BIOMEDICAL WASTE MANAGEMENT: AN INTERVENTIONAL STUDY AMONG NURSING STAFF IN TERTIARY CARE HOSPITAL OF MYSOREMaganur Lakshmana Kusuma¹, Ranjini. N², Anitha. K. T³, Muddasir Azeez Khan⁴, Mansoor Ahmed⁵**HOW TO CITE THIS ARTICLE:**

Maganur Lakshmana Kusuma, Ranjini N, Anitha K. T, Muddasir Azeez Khan, Mansoor Ahmed. "Biomedical Waste Management: An Interventional Study among Nursing Staff in Tertiary Care Hospital of Mysore". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 86, October 26; Page: 15017-15023, DOI: 10.14260/jemds/2015/2131

ABSTRACT: How healthy our workplace basically depends on how properly these bio medical waste is disposed of. Raising awareness of the risks related to health-care waste, safe and sound practices is very much needed. The study was done to assess the knowledge of all nursing staffs regarding Bio medical waste in Government tertiary care hospital of Mysore city and this knowledge was re-assessed after sensitization program at 1month and 6months. **METHODOLOGY:** A longitudinal study was conducted during the period of Jan 2014 to Sep 2014 in Mysore medical college and research institute. A total of 301 nursing staffs were included in the study. **RESULTS:** Before the sensitization program the mean score of knowledge of study subjects was 6.82 ± 1.77 , after one month it increased to 9.58 ± 1.06 and after six months it decreased to 7.56 ± 1.52 . **CONCLUSION:** There was a significant change in the knowledge a month after the intervention but it was not found to be satisfactory after six months. Regular sensitization program is required with a good interval to sustain the knowledge regarding Bio medical wastes.

KEYWORDS: Bio medical waste; knowledge; Sensitization program.

INTRODUCTION: According to Bio-Medical Waste (Management and handling) rules, 1998 of India, Bio Medical Waste (BMW) means any solid, fluid or liquid waste including its containers and any intermediate product which is generated during the diagnosis, treatment, or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological and includes ten categories for same. Majority of waste (75-90%) produced by the healthcare providers is non-infectious or general waste. The remaining (10-25%) of healthcare waste is regarded as hazardous and has the potential for creating a variety of health problems.¹

The waste produced in the course of healthcare activities carries a higher potential for infection and injury than any other type of waste. Inadequate and inappropriate knowledge of handling of healthcare waste may lead to serious health consequences and a significant impact on the environment as well. However, lack of awareness has led to the hospitals becoming a hub of spreading disease rather than working towards eradicating them. It is estimated that annually about 0.33 million tonnes' of hospital waste is generated in India and the waste generation rate ranges from 0.5 to 2.0kg per bed per day.²

This year theme is 'Advancing healthy workplaces'. Health-care waste contains potentially harmful micro-organisms which can infect hospital patients, health-care workers and the general public. The needles and syringes are not properly disposed of, creating a risk of injury and infection and opportunities for re-use.¹ how healthy our workplace is, basically depends on how properly these bio medical waste is disposed of. Raising awareness of the risks related to health-care waste, safe and sound practices is very much needed. Nursing staffs are the back bone of good hospital keeping.

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Hence the present study was aimed to assess the knowledge of nursing staffs about Bio medical waste handling and reassess their knowledge and practice after sensitization programme.

METHODOLOGY: A longitudinal study was conducted during the period of Jan2014 to Sep2014 in Mysore medical college and research institute. The Sensitization Program was conducted throughout the month of Jan2014 in series from the Department of Community Medicine and Hospital Infection committee. All the nursing staffs who participated in the program were included in the study. After obtaining their consent, a total of 301 nursing staffs were given a pre-tested, semi structured questionnaire before the program (Pretest). Post test was conducted twice, one month and six months after the program. Educational intervention was done with the help of posters, printed materials, flip charts, Overhead Projectors (OHPs) and Power point presentations. Knowledge was assessed in an arbitrary scale of 0-1, 1 for the correct response and 0 for incorrect one. Data was analyzed using EPI INFO 7 software. Statistical tests like Frequency, Proportions, mean, standard deviation and t test were used.

RESULTS:

Variable	Variable Value	Frequency	Percentage
Age	21 to 30	80	26.6
	31 to 40	48	15.9
	41 to 50	98	32.6
	51 to 60	75	24.9
	Total	301	100.0
Education	Bachelor of Nursing	49	16.2
	Diploma in Nursing	99	32.9
	GNM	153	50.9
	Total	301	100
Designation	ANM	1	0.3
	Grade 2 Nursing	5	1.6
	Junior Health	11	3.6
	Senior staff nurse	12	3.9
	Staff nurse	272	90.8
	Total	301	100
Years of experience	0 to 10	106	35.2
	11 to 20	103	34.2
	21 to 30	62	20.6
	31 to 40	30	10.0
	Total	301	100
Table 1: Basic Profile of Study Participants			

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Majority of the study subjects i.e. 98(32.6%) were in the age group of 41 to 50, 153(50.9%) had studied GNM, 272(90.8%) were staff nurse by designation and 106(35.2%) had a working experience up to 10 years.

Vaccine	Status	Frequency	Percentage
	Not Taken	55	18.3
	Taken	246	81.7
	Total	301	100
Hepatitis B	Not Taken	65	21.6
	Taken	236	78.4
	Total	301	100.0
Table 2: Immunization Status of Study Participants			

55 (18.3%) and 65(21.6%) of study participants were not immunized against TT and Hep B since past 10 years.

Knowledge	Before Intervention		After Intervention (1 month)		After Intervention (6 months)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
HIV, Hep B & C transmitted through	294	97.7	301	100	301	100
Percentage of infectious waste in	196	65.1	278	92.4	196	65.1
Knowledge regarding Colour coding						
a. Yellow	182	60.5	279	92.7	192	63.8
b. Black	175	58.1	245	81.4	188	62.5
c. Blue	192	63.8	229	76.1	204	67.8
d. Puncture proof	176	58.5	290	96.3	225	74.8
Knowledge regarding						
a. Syringes	137	45.5	252	83.7	226	75.1
b. Mercury	162	53.8	266	88.4	185	61.5
c. Drugs	214	71.1	223	74.1	214	71.1
d. Incinerable Waste	190	63.1	269	89.4	190	63.1
e. Autoclavable waste	156	51.8	253	84.1	156	51.8
Table 3: Knowledge of Bio Medical Waste among Study Subjects before Intervention and After Intervention						

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Out of 301 nursing staffs who had participated in the study, 294(97.7%) knew that the HIV, Hep B and C can be transmitted through Bio medical waste and all of them had knowledge about it after intervention. 196(65.1%) of them had a correct knowledge regarding the proportion of infectious waste in the total hospital waste which improved to 278(92.4%) after a month and 196(65.1%) after 6months. Knowledge regarding color coding of yellow, black, blue and puncture proof container were present among 182(60.5%), 175(58.1%), 192(63.8%) and 176(58.5%) of the study participants respectively before the intervention. Knowledge regarding disposal of Syringes, Mercury, Drugs, Incinerable waste and autoclavable waste were present among 137(45.5%), 162(53.8%), 214(71.1%), 190(63.1%) and 156(51.1%) of study participants respectively. knowledge regarding the disposal of drugs, incinerable and autoclavable waste remained the same after six months even though there was an improvement after a month.

Fig. 1: Distribution of study subjects according to the Knowledge of Bio-medical waste before and after intervention.

Before the sensitization program the mean score of knowledge of study subjects was 6.82 ± 1.77 , after one month it increased to 9.58 ± 1.06 and after six months it decreased to 7.56 ± 1.52 .

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	Mean Difference	Standard Deviation	T Value	P Value
Before Intervention and After intervention(1month)	2.76	1.73	27.71	<0.0001
Before Intervention and After intervention(6month)	0.74	1.29	9.98	<0.0001
Table 4: Comparison of Knowledge Scores of Study Participants before and After the Intervention				

From above table it was evident that there was an overall significant change in knowledge ($P < 0.001$) after educational intervention. The mean difference of 0.74 between before intervention and after intervention (6months) signifies that the knowledge after six months was not satisfactory.

DISCUSSION: The nursing staff who participated in the study were assessed for the knowledge attitude and practice regarding the BMW management in tertiary care hospital. Knowledge regarding possible transmission of diseases during handling of BMW also significantly improved after the sensitisation course. Yadavannavar MC found in a medical college hospital that significant differences existed in KAP of BMW among teaching and nonteaching staff where nonteaching staff had less fared poorly.³

The study revealed that awareness and practice of BMW was average for the required profession. Deo et al, showed that only 28.6% of paramedical and 20.23% of medical staff were aware of BMW disposal.⁴

This study showed that majority of the nursing staff had the knowledge regarding collecting and disposal of BMW but practiced it very stringently only after the sensitisation programme was conducted. In a study by Ramkote and Basu very high knowledge was seen at a Johannesburg hospital among nursing staff regarding BMW handling.⁵

But sustenance of such practice was seen to wane off considerably over a period of next six months stressing the need for periodic reinforcement.

Collection of BMW and awareness about the colour coding of BMW also showed subtle recovery after the sensitisation but couldn't achieve the same level at six months.

A marginal improvement in the mean score of 7.56 was noted among the study subjects after the intervention through the sensitisation programme at six months as compared to a score of 6.82 before any intervention but still this was not satisfactory as the overall significant change in knowledge was $p < 0.0001$.

Thirumala S showed in a study at various hospitals in Davangere city that hospital authorities were not concerned about the damage to society and environment around them due to inappropriate handling of BMW in spite their KAP was good⁴.

To properly separate, process and isolation of wastes, they must be well-characterized, which is challenging. Safe and effective management of bio medical waste is not only a legal necessity but also a social responsibility.⁶ Lack of concern in persons working in that area, less motivation, awareness and cost factor are some of the problem s faced in the proper hospital waste management.

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Proper surveys of waste management procedures in various practices are needed.⁷ clearly there is a need for education as to the hazards associated with improper waste disposal. An effective communication strategy is imperative keeping in view the low awareness level among different category of staff in the health care establishments regarding biomedical waste management.^{8,9}

CONCLUSION: There was a significant change in the knowledge a month after the intervention but it was not found to be satisfactory after six months. There is lack of knowledge regarding segregation & colour coding of waste among nurses. It also reveals that enough precautions are not being taken for preventing needle stick injuries. Regular sensitization program is required with a good interval to sustain the knowledge regarding Bio medical wastes. By providing training programmes, knowledge on the biomedical waste management can be improved.¹⁰ Constant supervision and implementation at each level of waste management is needed.

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