT), Surgeon, Pediatric, ENT, Skin and Pathology.

Table: 4.2

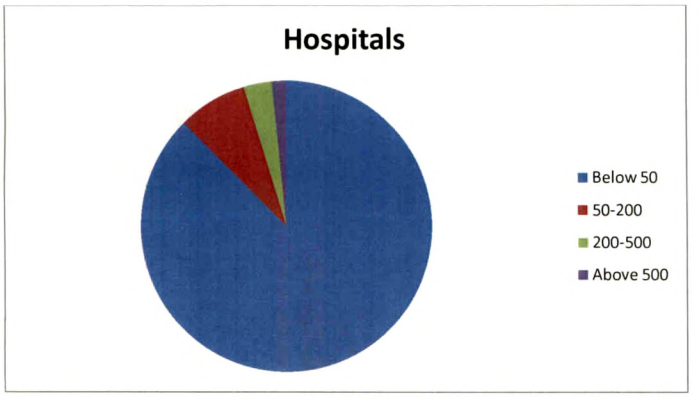
Total number of beds in different hospitals:

Total no.of beds	Below 50	50-200	200-500	Above 500
Hospitals	56	5	2	1

(Source: field data)

Graph no.4.2

Graph of total number of beds and hospitals



Graph no2 and table no 2 indicates the total number of beds in different selected hospitals in Sangli city. The hospital which having beds above 500 is only one that is Bharati hospital. There are only two hospitals having beds in between 200 to 500 is the Civil hospital Sangli and Ghatage Hospital. There are five hospitals which having the beds between 50 to 200 is Kullolli hospital Vishrambag, Avinash Patil hospital, Swant hospital, Madake hospital and MaishalkarShindehospitalSangli and remaining 56 hospitals are having the beds below 50.So only Bharati hospital having the the maximum number of beds.

Table: 4.3

Strata wise no of beds and quantity of HW generated per day

Types of Hospi (Strata)	Total no of hospitals considered	Total no. of Beds (Average)	Quantity of waste generated per day in Kg
Orthopedic	9	35	58
Maternity	9	19	35
Physician	5	N	0.175
Dental(DNT)	9	N	0.250
Surgeon	11	122	333
Neurologist	02	09	3.15
Pediatric	06	08	8.4
ENT	06	6	5.4
Skin	02	N	0.250
Pathology	05	N	15
Total populatio	**64**	**199**	**464.625**

(Source: field data)**Where N means Negligible**

Graph no4. 3 .1

Number of hospitals against total number of beds

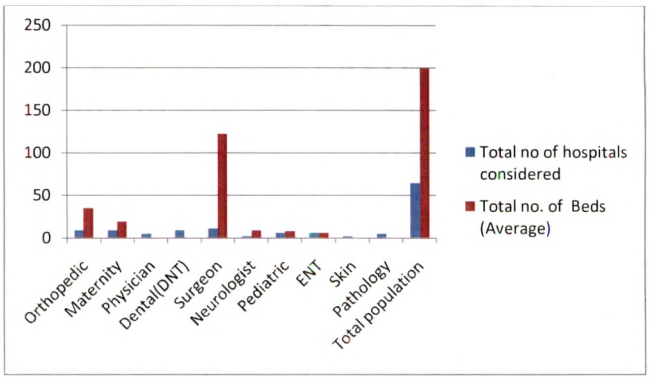
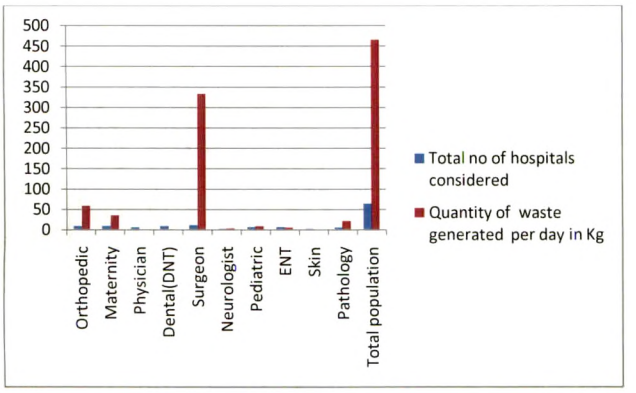


Table no.4.3 and graph no4.3 shows the number of hospitals from each strata and average number of beds per strata. Researcher has found that Orthopedic and Surgical hospitals having more beds as compare to other hospitals. Bharati hospital has large number of beds that is 700.After that civil hospital having 400 beds. Hospitals like dental and skin has very negligible or no beds in the hospitals.

Graph no4. 3.2

Graph of total number of hospitals against quantity of waste generated per day in Kg



The above table and graph 4.3.2 shows the number of hospitals in each strata and amount of waste generate in Kg per day. Researcher found that waste generation rate is more in the hospitals which are having more beds. Here surgical hospitals generate more waste as compare to other hospitals. Bharti and civil hospital having maximum occupied beds. Surgical hospitals having more beds and generates 333Kg of hospital waste, orthopedic hospitals generates 58Kg of waste, maternity hospitals generates 35Kg of waste per day. Dental, physician and skin hospitals generates Very negligible waste

WASTE SEGREGATION, COLLECTION, STORAGE AND HANDLING

Table no. 4. 4.

Segregation of generated waste

Types of Hospital (Strata)	Total no of hospitals considered	**Yes**	No
Orthopedic	9	9	0
Maternity	9	9	0
Physician	5	0	5
Dental(DNT)	9	0	9
Surgeon	11	11	0
Neurologist	02	2	0
Pediatric	06	6	0
ENT	06	0	6
Skin	02	0	2
Pathology	05	5	0
Total population	**64**	**42**	**22**

(Source: field data)

Graph no.4. 4. Segregation of generated waste

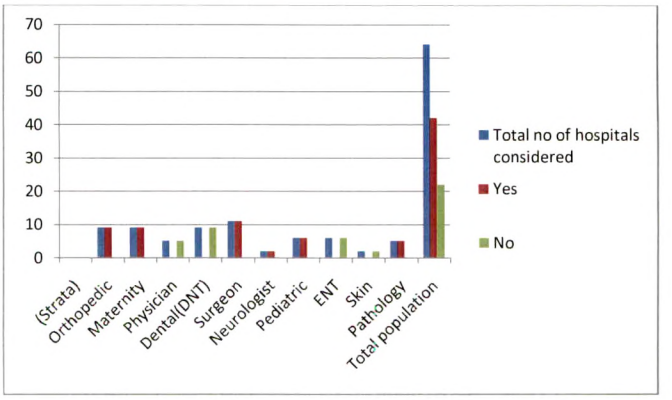


Table no.4.4 and graph 4.4 shows the segregation of waste in different strata. The hospitals like Orthopedic, maternity, Surgical, Pediatric and pathology follow the segregation practices but the hospitals like dental, physician and ENT do not follow the segregation practices. Researcher has found that the hospitals having more waste they follow the segregation practices.

Table no. 4. 5

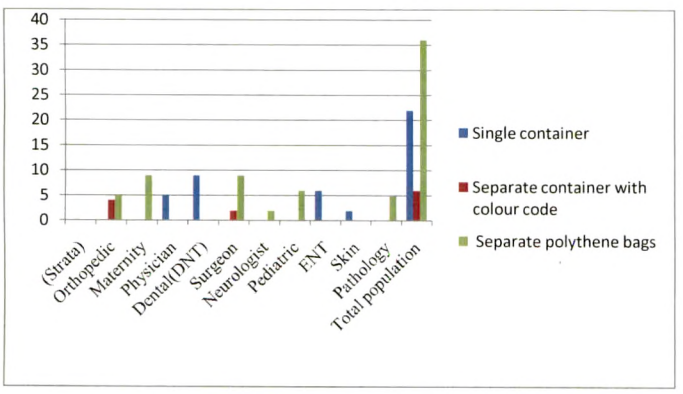
Storage facility for collected hospital waste

Types of Hospital (Strata)	Single container	Separate container with colour code	Separate polythen bags
Orthopedic	0	4	5
Maternity	0	0	9
Physician	5	0	0
Dental(DNT)	9	0	0
Surgeon	0	2	9
Neurologist	0	0	2
Pediatric	0	0	6
ENT	6	0	0
Skin	2	0	0
Pathology	0	0	5
Total population	**22**	**6**	**36**

(Source: field data)

Graph no.4.5

Storage facility of collected waste.



According to table no 4.5 and graph no.4.5 most of the hospitals which having less waste like dental, skin etc are used single container for storage of waste. Some orthopedic and surgical hospitals used Separate container with colour code and remaining hospitals used Separate polythene bags.

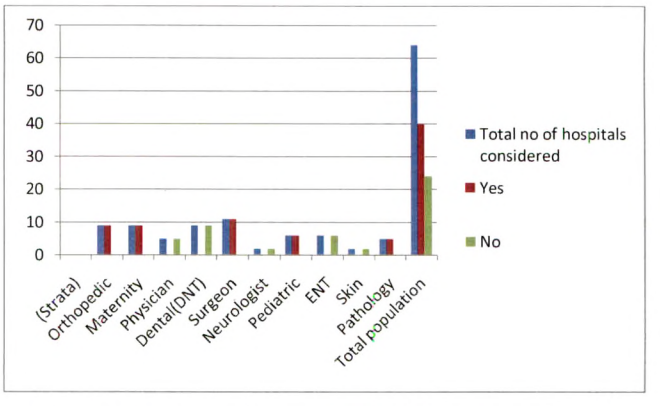
Table no. 4. 6

Waste handling equipment used by the waste collectors

Types of Hospital (Strata)	Total no of hospitals considered	**Yes**	No
Orthopedic	09	09	00
Maternity	09	09	00
Physician	05	00	05
Dental(DNT)	9	00	09
Surgeon	11	11	00
Neurologist	02	00	02
Pediatric	06	06	00
ENT	06	00	06
Skin	02	00	02
Pathology	05	05	00
Total population	**64**	**40**	**24**

(Source: field data)

Graph no. 4.6 Use of Waste handling equipments



The above table and graph shows the number of hospitals using waste handling equipment. In most of the hospitals like orthopedic, surgery, maternity etc which generates considerable waste and which is hazardous. The hospital staff uses handling equipments like hand gloves and mask. The hospitals which generates negligible waste do not use the handling equipments. Researcher here found that still the awareness regarding to the health in waste handler staff is not up to the mark.

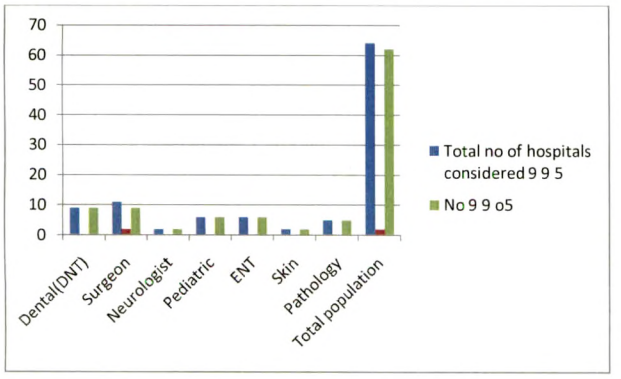
Table no :4. 7

Hospitals having waste treatment and recycling facility

Types of Hospital (Strata)	Total no of hospitals considered	**Yes**	No
Orthopedic	9	0	09
Maternity	9	0	09
Physician	5	0	o5
Dental(DNT)	9	0	09
Surgeon	11	2	09
Neurologist	02	0	02
Pediatric	06	0	06
ENT	06	0	06
Skin	02	0	02
Pathology	05	0	05
Total population	**64**	**02**	**62**

(Source: field data)

Graph:4.7 Hospitals having waste treatment and recycling facility



The above table and graph shows Hospitals having waste treatment and recycling facility. According to data about 98% of the hospitals does not have there own recycling or treatment plant. Only 2% hospitals have their own recycling and treatment plant. Among these civil hospital has a plant but from last two years it is not in working condition. Now Bharti hospital has own recycling plant which is in process and nearly about 175 to200 kg of hospital waste is treated daily.

Transportation of collected waste.

The mode of transportation of the hospitals for hospital waste is same. Researcher has found that the waste from all the hospitals in Sangli city is carried out by the private agency that is Surya Central Treatment Facility. Daily this agency collects the waste from different hospitals in Sangli city.

Agency for collecting hospital waste in Sangli city.

Surya Central Treatment Facility is the only agency in Sangli city which has collect the hospital waste from all the hospitals.

The rent charged by the agency is depends on the nature of the hospitals. For non beded hospitals like dental hospitals or physician the agency charges Rs.1300 per year. In case of beded hospitals again the charge is differen: for surgical and non surgical hospitals. For surgical hospitals the charges has Rs. 7.5 per bed and for nonsurgical hospitals it is Rs. 7 per bed.

PERSONNEL INVOLVED IN THE MANAGEMENT OF HOSPITAL WASTE

Designation of person (s) responsible for organization and management of waste

Researcher found that mostly all the hospitals do not defined a special post or designation for hospital waste management. The person who manages all the administration of hospitals is responsible for the management of the waste.

Qualification of most of the persons which are looking hospital waste and total management of the hospitals has 12th pass an graduate from different faculty.

Table no.4.8

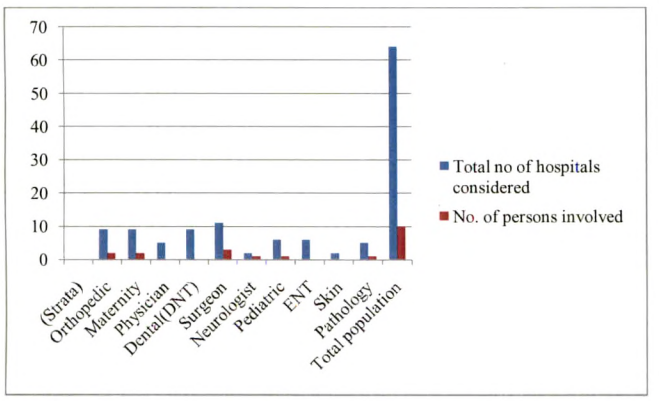
Number of persons involved in the collection, handling and storage of HW

Types of Hospital (Strata)	Total no of hospitals considered	**Average No. of persons involved**
Orthopedic	9	2
Maternity	9	2
Physician	5	0
Dental(DNT)	9	0
Surgeon	11	3
Neurologist	02	1
Pediatric	06	1
ENT	06	0
Skin	02	0
Pathology	05	1
Total population	**64**	**10**

(Source: field data)

Graph no 4.8

The number of persons involved in the collection, handling HW



Interpretation: The above table and graph shows the number of persons involved in the collection, handling and storage of hospital waste. Researcher found very few persons are involved in collection, handling and storage of hospital waste. These persons are associated with those hospitals who generates more waste and which shows lack of awareness among the hospitals regarding to the hospital waste.

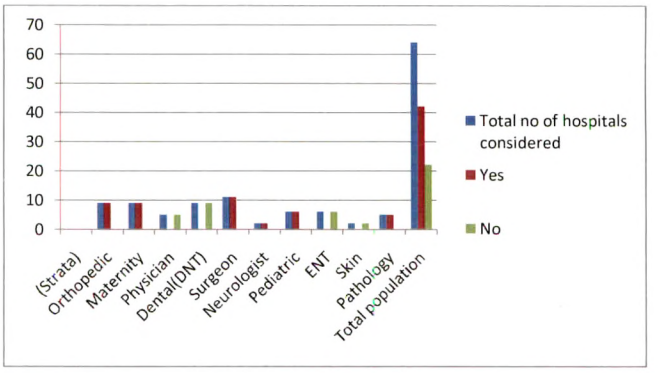
Table: 4.9

Training received on hospital waste management to the staff.

Types of Hospital (Strata)	Total no of hospitals considered	**Yes**	No
Orthopedic	9	09	00
Maternity	9	09	00
Physician	5	00	05
Dental(DNT)	9	00	09
Surgeon	11	11	00
Neurologist	02	02	00
Pediatric	06	06	00
ENT	06	00	06
Skin	02	00	02
Pathology	05	05	00
Total population	**64**	**42**	**22**

(Source: field data)

Graph no 4.9 Training received on hospital waste management



The above table and graph shows the training received to the waste handing staff in the hospitals. In most of the hospitals, training is given to the hospital staff by the waste collecting agency that is Surya Central Facility and not by the hospital management. Very few hardly one or two hospitals are giving training to the hospital staff. Hospital which generates very few wastes could not have special staff for waste handling. Researcher found the unawareness of the hospitals towards hospital waste and its bad impact on health.

Table: 4.10

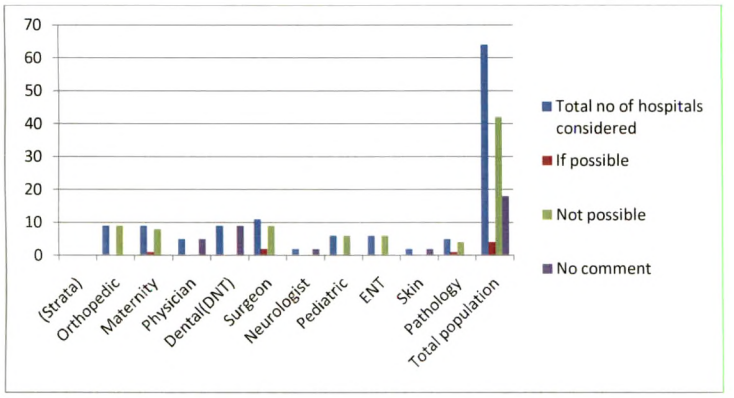
Number of hospitals taking efforts for reduction of hospital waste.

Types of Hospital (Strata)	Total no of hospital considered	If possible	Not possible	No commen
Orthopedic	9	0	9	0
Maternity	9	1	8	0
Physician	5	0	0	5
Dental(DNT)	9	0	0	9
Surgeon	11	2	9	0
Neurologist	02	0	0	2
Pediatric	06	0	6	0
ENT	06	0	6	0
Skin	02	0	0	2
Pathology	05	1	4	0
Total population	**64**	**4**	**42**	**18**

(Source: field data)

Graph no.4.10

Hospitals taken efforts for reduction of hospital waste



The above table and graph shows the number of hospitals taken efforts for reduction of hospital waste. Researcher found that maximum number of hospitals about 42 out of 64 that it is not possible to reduce the hospitals waste.18 hospitals has not give any comment and only 4 hospitals take efforts to reduce the waste if possible. These hospitals have reused the hand gloves where possible after disinfecting it and less use of cotton if possible.

Need of separate permit to transport biomedical waste

according to the survey conducted in different hospitals in Sangli ciry,it is found that there is no need of separate permission to transport the waste. The agency on their own collect the hospital waste from respective hospitals.

HOSPITAL WASTE MANAGEMENT POLICY

Awareness of biomedical waste management rule to hospital waste management

Researcher has found that all the selected hospitals are in the sample are aware of biomedical waste management rule to hospital waste management. The act was first published in 1998 under environmental protection act by .the ministry of Environment and Forests Government of India has notified the new draft Biomedical waste (management and handling) Rules,2011 to replace the earlier Biomedical waste (management and handling) Rules, 1998.

Hospitals having a waste management plan

Researcher has found that out of 64 hospitals no any single hospital have a waste management plan. There is no any special efforts are taken for waste management plan.

Table no. 4.11

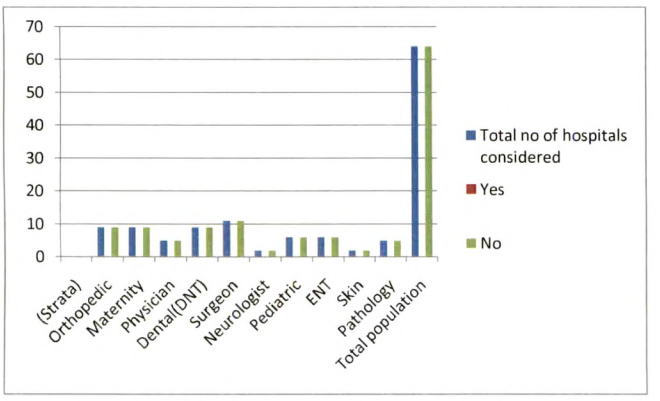
Hospital having a waste management team

Types of Hospital (Strata)	Total no of hospitals considered	Yes	No
Orthopedic	9	0	9
Maternity	9	0	9
Physician	5	0	5
Dental(DNT)	9	0	9
Surgeon	11	0	11
Neurologist	02	0	02
Pediatric	06	0	06
ENT	06	0	06
Skin	02	0	02
Pathology	05	0	05
Total population	**64**	**0**	**64**

(Source: field data)

Graph no 4.11

Hospital having a waste management team



Researcher found that there is no any well defined team for waste management in the hospitals. All the work related to the hospital waste is done by the general staff and workers in the hospitals. According to some hospitals it is not feasible for the hospitals to keep a special team for waste management in the hospitals.

Table no. 4.12

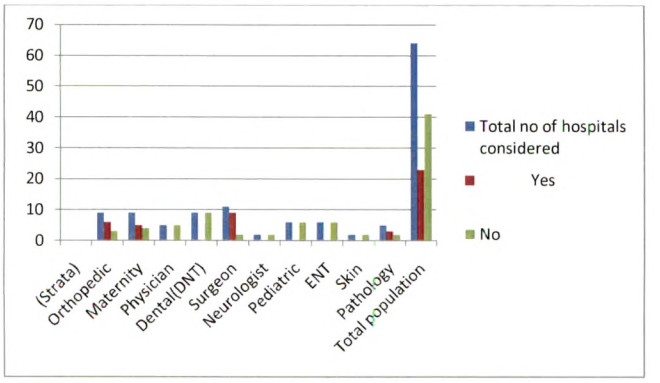
Hospitals having clearly defined procedure for collection and handling of waste from specified units in the hospital.

Types of Hospital (Strata)	Total no of hospitals conside	Yes	No
Orthopedic	9	6	3
Maternity	9	5	4
Physician	5	0	5
Dental(DNT)	9	0	9
Surgeon	11	9	2
Neurologist	02	0	2
Pediatric	06	0	6
ENT	06	0	6
Skin	02	0	2
Pathology	05	3	2
Total population	**64**	**23**	**41**

(Source: field data)

Graph no. 4.12

Hospitals having clearly defined procedure for collection and handling of waste



Above table and graph shows that out of 64 hospitals 41 hospitals has not clearly defined procedure for collection and handling of waste. Mostly these hospitals are small hospitals which carries only segregation practices. About 23 hospitals have clearly defined procedure for collection and handling of waste. These are the large hospitals having considerable number of beds.

SAFETY MEASURES OF HOSPITAL WASTE MANAGEMENT

Table no.4.13

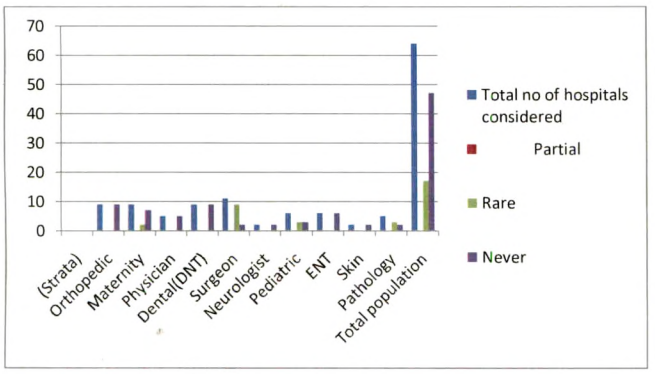
Impact of waste on health of waste collector

Types of Hospital (Strata)	Total no of hospitals considered	**Partial**	Rare	Never
Orthopedic	9	0	0	9
Maternity	9	0	2	7
Physician	5	0	0	5
Dental(DNT)	9	0	0	9
Surgeon	11	0	9	2
Neurologist	02	0		2
Pediatric	06	0	3	3
ENT	06	0	0	6
Skin	02	0	0	2
Pathology	05	0	3	2
Total population	**64**	**0**	**17**	**47**

(Source: field data)

Graph no. 4.13

Impact of waste on health of waste collector



The above table and graph shows impact of waste on health of waste collector. According to the 47 of the respondents, there is no any impact of waste on the health of the waste collector if proper precaution is taken. According to 17 hospitals there is rarely a health problem to the waste collector but not serious.

Table no.4.14

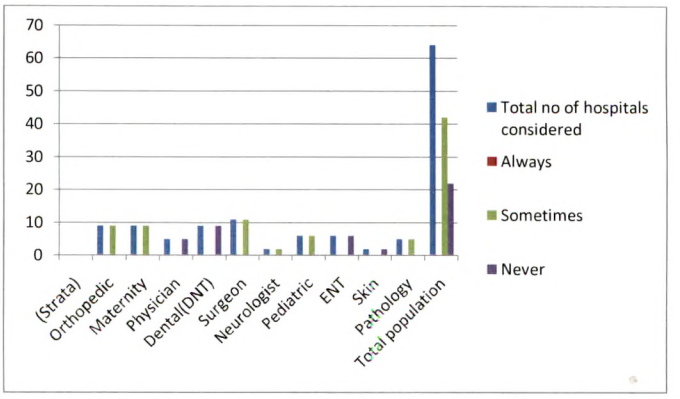
Routine checkup for waste collector staff

Types of Hospital (Strata)	Total no of hospit considered	Always	Sometimes	Never
Orthopedic	9	0	9	
Maternity	9	0	9	
Physician	5	0		5
Dental(DNT)	9	0		9
Surgeon	11	0	11	
Neurologist	02	0	02	
Pediatric	06	0	06	
ENT	06	0		06
Skin	02	0		02
Pathology	05	0	05	
Total population	**64**	**0**	**42**	**22**

(Source: field data)

Graph no. 4.14

Routine checkup for waste collector staff



From above table and graph researcher found that 42 respondents sometimes arrange a free check up for the waste collector and in 22 respondent's hospitals there is no any routine checkup for the waste collector. Researcher found that there is no any hospital which gives routine check up for the waste collector.

Safety measure are taken by the management of hospital to maintain the health of the staff

From the available data researcher here found that all most all the hospitals uses the handling equipment like hand gloves and mask as a safety measure to maintain the health of the staff. If there is any injury to the concern person, quick treatment is given to that person.

LEVEL OF AWARENESS ON BIOMEDICAL WASTE MANAGEMENT PRACTICE

Knowledge about colour-coding segregation of BM waste

According to the survey mostly all the hospitals are know about the colour coding segregation of BM waste. According to the Biomedical waste management act 1998,red colour container or bags are used to keep hazardous waste like human body part or tissues etc, Blue /white bags are used to keep the waste like sharps and needles etc. Generally puncture proof bags or container is mandatory. Red bags are used to keep the microbiology waste or biotechnology waste. Black bags are used for discarded medicines from the hospitals.

Table no 4.15

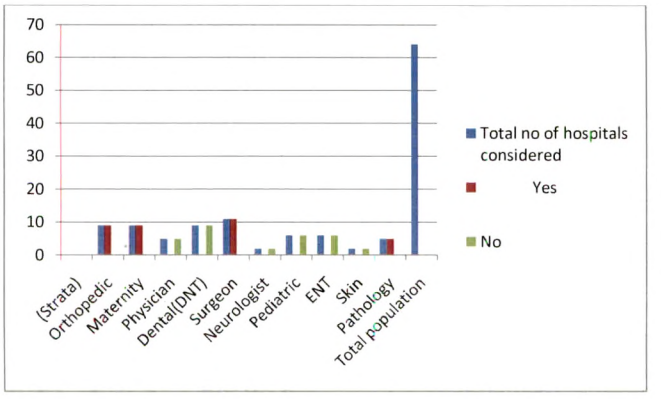
Hospitals following colour coding for HW

Types of Hospital (Strata)	Total no of hospitals considered	**Yes**	**No**
Orthopedic	9	9	0
Maternity	9	9	0
Physician	5	0	5
Dental(DNT)	9	0	9
Surgeon	11	11	0
Neurologist	02	0	02
Pediatric	06	0	06
ENT	06	0	06
Skin	02	0	02
Pathology	05	05	0
Total population	**64**	**34**	**30**

(Source: field data)

Graph no.4.15

Hospitals follow colour-coding for HW



Above graph and table shows the number of hospitals follows the colour coding for biomedical waste. Researcher found that About 34 hospitals follow the colour coding for biomedical waste and remaining 30 hospitals do not follow the colour coding. Researcher found that the hospitals who generates considerable waste follow the colour coding and the hospitals whose waste is negligible do not follow the color coding.

Hospitals having the correct waste disposal practice

Researcher found that almost all the hospitals in the sample told that whatever the waste disposal practices are followed by them are correct. All the hospitals in the Sangli city are associated with Surya Central Treatment Facility agency. The agency collects the hospital waste from all the hospitals from Sangli city for further processing.

The colour code for disposal of normal waste from the hospital is:

According to the survey 100% of hospitals are aware of the colour code for disposal for normal waste. The colour code of disposal for normal waste is black. Red and yellow colour is used for the hazardous waste like human tissues, sharps, needles etc.The waste which is reused or recycled is kept in blue and green container.

Table: 4.16

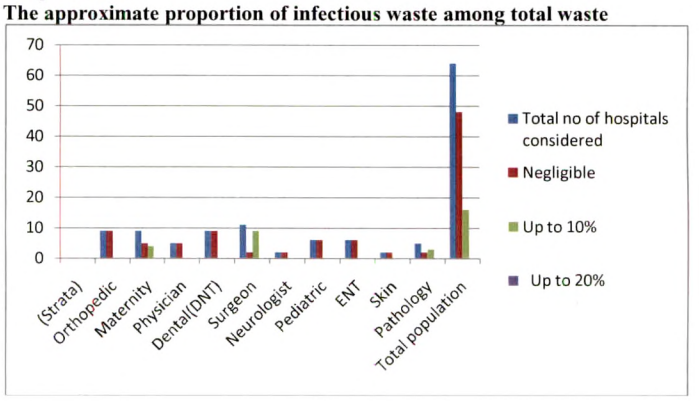
The approximate proportion of infectious waste among total waste

Types of Hospital (Strata)	Total no of hospital considered	Negligible	Up to 10%	Up to 20%
Orthopedic	9	9	0	0
Maternity	9	5	4	0
Physician	5	5	0	0
Dental(DNT)	9	9	0	0
Surgeon	11	2	9	0
Neurologist	02	2	0	0
Pediatric	06	6	0	0
ENT	06	6	0	0
Skin	02	2	0	0
Pathology	05	2	3	0
Total population	**64**	**48**	**16**	**0**

(Source: field data)

Graph no 4.16

The approximate proportion of infectious waste among total waste



The above table and graph shows the approximate proportion of infectious waste among total waste. Researcher found that about 48 hospitals has negligible infectious waste is as compare to the total waste. About 16 hospitals says the proportion of infectious waste is up to 10% of the total waste. Most of these hospitals are surgical hospitals which having the infectious waste.

Table: 4.17

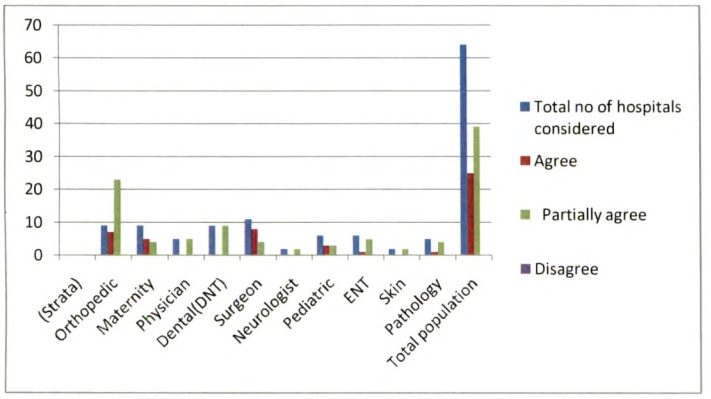
Relationship between awareness and discipline of hospital staff and HWM

Types of Hospital (Strata)	Total no of hospital considered	**Agree**	**Partially agree**	**Disagree**
Orthopedic	9	7	23	0
Maternity	9	5	4	0
Physician	5	0	2	3
Dental(DNT)	9	0	5	4
Surgeon	11	8	4	0
Neurologist	02	0	2	0
Pediatric	06	3	3	0
ENT	06	1	5	0
Skin	02	0	1	1
Pathology	05	1	4	0
Total population	**64**	**25**	**39**	**8**

(Source: field data)

Graph no4.17

Relationship between awareness and discipline of staff and HWM



The above table and graph shows relationship between awareness and discipline of hospital staff and hospital waste management. About 25 hospitals from64 are agree and 39 hospitals are partially agreed that hospital waste management is related with awareness and discipline of the hospital staff. If the hospital staff is aware about HWM and some disciplines has maintained in hospital staff then waste management practices can smoothly carried out in the hospitals.

ATTITUDE ASSESSMENT TOWARDS HW

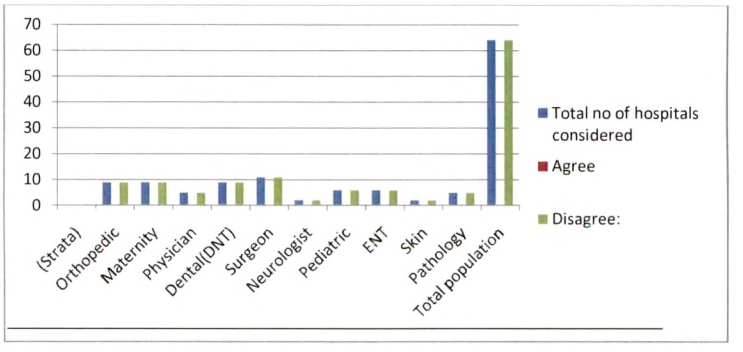
Table no 4.18
Safe management of health care waste is not an issue at all.

Types of Hospital (Strata)	Total no of hospitals considered	Agree	Disagree	Cannot comment
Orthopedic	9	0	9	0
Maternity	9	0	9	0
Physician	5	0	5	0
Dental(DNT)	9	0	9	0
Surgeon	11	0	11	0
Neurologist	02	0	02	0
Pediatric	06	0	06	0
ENT	06	0	06	0
Skin	02	0	02	0
Pathology	05	0	05	0
Total population	**64**	**0**	**64**	**0**

(Source: field data)

Graph no 4.18

Safe management of health care waste is not an issue



Above table and graph shows almost all the hospitals in the Sangli city are agree that the safe management of hospitals waste is an important issue. If proper management is not carried out it will be hazardous to health of waste collector.

Table 4.19

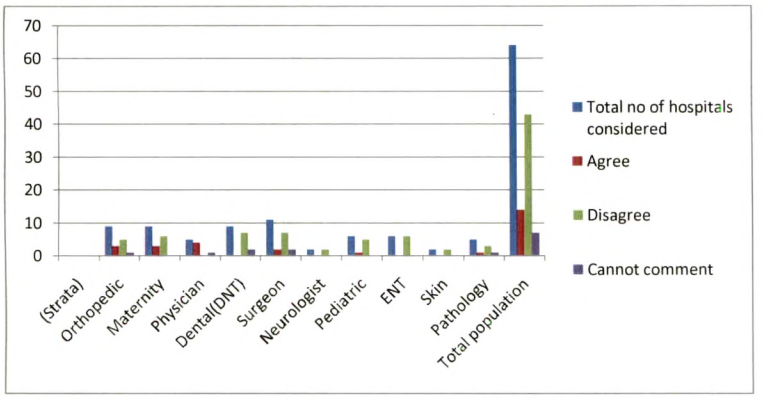
Hospitals reaction related to Safe management efforts and financial burden

Types of Hospital (Strata)	Total no of hospitals considered	Agree	Disagree	Cannot comment
Orthopedic	9	3	5	1
Maternity	9	3	6	0
Physician	5	4	0	1
Dental(DNT)	9	0	7	2
Surgeon	11	2	7	2
Neurologist	02	0	2	0
Pediatric	06	1	5	0
ENT	06	0	6	0
Skin	02	0	2	0
Pathology	05	1	3	1
Total population	**64**	**14**	**43**	**7**

(Source: field data)

Graph no 4.19

Safe management efforts and financial burden



The above table and graph shows attitude of the hospitals towards safe management of the hospitals waste. From the available data 43 hospitals does not feel any financial burden on management due to the safe management of the waste. But 14 hospitals feel the financial burden. Here number of the hospitals which having more occupied beds and generates more waste feels the financial burden

Table no 4.20

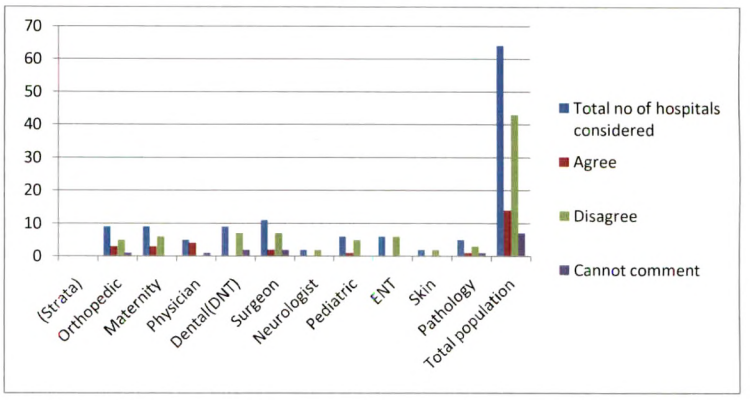
Safe management of health care waste is an extra burden on work.

Types of Hospital (Strata)	Total no of hospitals considered	Agree	Disagree	Cannot comment
Orthopedic	9	3	5	1
Maternity	9	3	6	0
Physician	5	4	0	1
Dental(DNT)	9	0	7	2
Surgeon	11	2	7	2
Neurologist	02	0	2	0
Pediatric	06	1	5	0
ENT	06	0	6	0
Skin	02	0	2	0
Pathology	05	1	3	1
Total population	**64**	**14**	**43**	**7**

(Source: field data)

Graph 4.20

Safe management of health care waste is an extra burden on work.



The above table and graph shows the opinion of different hospitals on the statement Safe management of health care waste is an extra burden on work. Most of the hospitals feel that safe management of health care waste is not an extra burden on work. But some hospitals who generates more waste feels a extra burden on work.

Table no 4.21

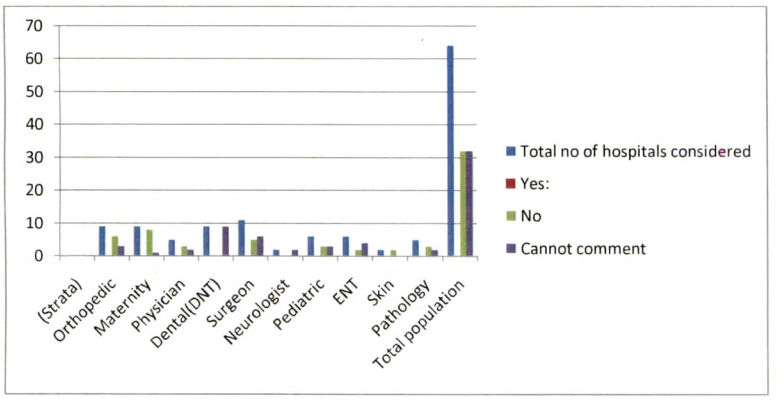
Hospitals attitude to attend voluntary program about HWM

Types of Hospital (Strata)	Total no of hospitals considered	Yes:	No	Cannot comment
Orthopedic	9	0	6	3
Maternity	9	0	8	1
Physician	5	0	3	2
Dental(DNT)	9	0	0	9
Surgeon	11	0	5	6
Neurologist	02	0		2
Pediatric	06	0	3	3
ENT	06	0	2	4
Skin	02	0	2	0
Pathology	05	0	3	2
Total population	**64**	**0**	**32**	**32**

(Source: field data)

Graph no 4.21

Hospitals attitude to attend the voluntarily about waste management



The above table and graph shows the attitude to attend voluntarily programs that enhance and upgrade the knowledge about waste management. Here most of all the hospital staff is not interested in attending the voluntary programs related to hospital waste management. Researcher here found very unenthusiastic attitude towards waste management.

Table no 4.22

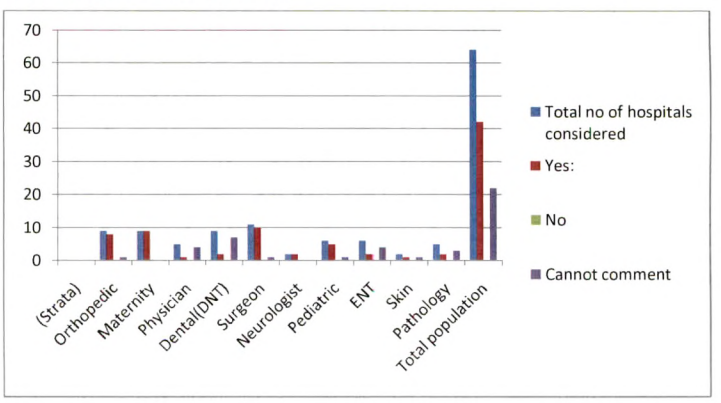
Opinion regarding to sterilization of infectious waste from infections by autoclaving before shredding and disposal

Types of Hospital (Strata)	Total no of hospitals considered	Yes:	No	Cannot comment
Orthopedic	9	8	0	1
Maternity	9	9	0	0
Physician	5	1	0	4
Dental(DNT)	9	2	0	7
Surgeon	11	10	0	1
Neurologist	02	2	0	0
Pediatric	06	5	0	1
ENT	06	2	0	4
Skin	02	1	0	1
Pathology	05	2	0	3
Total population	**64**	**42**	**0**	**22**

(Source: field data)

Graph no 4.22

Sterilization of infectious waste



From above graph and table researcher found that nearly about 42 hospitals are agree that there should be sterilization of infectious waste from infections by autoclaving before shredding and disposal and 22 hospitals didn't give any comment about the statement. But for the sake of safety the sterilization of hospitals waste is very important.

Table no.4.23

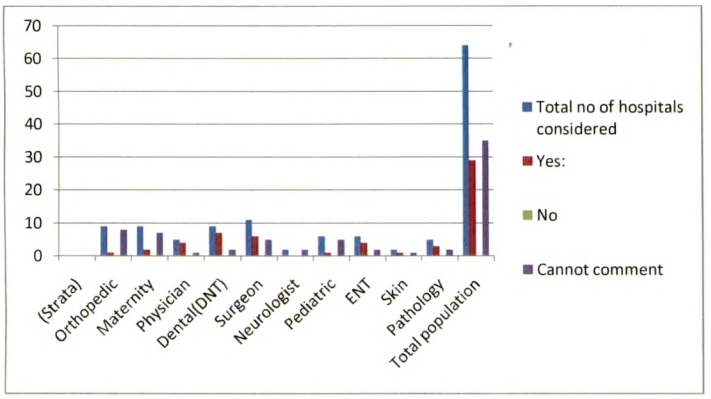
Hospitals feeling important to report to the PCBI about a particular institution if it is not complying with the guidelines for HWM

Types of Hospital (Strata)	Total no of hospital considered	Yes:	No	Cannot comment
Orthopedic	9	1	0	8
Maternity	9	2	0	7
Physician	5	4	0	1
Dental(DNT)	9	7	0	2
Surgeon	11	6	0	5
Neurologist	02	0	0	2
Pediatric	06	1	0	5
ENT	06	4	0	2
Skin	02	1	0	1
Pathology	05	3	0	2
Total population	**64**	**29**	**0**	**35**

(Source: field data)

Graph no 4.23

Report to PCBI



From above graph and table researcher found that only 29 hospitals out of 64 feels that it is important to report to the Pollution Control Board of India about a particular institution if it is not complying with the guidelines for biomedical waste management but 35 hospitals didn't give any comment they remain neutral.

Table no 4.24

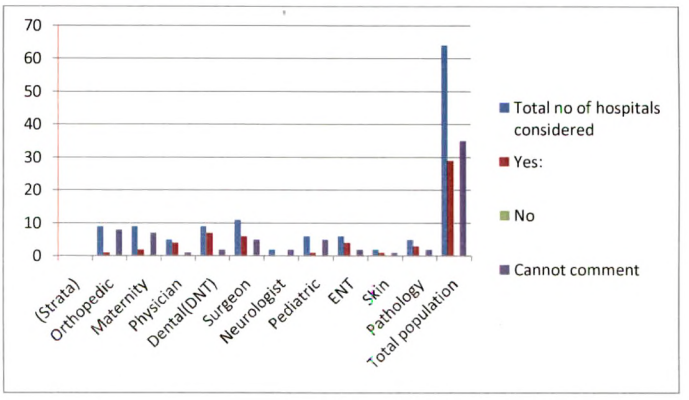
Labeling the container before filling it with waste is of any clinical .significance

Types of Hospital (Strata)	Total no of hospitals considered	Yes:	No	Cannot comment
Orthopedic	9	1	0	8
Maternity	9	2	0	7
Physician	5	4	0	1
Dental(DNT)	9	7	0	2
Surgeon	11	6	0	5
Neurologist	02	0	0	2
Pediatric	06	1	0	5
ENT	06	4	0	2
Skin	02	1	0	1
Pathology	05	3	0	2
Total population	**64**	**29**	**0**	**35**

(Source: field data)

Graph no 4.24

Labeling the container before filling it with waste is of any clinical .significance



The above table and graph shows that the opinion of the hospitals regarding to Labeling the container before filling it with waste is of any clinical .significance.29 hospitals out of 64 are agree with this statement while 35 hospitals didn't give any comment.

Waste management is team work/no single class of people is responsible for safe management.

All the respondent's hospitals here agree with statement above as waste management is team work/no single class of people is responsible for safe management. It is not a work of single person. All the persons that is from doctors , management staff and waste handling staff must be associate with waste management then only the waste management plan can be implemented

LEVEL OF KNOWLEDGE AMONG NURSES, DOCTORS, ON NEEDLE-STICK INJURIES

From the data collected from all respondents, researcher found that all the hospitals are concerned about needle-stick injury. Needle stick injury is very hazardous to the health which causes the diseases like AIDS, Hepatitis B etc.Used needle sticks are infectious whose injury is very dangerous for waste handling staff. Research found that 100% hospitals are aware about the needle stick injury.

All selected hospitals told that they recap the used needles .But according to the agency Surya Central Treatment Facility who actually collect the waste from different hospitals told that most of the hospitals could not recap the used needles, which is very serious problem. After visiting the selected hospitals researcher found that 100% hospitals discard the used needle.

Researcher also found that all the selected hospitals are aware about the consequences of needle-stick injury. If the discarded needle is not re-cap it may cause injury to the waste handling persons. As the discarded needle is infectious it may causes diseases like AIDS, Hepatitis B or other skin diseases to the injured persons. Sometimes surgery is required for injured person. No any hospital has fully inoculated against Hepatitis B.

Table no 4.25

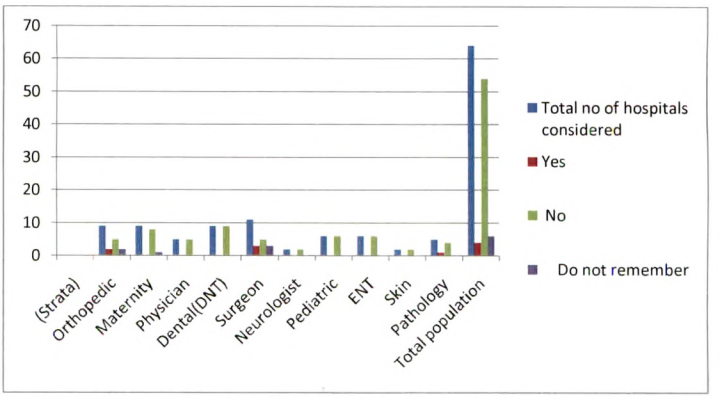
Needle-stick injury during the last 12 months

Types of Hospital (Strata)	Total no of hospitals considered	Yes	No	Do not remember
Orthopedic	9	2	5	2
Maternity	9	0	8	1
Physician	5	0	5	0
Dental(DNT)	9	0	9	0
Surgeon	11	3	5	3
Neurologist	02	0	2	0
Pediatric	06	0	6	0
ENT	06	0	6	0
Skin	02	0	2	0
Pathology	05	1	4	0
Total population	**64**	**6**	**52**	**6**

(Source: field data)

Graph: 4.25

Needle-stick injury during the last 12 months



Above graph and table shows the sustained needle-stick injury during the last 12 months in different hospitals. Here researcher found that the most of the hospitals did not have any needle stick injury. Few hospitals have needle stick injury to handling staff but it is very minor. It is not serious. Some hospitals from sample did not remember about needle stick injury. Researcher here found that at some extend the injuries are found which may cause a serious problem in future.

Table no 4.26

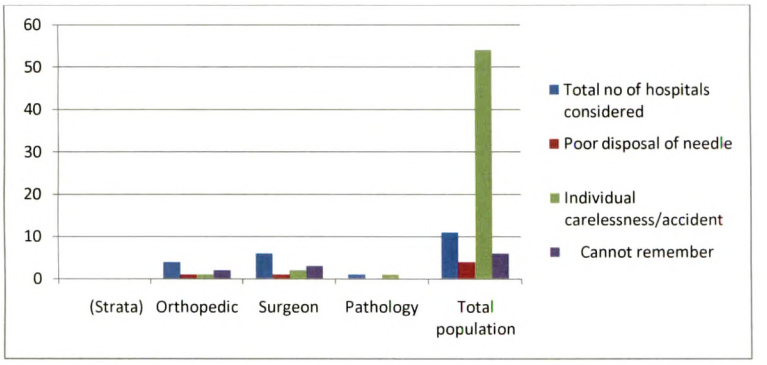
Cause of the most recent incident happened

Types of Hospital (Strata)	Total no of hospitals considered	Poor disposal needle	Individual carelessness/accider	Cannot remember
Orthopedic	4	1	1	2
Surgeon	6	1	2	3
Pathology	1	0	1	0
Total population	**11**	**2**	**4**	**5**

(Source: field data)

Graph no 4.26

Cause of the most recent incident happen



Above graph and table shows cause of the most recent incident happen due to a needle-stick injury in some hospital in the sample which generates major waste. Researcher here found that very negligible injuries are happened in some orthopedic and surgical hospitals. Few injuries are due to the poor disposal of needles and major injuries are occurs due to the individual carelessness. Awareness of the waste handling staff is very important while handling the waste.

AGENCY COLLECTING HOSPITAL WASTE:

The Surya Central Treatment Facility collect the waste from different hospitals from Sangli city. The agency collects the waste from total 258 hospitals from different area. In Sangli city the agency collect the waste from 154 hospitals.

The agency Surya Central Treatment Facility collects near about 452Kg to 475Kgtotal hospital waste from different areas per day. Specifically from Sangli city the agency collects near about 300kg to 350Kg hospital waste per day excluding the Bharati hospital. In recent years Bharati hospital has their own recycling plant. Before this plant Bharati hospital was associated with Surya Central Treatment Facility.

Total number of staff of Surya Central Treatment Facility is about 30. From which 8 to 9 persons are working in administrative department and remaining are associated with actual handling and treatment of the hospital waste.

The charges offered by the agency are different for different hospitals depending upon the category and availability of beds in the hospitals. In case of non beded hospitals the charges are again different. There are four categories as general health care facility which has charged by Rs.1200 per year. For dental clinic it is Rs 1300 per year, for pathology laboratories it is Rs. 1500 per year and for blood blanks it is Rs.2500 per year. For bedded hospitals again there are two categories, surgical and non surgical hospitals. For surgical hospitals it is Rs.7.5 per bed per day and for nonsurgical hospitals it is Rs. 7 per bed per day. Though the hospitals have the beds of particular capacity the occupancy of the bed is important. It is not possible in all the hospitals that all the beds are occupied every time. As the waste quantity is depends upon the number of occupied beds the agency offered the charges of70% of total beds.

According to the agency Surya Central Treatment Facility, about 98% of waste collected from different hospitals from Sangli city is un segregated which is a very serious problem. Only very few hospitals are there which can segregate the waste according to the biomedical waste management rule.

The Surya Central Treatment Facility gives training to each and every hospital staff in Sangli city. Mostly the training is given once per month. The training is given to the hospital staff regarding to collection, segregation and, handling of the hospital waste

The Surya Central Treatment Facility agency works on private bases. It collects the waste from different hospitals in Sangli city. Agency has its own incineration plant in MIDC

Miraj which incinerates the hazardous waste. Most of time, all the un segregated waste has incinerated in the plant. Also the agency has shredding and autoclaving machines. Recycling material has shredded after autoclaving.

The Surya Central Treatment Facility agency has not their own recycling plant but recycling material like saline bottles are shredded here after autoclaving. The agency is associated with one recycling plant that is Sakshi Plastics MIDC Miraj. After shredding the material is send to Sakshi Plastics for recycling. With incineration technique the agency adopted autoclaving and shredding techniques. The infected materials disinfected under high degree temperature primarily about 800to 850 degree Celsius and secondary temperature about 1050 to 1100 degree Celsius.

The Surya Central Treatment Facility agency has collect the ash which is produced during the incineration process and send it to the company Maharashtra Enviro Power Limited Ranjangaon for further treatment.

There is a strong relation between segregation of waste and training of staff. Segregation of the waste must be takes place at the point of generation of the waste. Awareness of the hospitals workers at the point of generation of hospital waste can reduce number of problems

There are number of problems faced by the agency while collection transportation and segregation of waste. First serious problem is lack of segregation practices at hospital level. The un segregated waste becomes a challenge for agency. There are number of injuries takes place at incineration plant workers, According to agency the second problem is that total 100% hospital waste is not provided to the agency.

Testing of hypothesis

The first hypothesis framed by the researcher is as under

1) **H_0:** There is significant relationship between number of the beds in the hospitals and waste generation rate.

H_1: There is no any significant relationship between number of the beds in the hospitals and waste generation rate.

Table no.4.27
Estimation of coefficient of correlation

Types of Hospital (Strata)	**Total no of hospitals considered**	**Total no. of Beds (Average)**	**Quantity of waste generated per day in Kg**
		X	Y
Orthopedic	9	35	58
Maternity	9	19	35
Physician	5	0	0.175
Dental(DNT)	9	0	0.25
Surgeon	11	122	333
Neurologist	2	9	3.15
Pediatric	6	8	8.4
ENT	6	6	5.4
Skin	2	0	0.25
Pathology	5	0	21
Total population	64	199	464.625

Formula used:

$$r = \frac{\Sigma(x-\bar{x})(y-\bar{y})}{\sqrt{[\Sigma(x-x)^2\,\Sigma(y-y)^2]}}$$

Where, r – is the coefficient of correlation

r= 0.9932

The value of r is positive that is 0.9932 which is nearly equal to 1. So there is positive correlation ship between the two variables.

Chi-square test :

Another hypothesis is

H_0: Segregation of hospital waste is independent on training and discipline provided to hospitals staff.

H_1: Segregation of waste not independent on training and discipline provided to the hospital staff.

For testing the hypothesis the chi-square test is used to determine the relationship between the segregation process and training and discipline provided to the staff

Table no.4.28

	Agree	Partially agree	Disagree	
Training provided to hospital staff	24	18	0	42
Training not provided hospital staff	1	13	8	22
	25	31	8	64

Table no. 4.29

Perticulars	**O**	**E**	**O-E**	**O-E^2**	**(O-E)^2/E**
Training Provided and agree	24	16.40625	7.59375	57.66504	3.514821429
Training Provided and partially agree	18	20.34375	-2.34375	5.493164	0.270017281
Training Provided and disagree	0	5.25	-5.25	27.5625	5.25
Training not Provided and agree	1	8.59375	-7.59375	57.66504	6.710113636
Training not Provided & partially agree	13	10.65625	2.34375	5.493164	0.515487537
Training not Provided and disagree	8	2.75	5.25	27.5625	10.02272727
Total					**∑=26.28316716**

We have the calculated X^2 (Chi square)

$$X^2 = \frac{\sum (O-E)^2}{E}$$

X^2 = 26.2831

Now

Degree of freedom = (number of Coloum – 1)* (number of rows – 1)

= (3-1)*(2-1)

= 2 * 1

= 2

But we have tabular X^2 = 5.991 at 5% level of significance for 2 degrees of freedom

Hence calculated value of X^2 is greater than table value of X^2

Therefore

Calculated X^2 > Tabular X^2

Reject the null hypothesis

So accept the alternative hypothesis, segregation of HW is not independent on training and discipline in the staff.