

Awareness of Shrushrutha Bio-Medical Wastage Management Society in Machenahalli – An Empirical Study

V. VIMALA

Bio - Medical Wastage Management (BMWM) is the new jargon frequently used in the medical field and in Hospital Management. The present paper provides a platform to understand the awareness level, usage of wastages in the hospitals especially with Shrushrutha Bio-Medical Wastage Management Society, Hospitals, related Organisations and its social welfare to the society in Karnataka with special reference to Shivamogga city. The current study focuses on the awareness levels of Bio-Medical Wastage Management in the Shrushrutha Bio-Medical Wastage Management Society in Machenahalli, Shivamogga District. With the help of a structured questionnaire and personal interviews with the respondents in Machenahalli, Shivamogga town, the analysis is made thereafter. The analysis, interpretation and evaluation is made by using suitable statistical tools and techniques in order to arrive a authenticate information about the awareness level of BMWM and its public welfare measures in the present scenario. It concentrates on the new emerging challenges in the management of BMWM efficiently in the selected area in the study. Finally it makes an attempt to offer few suggestions to enhance its awareness and to provide maximum benefits to cope up with the existing challenges in the wake of severe competition and ultimately providing better service to help the people and the Shrushrutha BMWM Society to improve its performance and to create more awareness about the BMWM in Shivamogga, Machenahalli.

Key Terms: Bio-Medical Wastage Management, Hospital Waste Management, Wastage Treatment Facilities and Shrushrutha Society

INTRODUCTION

Management of Bio-Medical waste in a hospital should be based on a scientific approach to process of waste generation, storage, transport, treatment and its disposal. **Biomedical Waste (BMW)**, consists of solids, liquids, sharps,

V. Vimala is a Assistant Professor, Department of Commerce, Avinashilingam Institute for Home Science and Higher Education for Women University, Coimbatore – 641 043, Tamil Nadu, INDIA, vim2achar@gmail.com. 094897 97852 / 094819 69904

and laboratory waste that are potentially infectious or dangerous and are considered bio-waste. It must be properly managed to protect the general public, specifically healthcare and sanitation workers who are regularly exposed to biomedical waste as an occupational hazard.

BIO-MEDICAL WASTAGE MANAGEMENT IN HOSPITAL: GLOBAL CONTEXT

Until fairly recently, medical waste management was not generally considered an issue. In the 1980s and 1990s, concerns about exposure to human immunodeficiency virus (HIV) and hepatitis B virus (HBV) led to questions about potential risks inherent in medical waste. Thus hospital waste generation has become a prime concern due to its multidimensional ramifications as a risk factor to the health of patients, hospital staff and extending beyond the boundaries of the medical establishment to the general population.

HOSPITAL WASTAGE MANAGEMENT: INDIAN SCENARIO

The Origin of Bio - Medical Waste Management in the Indian Sub Continent:

In the Indian sub-continent, Mortimer Wheeler's work at Harappa in 1946, nothing was known with certainty of the way in which this people dispose of their dead, but from a century than discovered, containing at least 57 graves, each appears the burial was a usual rite. The whole cemetery has not been evocated posture with pottery and personal belongings, coming back to modern age, in the 21st century with increased use of disposable material and the presence of the infected and hazardous waste to save the mankind from disaster.

KARNATAKA STATE POLLUTION CONTROL BOARD

The Karnataka State Pollution Control Board was constituted as the 'Karnataka State Board for the Prevention and Control of Water Pollution' by the Government of Karnataka on 21.9.1974, under the Water (Prevention and Control of Pollution) Act 1974. Later as per the Water (Prevention and Control of Pollution) amendment Act 1988 (Art.53 of 1988), the name of the Board was changed to Karnataka State Pollution Control Board. Initially the mandate of the Board was only to implement the Water Act 1974; subsequently the Board was given the responsibility of implementing –
The role and the guidelines of State Pollution Control Boards (SPCBS) and Pollution Control Committees (PCCS):

01. Concerned SPCB/PCC should conduct water quality assessment of the water body, preferably in class-I cities (having population more than

one lac), at three staged i.e pre-immersion, during immersion and post immersion.

Considering the size of water body, appropriate number of sampling locations may be determined in order to get a fairly representative assessment of water quality. For ascertaining water quality, Physio-chemical parameters such as pH, DO, BOD, COD, conductivity, Turbidity, TDS, Total Solids and Metals (Chromium, Lead, Zinc and Copper) may be analysed and results posted on the SPCB's website.

02. SPCB/PCC shall help to local administration in preparing material for mass awareness for the purpose.
03. Sewage Treatment Plant (STP) -, the Karnataka State Pollution Control Board mandated that Sewage Treatment Plants be built and operated in individual residential complexes having fifty or more dwellings, or generating 50 m³/day or more of sewage. Additional conditions imposed among others were that the treated water quality shall meet stringent "Urban Reuse Standards", treated water shall be reused for toilets flushing (thus requiring dual plumbing system in the residential complexes), for car washing, and for irrigation use within the campus.
04. A large residential complex, in its sewage generation potential, may then be viewed as a microcosm of the city itself; with a ready and perennial source of water right at its doorstep. All that the complex needs is to have a good, robust, well designed STP to produce water for all its secondary needs.
05. So, given this already grim and rapidly worsening [water supply] scenario, it is important for the people living in Bangalore and other mega cities in India to realize the importance of recycled water, and strive to set up efficient water treatment plants within their complexes, so that they can themselves control the quality of the water they use. At the same time, they will also be bringing down their own cost of living substantially, by obviating the laying of huge pipelines that bring water from far-off places.

BIO-MEDICAL WASTEAGE MANAGEMENT: A BRIEF PROFILE OF SHRUSHRUTHA MACHENAHALLI, SHIMOGA DISTRICT

A Common Bio-Medical Waste Treatment Facility (CBWTF) is a set up where Bio -Medical Waste. It requires a separate manpower and infrastructure development for proper operation and maintenance of treatment system. Shrushrutha Bio-Medical Waste Management establishment in **21st August, 2004** located in **Machenahalli Industrial Area, Shivamogga District**. A CBWTF shall be located at a place reasonably far away from residential and sensitive

area so that it has minimal impact on these areas. The CBWTF shell is located as near to its area of operation as possible in order to minimize the travel distance in waste collection, thus enhancing its operational flexibility. The location shall be decided in consultation with the State Pollution Control Board (SPCB), Pollution Control Committee (PCC). Karnataka's second largest Bio-Medical Wastage Management.

Table - 1.1.

**a. Fact Sheet of Shrushrutha Bio Medical Wastage Management Society,
Machenahalli, Shivamogga District**

Sl.No.	Facts	Figures
01.	Name of CBMWTF with Contact Details	The Shrushrutha Bio Medical Waste Management Society. Site No. 31/C, Machenhalli Industrial Area, Shimoga District. Phone: 08182-290203, Mobile No. 094482 44262, 090089 82039.
02.	Month/Year of Establishment	21/08/2004
03.	Area Covered	Shimoga District
04.	Waste treatment capacity of CBMWTF	50 kg/ hour
05.	Authorization Validity	01/07/2009 to 30/06/2011
06.	Investment in setting up the CBMWTF	Rs. 40.00 Lakhs
07.	Area of Plot size for CBMWTF (in acres)	1-00 Acres
08.	Daily operation schedule (timings)	10 - 30 am to 6.30 ^o pm
09.	Total quantity of BMW treated (Kg per day):	235 kg per day
	a. Incinerable	a. 170 kg per day
	b. Autoclaving	b. 40 kg per day
	c. Others (Please Specify)	c. Shredding 25 kg per day
10.	Staff involvement in CBMWTF operation (No. of persons):	12
	a. Managerial / Administration	a. Honorary Committee + 2
	b. Equipment operations	b. Cleaning-4, operator - 2
	c. Transportation of BMW	c. 4 - Members
11.	Sanitation and others	Good
12.	Treatment equipment installed at CBMWTF:	
	a. Incinerator (Capacity, make air pollution control devices etc)	50 kg/ hr, Wet Scrubber and Chimney

b. Details of heat recovery system installed with incinerator	30 Meters above ground level provided
15. Capacity of autoclave/microwave/hydroclave and make	Auto Clave – 200 Liters Double bin Horizontal
16. Capacity of Shredder and make	Three ESS Engineers, Bangalore Capacity 40 kg per hrs
17. Give details of sharp pit/encapsulation facility	15ft. X 6ft. X 6ft. Daily 2 kg sharp
18. Give details of vehicle/container washing facility	16Ft. X 28Ft.
19. Water balance	5000 Ltrs per day
20. Source and quantity of water intake per day (cubic m/day)	5000 Ltrs KIADB supply and 5000 Ltrs/day
21. Break up of water usage (such as washing, scrubbing etc)	Scrubber 300 – Ltrs / day Domestic 1000 Ltrs / day Washing 1000 Ltrs / day
22. Total water effluent generated per day	4500 Ltrs per Day
23. Status of infrastructure (Yes/No)	—
24. Treatment equipment room	33 ½ X 32 ½
25. Main waste storage room	32 X 26 Ft.
26. Treated Waste Storage room	28 X 22 Ft.
27. Administration room	16 X 10 ½ ft.
28. Generator set (Size and regulatory compliance details)	Proposed to purchase
29. Site security (High walls, fencing, guarded gates etc)	Left side fencing other Three side 8 -10 feet Brick wall
30. Parking facility	Available
31. Sign Board	Provided
32. Green Belt	YES
33. Washing Room	YES
34. First aid Box	YES
35. Lighting arrangements	Good
36. Odour Problem remedial	—
37. Fire fighting and emergency facilities	Provided
38. Measures for control of pests/insects	YES
39. Protective wear for waste handlers	Gloves, Mask, Goggles, Boots etc.

40.	Telephone facility	Provided
41.	Record keeping details does the CBMWTF operator have record keeping system as per the CPCB guidelines (Waste movement record, log book for equipment, site records etc) specify shortcomings observed if any	Maintained
42.	Collection and transportation Status Yes/No	YES
43.	Whether waste collected in a container of similar colour with label as per the rules	YES
44.	Whether the person who collects BMW maintain a register with him/her	Supervisor maintained the register
45.	Has due attention have been given in vehicles to prevent spillage/loading/unloading etc.	YES
46.	Is the vehicles labeled with the symbol and display the name, address, telephones No. etc	YES
47.	Does the CBMWTF operator collects waste daily or alternate day? Whether criterion of 48 hours in complied daily.	Shimoga and Bhadravathi daily and Others areas alternatives days
48.	No. of vehicles owned and used for collection of BMW	2 Maruthi Van (Cargo type)
49.	Disposal of treated after treatment	—
50.	Plastic wastes after treatment	Scrap dealer
51.	Treated Sharps	Sharp pit
52.	Incineration ash	Secured Landfill
53.	Other treated Solid waste	Municipality
54.	Oil and grease	Not applicable
55.	Treated waste water	Discharged towards the gardening
56.	Monitoring details	—
57.	Frequency of Incinerator/autoclave/microcline/hydroclave/ETP discharge effluent testing and name of the laboratory (Specify testing and name of the laboratory (Specify approved or not) give details of compliance/non-compliances)	a. Government analysis Laboratory, Davangere b. Enviro-Tech Company, Bangalore (Approved)

Sources: Survey Data, 2010 (The Shrusrutha Bio Medical Waste Management Society, Machenhalli Industrial Area, Shivamogga)

LITERATURE REVIEW

The literature in the area Bio – Medical Wastage Management in India is enormous. Since it is difficult to review all the works carried out in the area of Bio – Medical Wastage Management, in this view only few reviews is limited to only those studies which are relevant to the objectives of the present study. With this background, review of a few important works is made in the following paragraphs -

Vandan Jain, V. K. Sharma, Arvind Kumar and Sanjeev Jain¹, in their work **Bio - Medical Waste Management - A Case Study of Bhopal City** studied the bio-medical waste is any waste, which is generated during diagnosis, treatment or immunization of human beings or animals or in research activities pertaining to or in the production or testing of biological and categories mentioned in schedule - 1 of Bio-medical Waste Management and Handling (1998) Rules. U. S. Shree Ramalu, and Shobha. U.S.² stated in their book **Urban Solid Waste Management in India** they represented that in biomedical when potentially infectious wastes get mixed with solid wastes from other activities, the entire chain of work persons involved in solid wastes disposal and other public will be affected. S.C. Bhatia³, in his book **Solid and Hazardous Waste Management**, defined, bio - medical waste may be defined as any solid, fluid or liquid waste , including its container and intermediate product, which is generated during the diagnosis, treatment or immune ration of human beings or animals. P.N. Prasad and T.R. Amarnath⁴ (2010), in their work **Waste Pollution and Its Control**, discussed that healthcare waste (HCW) is defined as the total waste stream from a healthcare facility (HCF) most of it (75 - %) is similar to domestic waste. This fraction referred to as healthcare general waste (HCGW) is made of paper, plastic packaging, food preparation etc that have not been in contact with patients. A smaller proportion (10 - 25%) is infectious/hazardous waste that requires special treatment.

Bhoyar et.al,⁵ (1996) have characterized the municipal solid waste in the cities of Karmaagar, Surat, Thane, Pune, Delhi, Mumbai, Indore, Nagpur and greater Bombay .The percentage of paper content varied between 2.9% and 6.5%. The percentage of plastic, rubber and leather was 21%. Frantizis (1989) has studied the attitude of municipalities towards waste management. Umme Naseeba⁶ (1997) has studied solid waste management of Bangalore city and as given a geographical look. Dayal and Singh¹⁰ (1990) who have studied the physic-chemical properties of solid waste of Agra city have recommended better management strategies.

OBJECTIVES OF THE STUDY

The primary objectives of the present study are:

01. To know the Bio-Medical Wastage Treatment Facilities in Shrushrutha Bio-Medical Waste Management, Machenahalli, Shivamogga District;
02. To understand the Bio-medical wastage management in Shrushrutha;
03. To know the awareness about hospital waste management among the public in Machenahalli;
04. To study and design the Bio-Medical Wastage Management Model in Shrushrutha; and
05. To offer few suggestions and measures to improve the BMWTF and HWM in Shrushrutha Bio –Medical Wastage Management Society, Machenahalli Shivamogga, District.

SCOPE OF THE STUDY

The current study focuses on Bio - Medical Waste Management in the Shrushrutha Bio - Medical Wastage Management Society, Shivamogga district. This paper tries to understand the awareness level about the Bio - Medical Waste Management among the public and makes an attempt to find various treatment facilities and the models designed for collection, disposal and treatment. This present study covers 46 respondents in Machenahalli, Shivamogga District, particularly focusing on Shrushrutha Bio - Medical Wastage Management Society. It provides the information about awareness of Bio - Medical Wastage Management and its changes, challenges faced by the hospital and the society. The structured questionnaire was prepared to measure the respondent's awareness level, treatment facilities, wastage collection methods, regarding Bio- Medical Wastages in the Machenahalli. The respondents for the survey are randomly selected irrespective of doctors, patients, general public and few association – cum society who involved directly and indirectly in the Bio- Medical Management in the both public as well as private sector.

HYPOTHESIS OF THE STUDY

- **H₀₁**: There is no significant relationship between the Shrushrutha Bio – Medical Waste Management system and Hospital Wastage Management system in Shivamogga;
- **H₀₂**: BMWTF has no impact of the development of public welfare;
- **H₀₃**: BMW Management has no relationship between Wastage Management (WM).

METHODOLOGY OF THE STUDY

This present study uses the data from the available secondary sources and primary data. The primary data are collected by conducting the survey and personnel interviews in selected field and for the purpose of survey the structured questionnaires were used. The questionnaire purely based on the present objective of the study. In this view a small attempts have been made to measure the extent of deployment of Bio - Medical Waste Management in the Shrushrutha Bio - Medical Wastage Management Society, Machenahalli, Shivamogga district. The survey covers doctors, patients, general public and few associations – cum society in Shivamogga city and their awareness about the fisheries in the selected area. The secondary data have been mainly drawn from various magazines, journals, newspapers, articles, textbooks; reports on Marketing and the data available on web sites.

STATISTICAL TOOLS AND TECHNIQUES

The collected data have been properly arranged and presented with the help of tabulation, charts, graphs and other illustrations in order to support the interpretation of analyzed data. Collected data's have been analyzed with held of suitable statistical tools and techniques. In this present study the tools such as X^2 – test, **T - test**, **percentages** and **Frequency distribution** table and other techniques which ever applicable for the analysis have been used in the present study.

SAMPLE DESIGN

The present study was conducted on selected area in Shivamogga city including the Shrushrutha Bio - Medical Wastage Management Society were taken for the study, and the samples are randomly selected.

RESEARCH DESIGN

The researchers have used the Descriptive Research Design, which is concerned with describing the Bio-Medical Waste Management in the hospitals.

PERIOD OF STUDY

The study was conducted during month of January 2011 to August 2011.

BIO-MEDICAL WASTAGE TREATMENT FACILITY IN KARNATAKA

A Common Bio-Medical Waste Treatment Facility (CBWTF) is a set up where bio-medical waste, generated from a number of health care units, is imparted necessary treatment to reduce adverse effects that this waste may pose. The treated waste may finally be sent for disposal in a landfill or for recycling purposes. Installation of individual treatment facilities by small healthcare units requires comparatively high capital investment. In addition, it requires separate manpower and infrastructure development for proper operation and maintenance of treatment System.

FLOW DIAGRAM OF BIO MEDICAL LIQUID, WASTE TREATMENT SYSTEM

- Bio – Medical wastage operating system
- Components of an Incinerator and
- Incinerator in Shrushrutha Bio–Medical Wastage Management System, Machenahalli, Shivamogga.

Figure - 1

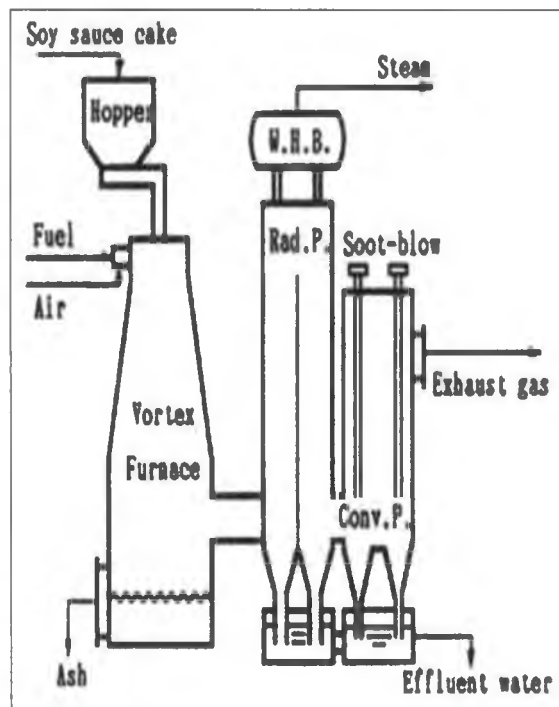
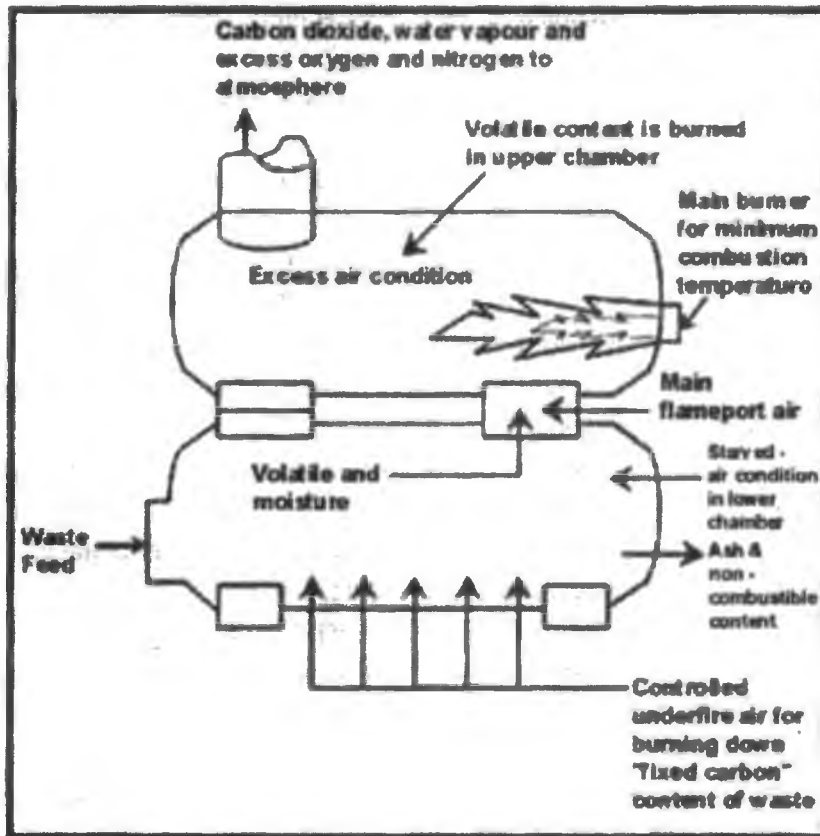


Figure - 2

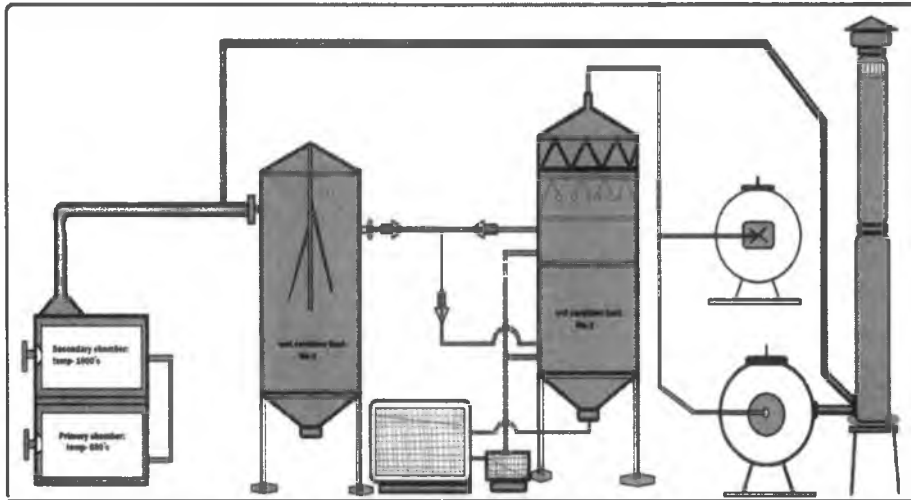


Components of an Incinerator¹

BIO - MEDICAL WASTAGE TREATMENT FACILITY AND ITS MODEL

A common Bio-Medical Waste Treatment Facility (CBWTF) is a set up where bio-medical waste, generated from a number of healthcare units, is imparted necessary treatment to reduce adverse effects that this waste may pose. The concept of CBWTF not only addresses such problem but also prevents proliferation of treatment equipment in a city.

Chart – 1 (a)



The chart showing a Blueprint how to operate an incinerator in shrusrutha Bio-Medical Waste Management system.

Source: Shrusrutha Bio Medical Waste Management Society, Shimoga Survey Data 2011

In turn it reduces the monitoring problem but also prevents proliferation of treatment equipment at CBWTF to its full capacity; the cost of treatment of per kilogram gets significantly reduces. Its considerable advantages have made CBWTF popular and proven concept in many developed countries. CBWTF shall be located at a place reasonably far away from residential and sensitive area so that it has minimal impact on these areas. The CBWTF shall be located as near to its area of operation as possible in order to minimize the travel distance in waste collection, thus enhancing its operational flexibility. The location shall be decided in consultation with the State Pollution Control Board (SPCB)/Pollution Control Committee (PCC).

ANALYSIS AND INTERPRETATION OF DATA

This section analyses the network system and issues of the Bio - Medical Waste Management in the Shrusrutha Bio - Medical Waste Management Society, Shimoga district, for various services and facilities provided Shrusrutha Bio - Medical Waste Management Society, to their respondents. This analysis is based on various factors in the selected sample.

Table - 1.2
The Socio - Economic Profile of the Respondents, Shivamogga
(With Special Reference to Shrushrutha Bio - Medical Waste Management Society)

Gender

Sl. No.	Description	Responses	Percentage
01.	Male	19	41.30
02.	Female	27	58.69
03.	Other	00	00.00
TOTAL		46	100.00

Age

Sl. No.	Description	Responses	Percentage
01.	Less Than 14	00	00.00
02.	14 – 18	02	04.30
03.	18 – 23	12	26.00
04.	23 – 28	11	23.90
05.	28 – 35	04	08.60
06.	35 – 45	07	15.20
07.	45 – 55	06	13.00
08.	55 – 60	03	06.50
09.	More Than 60	01	02.10
TOTAL		46	100.00

Marital Status

Sl. No	Description	Responses	Percentage
01.	Single	21	45.60
02.	Married	22	47.80
03.	Divorce	00	00.00
04.	Separate	00	00.00
05.	Living Together	00	00.00
06.	Widow	03	06.52
07.	Others	00	00.00
TOTAL		46	100.00

Education

Sl. No.	Description	Responses	Percentage
01.	Primary Level	01	02.17
02.	High School	05	10.80
03.	PUC	12	26.00
04.	UG	07	15.21
05.	PG	02	04.34
06.	Professional	12	26.08
07.	Technical	07	15.21
08.	Other	00	00.00
TOTAL		46	100.00

Occupation

Sl. No.	Description	Responses	Percentage
01.	Private Employee	05	10.80
02.	Public Employee	15	32.60
03.	Semi-Government	11	23.91
04.	Business	00	00.00
05.	Professional	05	10.86
06.	Other	10	21.73
	TOTAL	46	100.00

Annual Income

Sl. No.	Description	Responses	Percentage
01.	Less Than 15,000	11	25.00
02.	15,000 – 1,00,000	10	22.72
03.	1,00,000 – 2,00,000	10	22.72
04.	2,00,000 – 3,00,000	05	11.36
05.	More Than 3,00,000	08	18.18
	TOTAL	44	100.00

Family Size

Sl. No.	Description	Responses	Percentage
01.	Less Than 2	03	06.50
02.	2 – 4	26	56.52
03.	4 – 6	14	30.46
04.	More Than 6	03	06.52
	TOTAL	46	100.00

Source: Survey Data, Shrushrutha Bio - Medical Wastage Management Society, January 2011.

INFERENCE

Reference to the above socio-economic profile of the respondents in and around the Mc. Gann Hospital, Shivamogga, shows that 58.69% are belongs to the female groups, 26% belongs to 18-23 age groups, 47% are married with respect to the marital status, 26 % of professional and 26% of intermediate levels (PUC) in terms of literacy, 32.6% are under public sector employees, 25% of the respondents annual incomes falls below 15,000 per year and the family size of the respondents fall under 2 - 4 are 56.52%.

TESTING OF THE HYPOTHESIS**HYPOTHESIS TEST – I**

H_{01} : There is no significant relationship between the Shrushrutha Bio – Medical Waste Management system and Hospital Wastage Management system in Shivamogga;

Table – 1.3

Bio – Medical Waste Management system in Shrushrutha Society and Hospital Management, Machenahalli, Shivamogga District, Karnataka

Sl.No.	Performance	No. of Respondents	Percentage
01.	Increased Bio–Medical Waste Management system	32.20	70.00
02.	Not Increased Hospital Management system	13.80	30.00
	Total	46.00	100.00

Source: Survey Data, SSBWMM, Machenahalli, Shivamogga (January 2011)

The above table brings to light the fact that a majority of the respondents are strongly believe that hospital management doesn't have any impact on the Bio- Medical Wastage management in the Shrushrutha Society of Bio - Medical Wastage Management, Machenahalli (SSBWMM), Shivamogga. The fact that society's performance has increased after having the separate Bio - Medical wastage Management system in the hospital. From the above analysis it is understood that the BMWM in the hospitals has a decisive effect on the hospital management and the public welfare.

Applying Chi-square Test

$$\sum X^2 = [O - E]^2 / E$$

Where, O = Observed Frequency, E = Expected Frequency

Table – 1.4. Observed Frequency Table

Mc.Gann Hospital	Increased	Not Increased	Total
Attended Bio–Medical Waste Management system	26.200	06.000	32.200
Not Attended Hospital Management system	06.000	07.800	13.800
Total	32.200	13.800	46.000

Source: Survey Data, SSBWMM, Machenahalli, Shivamogga (January 2011)

Table – 1.5. Expected Frequency Table

Mc.Gann Hospital	Increased	Not Increased	Total
Attended Bio – Medical Waste Management system	15.778	16.422	32.200
Not Attended Hospital Management system	06.752	07.048	13.800
Total	22.530	23.470	46.000

Table – 1.6. Tabulation of Chi-Square

O	E	O-E	(O-E) ²	(O-E) ² /E
26.000	15.778	10.222	104.449	6.6199
06.000	16.422	-10.422	104.449	6.3603
06.000	06.752	-00.752	000.566	0.0838
07.800	07.048	00.752	000.566	0.0803
$\sum X^2 = [O - E]^2 / E$				13.1443

At 5% level of significance, the table value of Chi-square is 3.841 and X² Value is 13.1443.

As the calculated value of chi-square is higher than the table value, the hypothesis is rejected. From this, it is inferred that Bio – Medical Waste Management Society of Shrusrutha and Hospital Management system in Machenahalli, Shivamogga District has significant relationship in the BMW.

HYPOTHESIS TEST - II

H₀₂: BMWTF has no impact of the development of public welfare; The result can be seen in the below table – 2(a) Chi-square probability of 0.05 (5%) or less is commonly interpreted for rejecting the null hypothesis that the row variable is unrelated (that is, only randomly related) to the column variable. Since here it is 0.695, greater than 0.05, therefore the null hypothesis is accepted that the BMWTF has impact on the development of public welfare. Adequate cell sizes are also assumed. Some require 05 or more, some requires more than 5, and others require 10 or more. A common rule is 05 or more in all cells of a 2-by-2 table, and 05 or more in 80% of cells in larger tables, but no cells with zero count. When this assumption is not met. Yates's correction is applied (which here is represented by continuity correction).

Table–1.7. Whether the BMWTF has no impact of the development of public welfare

Description	Value	df	Asymp.	Exact Sig.	Exact
Pearson Chi-Square	0.154(b)	1	0.695	-	-
Continuity Correction (a)	0.000	1	1.000	-	-
Likelihood Ratio	0.150	1	0.698	-	-
Fisher's Exact Test	-	-	-	0.700	0.493
Linear-by-Linear Association	0.152	1	0.697	-	-

A. (a) computed only for a 2X2 table

B. (b) 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.52.

HYPOTHESIS TEST - III

H_{03} : BMW Management has no relationship between Wastage Management (WM).

Table – 1.8. Paired Samples Statistics

Category	Mean	N	Std. Deviation	Std. Error Mean
BMWM in Hospitals and Shrushrutha wastage management	4.30	46	2.485	.351
BMWM difference between WM in Shivamogga banking	1.98	46	1.152	.163
BMWM system in Hospitals	3.64	46	1.758	.249
HWM and Bio – Medical Wastages in Machenahalli	1.00	46	.000	.000

Table – 1.9. Paired Samples Test

Category	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Devia	Std. Error	95% Confidence				
				Lower	Upper			
BMWM and Waste Management	2.320	2.846	.402	1.511	3.129	5.764	49	.000
HWM in Shrushrutha	2.640	1.758	.249	2.140	3.140	10.616	49	.000

INFERENCE

As H_{03} is two-sided in the above table, by applying the two-sided test for determining the rejection regions at 5% level which come to as under, using SSPS package, and the **t-value** are 5.764 and 10.616 respectively. Here table value is higher than the calculated value hence the result is rejected and it is true that BMWTF has no impact of the development of public welfare.

LIMITATIONS OF THE STUDY

The present study has certain shortcomings which are enlisted as follows:

01. This paper is confined to the Bio- Medical Wastage Management in the Mc Gann Hospital and Shrushrutha BMW Society, Shivamogga;
02. The respondents for the survey are limited to 46 only;

03. An incomplete response from the hospital and the city is due to lack of awareness about the BMWM in the city;
04. The period of this study is limited only for 8 months (Jan - Aug, 2011).

MAJOR FINDING

The following are major findings of the study -

01. 100% it is necessary that Bio – Medical Wastage management treatment facilities should be managed in every hospital in the state.
02. 100% of general public are aware about the Mc. Hospital in the Shivamogga District.
03. 100% of general public are aware about the Mc. Hospital in the Shivamogga District
04. 21.73% of the people take precautionary measures for the segregating the plastic items as well as while burning wastages incinerator boxes, 19.56% for immediately disposal of infected items maximum about 50 Kgs of wastages, 10.86% for wet scrubber and chimney provided 30 meters above the ground level, 4.34% of burned (ashes) and only 02.17% for the other wastages
05. 32.60% of Bio – Medical Wastages is collected every day in the blue box which is about 05 kgs and below in the hospital every day.
06. 34.78 % of Bio – Medical Wastages is collected every day in the yellow box which is about 15 kgs and above in the hospital every day.
07. 37.70 % of the Workers involved in Shrushrutha BMW Management Society in Shimoga District.
08. 39.13% of the organizations are involved in the Bio – Medical Wastage Management System with the help of hospitals.
09. 42.40% people are well known about the yellow boxes, 21.73 % are about white box and PPT boxes, 8.69 % of Blue boxes and only 4.34% of other way.
10. 48.78 % of Bio – Medical Wastages is collected every day in the red box which is about 05 kgs and below the hospital every day.
11. 55.55 % of Bio – Medical Wastages is collected every day in the PPC box which is about 05 kgs and below the hospital every day.
12. 58.69 % of Bio – Medical Wastages is collected every day which is about 15 kgs and above in the hospital every day.

13. 60.86% of both private and government hospital cover the Waste collection system and BMW management in the city.
14. 82.60% of the general public are awareness about the Shrushrutha BMW Management in Shimoga
15. 82.60% of the organizations are involved in the Bio – Medical Wastage Management System in the City
16. 91.30% of the respondents are aware about the method of collecting the Bio – Medical Wastage Management in the hospital.
17. 93.4% of the people are aware about the Bio – Medical Wastage collection System in the city.
18. 93.47% of Bio – Medical Wastages are collected every day in the hospital, 04.34% collected every week and only 02.17% fortnightly.
19. Many of the people feels that Bio – Medical Wastage Management treatment facility is of high risk, with reference to the above its clear that 28.26% are strongly state that its of high risky job as it is harmful to the health.
20. Public rated that 54.34% are satisfied with the Bio - Medical Facilities in the hospital.
21. The people came to know about the Bio - Medical Wastage System only through the advertisements, it is very clearly stated in the above table that 15.21% of people awareness is due to the ads.
22. The public rated that 56.52% are satisfied with the role of doctors rating the Bio - Medical Facilities in the hospital.
23. The reasons for preferring the BMW Treatment Facility is for the sake of sanitation/hygienic/cleanliness, i.e. 32.60 % people prefer for this sake and rest for other reasons as stated in the aforesaid table.

SUGGESTIONS

Regarding the Bio - Medical waste management by the Government hospitals (Mc. Gann Hospital, Administrative officers, and Government hospital members. Health and Family Welfare Department was requested to carry out the following.

01. Take immediate action for the segregation of the biomedical wastes at source;

02. To go for advanced alternate technology like autoclaving for the treatment of biomedical wastes at source;
03. To go in for a common treatment and disposal facility for the biomedical wastes that must be located away from any habitation and water bodies. Action has been initiated by the Health and Family Welfare Department for identification of site for establishing common biomedical waste treatment facility for the wastes from Government hospitals;
04. To incinerate the pathological waste alone corporations in consultation with Karnataka Pollution Control Board; and
05. To develop the Shrusrutha Bio-Medical Wastage Management Society in the big units to manage the wastage efficiently and effectively.

CONCLUSION

A proactive, strategic approach to Bio-Medical Wastage management **offers** considerable organizational benefits in terms of developing a pool of cleanliness, hygiene and public welfare as a resource to meet its identified needs in managing the hospital wastages effectively. Firstly, Bio-Medical Wastage management forces the hospital to become aware of and assess their workforce to increase better wastage, management as well as public welfare and good health. Secondly, organizations, society and the both private and public hospitals that understand the work successfully link with BMWM in Karnataka, reaping the benefits in increased public health and hygiene. Third, BMWM Society and organizations are seeking effective ways to measure and determine bottom line impact on the Hospital wastage management, Shivamogga District. The present study has focused on the awareness, benefits, BMWM treatment facilities, designs, models and its effective management in the hospital to help the society. It reveals the fact that society's hospitals performance has increased after developing a separate unit called Shrusrutha BMWM Society, Machenahalli, Shivamogga and they tried to improve their performance, efficiencies, and etiquettes involved in following the practices of BMW management and challenges faced by both hospitals and Organizations'. On the whole, this study is intended to understand the emerging changes and challenges faced by the hospital and the general public's towards BMW management in Shivamogga city, how do they follow the systematic methods to frame the BMW management policies and procedures in the emerging economy in the Karnataka and social responsibility to the society and in turn indicates how best is the BMW management and identifies the SWOT of the BMW management in the selected sample area.

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