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A study to assess the knowledge and practices regarding biomedical waste management among staff nurses at Deen Dayal Upadhyaya Zonal Hospital, Shimla, Himachal Pradesh

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Abstract
Biomedical waste is the waste generated during diagnose treatment of humans as well as animals from health care settings. It may include waste associated with generation of biomedical waste that usually appears to be medical or laboratory origin (e.g. packaging, unused bandages, infusion kits etc.) as well as research laboratory waste containing bio molecules or organism that are restricted from environmental release. Biomedical waste may be solid or liquid. Biomedical waste is hazardous and infectious, so it should be managed properly. So the proper handling and disposal of waste is called biomedical waste management. The present study was to assess knowledge and practices regarding biomedical waste management among the staff nudes of DEEN DAYAL UPADHAYA ZONAL HOSPITAL SHIMLA and 30 nurses were evaluated from different wards such as emergency department, General wards (male, female, paediatric and private wards) Gyne ward (labor room, postnatal ward, antenatal ward).The objective of the study was to assess the knowledge and practice regarding biomedical waste management among staff nurses of DEEN DAYAL UPADHAYA ZONAL HOSPITAL. Written permission was obtained from the head of hospital and verbal consent was taken from the study subjects before conducting the study. In the present study Quantitative approach and descriptive design was used. The sample used for the study was 30. Samples are selected by non-probability purposive sampling technique. The data obtained were compiled, tabulated and analyzed using by descriptive and inferential statically methods. The result of study shows that maximum of the nurses 18(60% Very good knowledge, 9(30%) having excellent knowledge level and minimum 3 (10%) having good knowledge score. For the practices maximum of the staff nurses 15 (50.1%) having excellent practice score, 14(36.6%) having very good practice score and minimum of the staff nurses 1(3.3%) having good practice score regarding the biomedical waste management. The correlation between the knowledge and practice score is 0.21 which is less than tabulated value with the degree of freedom of 28 which means that staff nurses had good knowledge but not following practices regarding biomedical waste management.

Keywords: Biomedical Waste Management, Staff Nurses

Introduction
'Prevention is better than cure'
According to Biomedical Waste (Management and Handling) rules, 1998 of India," Biomedical Waste" means any waste, which is generated during the diagnosis, treatment or immunization. Common generators of biomedical waste includes hospital, health clinics, nursing homes, medical research laboratories, dentists clinic, home health care, sub-centres, Primary health centres, Community health centres. The management of Bio Medical Waste (BMW) is of great importance due to its potential environmental hazards and public health risks, in the context of rapidly expanding health care facilities in developing countries [1]. World Health Organization (WHO) indicated, some of healthcare wastes are considered the most hazardous and potentially dangerous to human health and pollute the environment. Though 75-90% of the waste produced by health care institutions is non–risky generated from administrative and housekeeping of health care establishment, the remaining 10-25% waste generated by Health Care Centres is regarded as 'hazardous' and may create a variety

of health risks. 10% is considered infective and remaining 5% non -infective but hazardous [2]. Clinical and general wastes should be segregated at source and placed in colour coded plastic bags and containers of definite specifications prior to collection and disposal [3]. Day to day activities in health institutions generate a lot of waste which is biological in nature and are potential sources of infection transmission, especially hepatitis B and C, HIV, and tetanus. World Health Organization opinion that globally; Injections with contaminated syringes caused 21 million hepatitis B infections (32% of all new infections), 2 million hepatitis C infections (40% of all new infections) and 2,60,000 HIV infections (5% of all new infections). Furthermore it documents that, in India, 2 million, new Hepatitis B, 4, 00,000 Hepatitis C and 30,000 HIV positive cases occur in a year due to needle prick injuries [4]. One of the causes for the increase in infectious diseases is improper waste management. Blood, body fluids and body secretions which are constituents of bio-medical waste harbour most of the viruses, bacteria and parasites that cause infection. Tuberculosis, pneumonia, diarrhoeal diseases, tetanus, whooping cough etc. are other common diseases spread due to improper waste management [5]. Improper waste management practices are a serious problem that involve not only to the hospital administration but society at large. Within waste management, the health care waste management is a process that helps to ensure proper hospital hygiene and safety of health care workers and communities [6]. Approximately 1.45 kg waste is generated per patient per day in Indian hospitals it is as high as 4.5 kg in developed countries According to health information statistics 20% of total beds are in rural hospitals while 80% are in urban hospitals. Main purposes of waste management are to clean up the surrounding environment and to identify the appropriate methods for waste neutralization, recycling and disposal. Within waste management (WM) [7]. HCWM concerns about planning and procurement, staff training and behaviour, proper use of tools, machines and pharmaceuticals, proper methods applied for segregation, reduction in volume, treatment and disposal of biomedical waste. Bio Medical Waste should be segregated at source into color-coded bags or containers and its collection and proper disposal should be a significant concern for both medical personnel and general community [8].

A cross sectional study was conducted to assess Knowledge, attitude and Practices about Biomedical Waste management among 50 Nursing Professionals of SKIMS Medical College Hospital Bemina (Srinagar) among 50 during August 2012 to December 2012.The data was collected by using pretested, predesigned questionnaire. The result revealed that practices related biomedical waste 70% practiced the disposal in specified color coded bins, 72% made disposal of sharps in puncture proof container, only 30 % were reporting the injuries due to improper disposal of sharps.The study suggests a regular training and awareness generation activities among nursing staff need to increase the practices up to 100%.

Benefits of Biomedical Waste Management is Cleaner and healthier surroundings, Reduction in the incidence of hospital acquired and general infections, Reduction in the cost of infection control within the hospital, Reduction in the possibility of disease and death due to reuse and repackaging of infectious disposables, Low incidence of community and occupational health hazards, Reduction in the cost of waste management and generation of revenue through appropriate treatment and disposal of waste. Due to this improve image of the healthcare establishment and increase the quality of life. From this it is clear that biomedical waste has been major problem in the health care setting. It is identified as research priority for better health care in hospitals. In view of the above scenario this study was envisaged to assess the knowledge and practices regarding biomedical waste management among staff nurses at Deen Dayal Upadhyaya Zonal Hospital, Shimla, and Himachal Pradesh.

Research methodology
"Research methodology is the significant part of any research study, which enables the researcher to project a blue print of the research understanding. The research approach adopted in the study was Descriptive research approach. The study was conducted at deen dayal upadhaya zonal hospital shimla. Name of the wards in zonal hospital were Emergency ward, Labor room, Postnatal ward, Female medical ward, male medical ward, pediatric ward, operation theater. The target population for the present study includes staff nurses working in Deen Dayal Upadhyaya Zonal Hospital, Shimla, Himachal Pradesh. Total female nurses were 30. In present study the sample size 30 Staff nurses working in Deen Dayal Upadhyaya Zonal Hospital, Shimla. In the present study questionnaire was used as the tool for data collection. The tool for data collection consists of three sections.

Section I: Sample characteristics which consisted the demographic Performa constructed to collect data regarding Sample characteristics Age, Gender, Qualification, Experience, training related to Biomedical Waste Management.

Section II: Structured knowledge questionnaire to assess the knowledge and Practices regarding biomedical waste management among staff nurses.

Section III: Observational Checklist to assess Practices of Health Care Personnel regarding Biomedical Waste Management. Validity of tool was established by experts from nursing field for content. The reliability of the tool was determined by using split half method and the tool was found to be reliable. The 'r" value calculated was r=0.71, hence the tool was considered reliable for proceeding with the main study. Ethical approval to conduct the study was obtained from the Chief Medical Officer of the hospital. The purpose and details of the study was explained to study subjects. Data collection was not interfere in the routine working of the area. Data were collected by using paper pencil technique and through observation at their respective working area. Researcher introduced herself to the ward in charge and explained the purpose of questionnaire which were filled by samples during the break time. Verbal consent was taken from study subjects. Researchers firstly assessed the level of knowledge. After that assessed or observe the practice level of study samples. Language of questionnaire was clear and easily understood. Researchers thanked all the study subjects after the data collection.

Result
Section A: Description of socio demographic variables among staff nurses.

Table 1: frequency, percentage distribution of staff nurses based on demographic variables such as age, gender, qualification, experience, marital status, education regarding BMW, (n=30)

S. no.	Variable	Frequency	Percentage
1.	Gender		
	1. Male	30	100%
	2. Female		
2.	Age		
	1. 25-30	16	53.3%
	2. 31-35	7	23.3%
	3. 36-40	4	13.3%
	4. Above 41 years	3	10.1%
3.	Qualification		
	1.A.N.M	4	13.3%
	2.G.N.M	17	56.6%
	3.BSC Nursing	9	30.1%
	4.MSC Nursing	0	-
4.	Experience		
	1. Less than 1 year	5	16.6%
	2. 1 year-3years	9	30.2%
	3. 3 years-5years	4	13.2%
	4. More than 5years	12	40%
5.	Marital status		
	1. Married	21	70.1%
	2. Unmarried	8	26.6%
	3. Divorce	1	3.3%
	4. Widow	0	-
6.	BMW Education		
	1.Yes	16	53.3%
	2.No	14	46.7%

Data presented in table shows, 100% study students were females. 53.3% study subjects were under 25-30 years of age, 23.3% study subjects were in 31-35 years of age, 13.3% of study subjects were under the age group of 36-40 years, 10.1% of study subjects were above 41 years. 13.3% study subjects had professional qualification in A.N.M., 56.6% study subjects had professional qualification in G.N.M., 30.1% study subjects had professional qualification in B.Sc nursing. 16.1 % study subjects had 0-1 years of professional clinical experience, 30.2% of study subjects had 1-3 years of professional clinical experiences, 13.2 % of study subjects had clinical experience of 3-5 years, 40% of subjects had experience of more than 5 years. 70.1% of subjects were married, 26.6% study subjects were unmarried, 3.3% study subjects were divorced. 53.3% of study subjects had BMW education, 46.7% study subjects didn't have any BMW education.

Section B: Assessment of level of knowledge related to BMW management among staff nurses. (n=30)

S. No.	Grade	Scoring	Frequency	Percentage
1	Excellent	23-30	9	30%
2	Very Good	16-22	18	60%
3	Average	09-15	3	10%
4	Fair	1-8	0	-

Table 2 shows that maximum of the staff nurses 18 (60%) having very good knowledge regarding biomedical waste management, 9(30%) staff nurses having excellent knowledge, 3(10%) staff nurses having average knowledge regarding biomedical waste management.

Section C: Frequency and percentage distribution of staff nurses based on the level of practices. (n=30)

S. No.	Grade	Scoring	Frequency	Percentage
1	Excellent	10-12	15	50.1%
2	Very Good	7-9	14	36.6%
3	Average	4-6	1	3.3%
4	Fair	0-3	0	-

Table 3 shows that maximum of the staff nurses15 (50.1%) having excellent practice level,14(36.6%) having very good knowledge, 1(3.3%) having average knowledge.

Section D: assess the relation between knowledge and practice: This section deals with the correlation between the knowledge and practices regarding biomedical waste management among staff nurses. (N=30)

S no.	Knowledge score		Practice score		Correlation
1.	Mean	20.23	Mean	9.6	
2.	Standard deviation	3.87	Standard deviation	1.64	0.21

$p<0.05$- Not correlated

Table no. 4 correlation between the knowledge and practice level Scores: The findings showed that there was –ve corelation between the knowledge and practices level of scores at p<0.05. It means that the staff nurses may have good knowledge regarding the biomedical waste management but their practice may not be followed accordingly.

Discussion
The finding of study were discussed in terms of objective. The present study was conducted on Practices and knowledge of nurses regarding Biomedical Waste management among staff nurses of Deen Dayal Upadhaya, Shimla hospital.

To assess the knowledge level score
Maximum of the staff nurses 18(60%) having very good knowledge, 9(30%) staff nurses having excellent knowledge, 3(10%) staff nurses having average knowledge regarding biomedical waste management.
The study was conducted by Sharma Ashok, Sharma Varsha related to awareness of BMW in Jaipur 2013 among the 140 staff members. And result concluded that 15(30%) had excellent knowledge, 18 (36%) had poor knowledge. And another descriptive study was conducted by Bala S regarding the awareness of BMW in 2013.Among 116 employees. The result shows that 67% employees did not any awareness, 79% follow BMW management, 90% staff nurse and 79 % students had minimum knowledge.
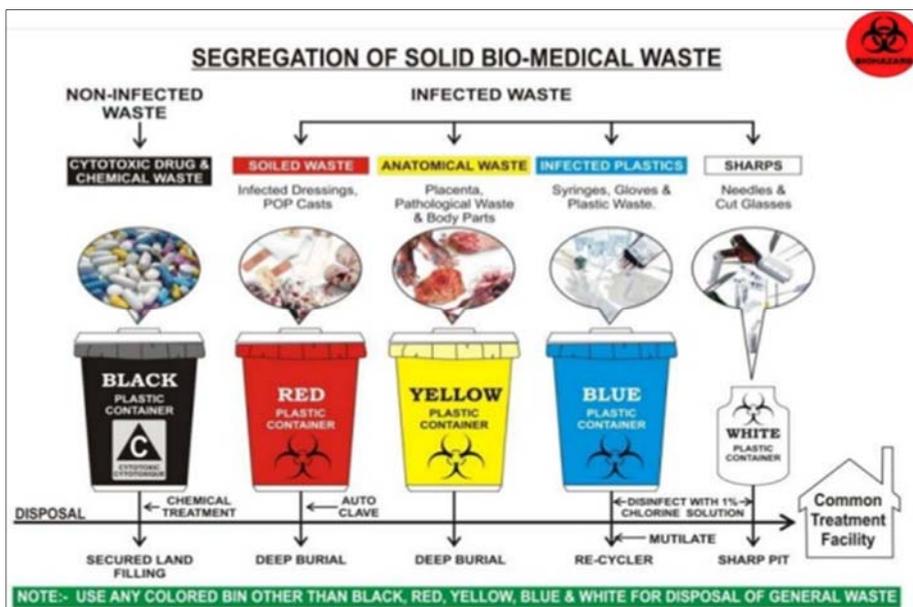
To assess the practice level
Maximum of the staff nurses 15(50.1%) having excellent practice level, 14(36.6%) having very good Practices, 1 (3.3%) having average level Practice regarding BMW management.
A cross sectional study was conducted by Azage Muluken, Gebrehiwothaimanot in 2013 regarding the practices in 11 HCFs of Gondar town Northwest Ethiopia in 2013 among 260 health care personnels and result reveales that 82(31.5%) had doing practices properly. A quantitative descriptive survey was conducted to assess knowledge and practices in the all PHCs of bagepallitaluk among 120 health care providers by Nagaraju B, Padmavathi GV in 2013 The result revealed that 79(65%) had average knowledge and 63(53%) had average practices. 71% had knowledge regarding waste generation, 66% had transportation and 57% had classification and color coding regarding BMW.

To assess the correlation between knowledge and practice scores: The correlation between the knowledge and practices is negatively correlated

Conclusion
The conclusion of study reveal that maximum of the nurses 18(60%) having very good knowledge, 9(30%) having excellent knowledge and 3 (10%) nurses having good knowledge regarding bio medical waste management. Maximum number of the nurses15 (50.1%) having excellent practice level 14(36.6%) having very good practice and minimum number of nurses 1 (3.3%) having average practice level. The correlation between the knowledge and practice score is 0.21 which is not related.

Recommendations
A descriptive study on knowledge and practices related to Bio Medical waste management among staff nurses of DDU Hospital. A comparative study to assess the knowledge, practice, attitude regarding biomedical waste management among health care personnel's. A experimental study to assess the correlation between the knowledge and practices regarding biomedical waste management among health care personnel's.

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