Performance Evaluation of Structured Teaching Program on Knowledge in Biomedical Waste Management among Staff Nurses

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Abstract:*Poor waste management policy, practice poses a huge risk to the health of the public, patient, and professional. This all contribute to environmental degradation. In the present paper, an attempt is made to determine the awareness about Biomedical Waste Management (B.M.W.M.)policy – practices. The main focus is to assess the attitude of staff nurses towards it and to develop a B.M.W.M. plan for health care environmental setting with special focus on selected hospitals. The improvement in the different knowledge areas of B.M.W.M. has been observed after the post test session.*

Keywords*: biomedical waste, management, health problems, staff nurse, patients.*

I. Introduction

Bio-medical waste is referred as "any waste generated by heath care setting laboratories, home care, diagnoses treatment or immunization of human being, of animals or research activities used in the production or resting of biological". The planning is required for the comprehensive management system for health care establishment.A long standing necessity has been fulfilled by the legislation. It is required to implement proper B.M.W.M system for each hospital, clinics or laboratories.

The discriminate dispose of biomedical waste from clinical places has lead to major degradation of environment. It leads to spread of diseases and put the public to great risk. This gives rise to considerable environment concern. These are spread of infection and disease via vectors such as fly, mosquito, and insects that may affect in house or surroundings population. The infection may also spread through contacts among medical or non medical people, unauthorized recycling of disposal of items, use of discarded medicines, indiscriminate disposal of incinerators ash/residues, deadly toxicants from inefficient incinerators.

II. Literature Review

Lot of research is going to provide means for efficient biomedical waste management. According to Wenzel R.P., the most significant part of hospital hygiene and infection control is to manage health care waste.Such a waste should be considered as a reservoir of pathogenic micro organism which can give rise to infection. Due to inadequate management, these micro organisms can be transmitted by contact, in the air or by a variety of vectors and cause infections. This putsrisk to health of hospital staffas well as patients. As a result of these barriers, few projects have demonstrated sustained improvement in compliance with hand hygiene guidelines and a reduction in HCAIs areas[1, 2]. A study on current status of health care waste management has been conducted in Bangladesh. It has been found that the management is very poor. The waste was generally dumped together in public place such as the hospital surroundings in road side of the city, corporation dustbin. Many doctors and nurses are not fully aware about constitute as medical waste.An interview among staff members reveals that they suffers from various infectious diseases like VH-B, VH-C, diarrhea, typhoid, dysentery, T.B. and malaria due to the above mentioned facts [3]. A study was also conducted on 400 health workers in Gaza. No emission control or safety measure was reported. Few gaps in knowledge of health care workers and current practices are found inadequate [4]. Specially designed containers calledsharp disposal containers are used to dispose used needles and other medical waste-sharps; the intention is to protect hospital employees- including sharp users[5]. The most appropriate options for safe health care waste management at Primary Health Care Centers (PHCs) in developing countrieshave been selected [6].On the basis of WHO guidelines for healthcare facilities and waste management projects contained in "Safe Management of Wastes from Health-care Activities, WHO, l999" has been developed. It covers areas like small and large health care units; municipal, metropolitan, regional and national health care waste projects [7].World Health Organization Geneva 2004,the practical guidelines for planning and managing health care facilities are formulated[8].Auto Disable (AD) syringes has been introduced for immunization programme. The use and the possibilities of material recovery of these syringes have also been discussed [9]. Theprinciples for national health care waste management strategy have been developed including the legal and financial responsibility and duty of care [10].Key structures like segregation, proper containerization of wastes, a secure system of storage and

transportation, and appropriate and safe treatment and disposal sites that are adequately operated has been reported in the literature [11].At the district level, the elements of bio-medical waste management have also been planned.The planning is done to tackle the issues of health-care waste management thatarises from operations, at various levels of health care delivery system.18 million children have been targeted in the Philippine Follow-Up Measles_ Elimination Campaign (PMEC). It presented an opportunity to demonstrate the waste management and disposal without incineration.

In view of above, an effort has been made in the present research to make the staff nurses aware of the several factors to manage the biomedical waste in order to save themselves as well as the community.

III. Methodology

The study was conducted in the selected hospitals. The pilot study was conducted to test the reliability and validity of tool. The sample of the study consists of 100 Staff Nurses (S.N.). The tool used for the study was structured questionnaire and teaching program and techniques adopted for study was structured interview schedule and observations. The obtained data was analyzed by using descriptive and inferential statistics and interpreted in term of objectives of the study.

A. Research Design:

A research design used in present study is one group of staff nurses for pre-test and post-test research design. The design did not include any control group. The pre-test design in which the observations are made in different days with only one selected group and without control group. The pre-experimental design chosen for study shown in table: Only indoor department are selected e.g. surgical, medical, Ortho, peadiatric, gynae, obst and emergency department. For the present study, questionnaire, interview schedule, observation technique and structured teaching program are taken as development tools.

Table 1: Research Design

Group	Pre-test (Administration of knowledge questionnaire on 1st day)	Investigation administration of teaching program on 1st day	Post-test (Administration of knowledge questionnaire on 7th day)
Staff nurses of selected hospital	01	X	02

B. Sample Criteria:

For the purpose of sample collection following criteria was taken:
a) Education: B.Sc. Nursing, Post Basic Nursing and GNM level
b) Age: age of the respondents are taken in years as (20-25, 26-30, 31-35, 36 & above)
c) Experience: experience of the respondents is taken in years as (0-10, 11-20, 21-30, 31 & above)

C. Preparation Of Questionnaire:

A questionnaire containing 20 multiple choice questions with the help of experts were prepared. One mark was assigned for each correct answer. All questions were allotted under knowledge assessment. In the teaching program, there were 20 multiple choice questions in which 2 questions were regarding the definition, 5 questions were regarding category of waste and its segregation, 5 questions were regarding collection and treatment of bio-medical waste, 5 questions were regarding final disposal and 3 questions were regarding the safety measures. To interpret the level of knowledge the score was distributed as follows:

- For inadequate knowledge < 50% marks
- For moderately adequate knowledge 51% to 75% marks
- For adequate knowledge >75% marks

D. Interview Schedule:

The interview is employed to study the present problem. For this purpose researcher prepared a questionnaire with the help of experts and the same questions asked by the respondents in the interview to collect the data.After the interviewing the staff nurses in the setting department researcher observed the target behaviours on bio-medical waste management in clinical area and specially equipped for visual, auditory, monitoring, observe the communication behavior, facial expression, touch, activities of staff nurses during procedure.

E. Structured Teaching Program:

The researcher prepared the structured teaching program on the basis of the observation. In the teaching program, there were lessons regarding definition, category of waste and segregation, collection and treatment of bio-medical waste, final disposal and safety measures.The researcher selected the 10 S.N. for the pilot study to

find out the result prior to main study. After pilot study the investigator got the permission from the authority for data collection process.

Pre-test knowledge regarding B.M.W.M has been assessed on using structured knowledge questionnaire.Post test knowledge gained after teaching plan and compared the pre-test and post-test score.

IV. Results & Discussions

According to the educational qualification the samples are divided into two educational levels as shown in the Fig.1. There are total 100 respondents and depicts that 10% respondents are B.Sc. Nursing/Post basic nursing while 90% respondents have done GNM.
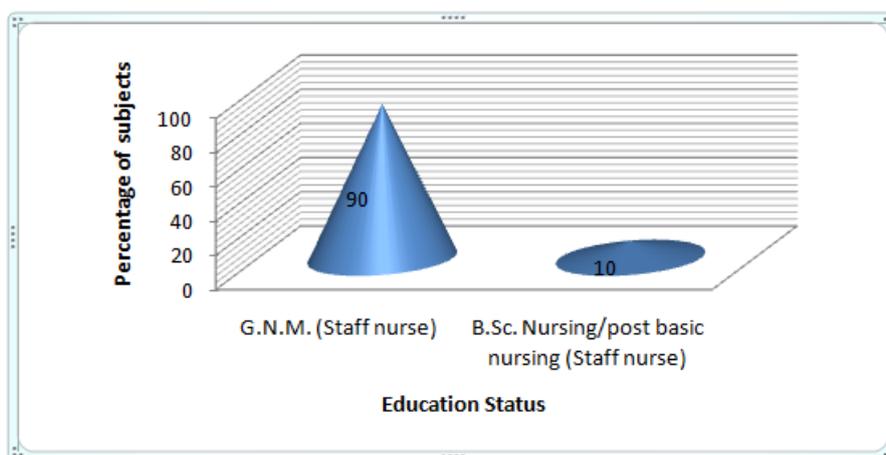
Fig. 1: Distribution of the respondents according to their educational qualification

A. To assess the knowledge of the staff nurses on B.M.W.M. using pre-test and post-test knowledge questionnaire:

The knowledge of staff nurses regarding biomedical waste management is assessed by the pre-test conducted on the basis of several areas as shown in fig.1.Fig. 2 shows overall knowledge of the respondents and area wise knowledge regarding the B.M.W.M. It is evident from fig. 2 that most of the respondents (70%) have the knowledge in the definition area, on the other side in the collection and treatment of waste; the respondents have the least percentage of knowledge (37.80%). This result shows the pre-test knowledge of the respondents i.e. before the lecture provided by the researcher.
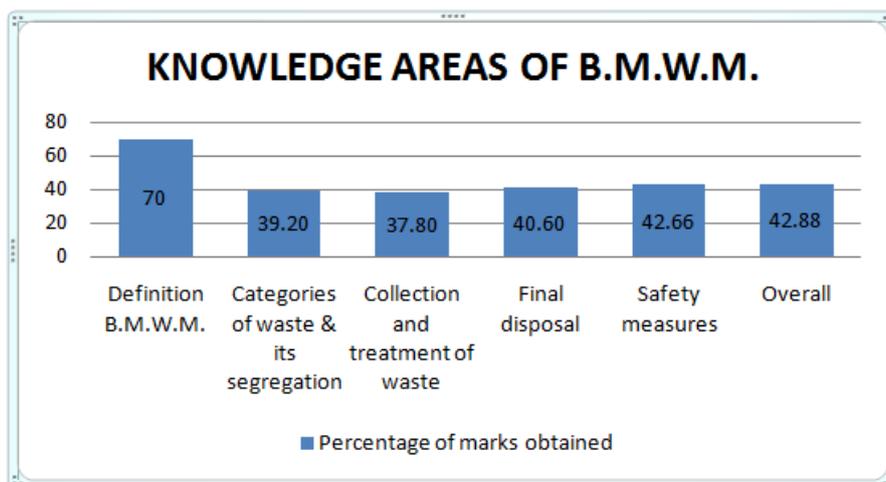

Fig. 2: Pre-test knowledge of staff nurses on B.M.W.M.
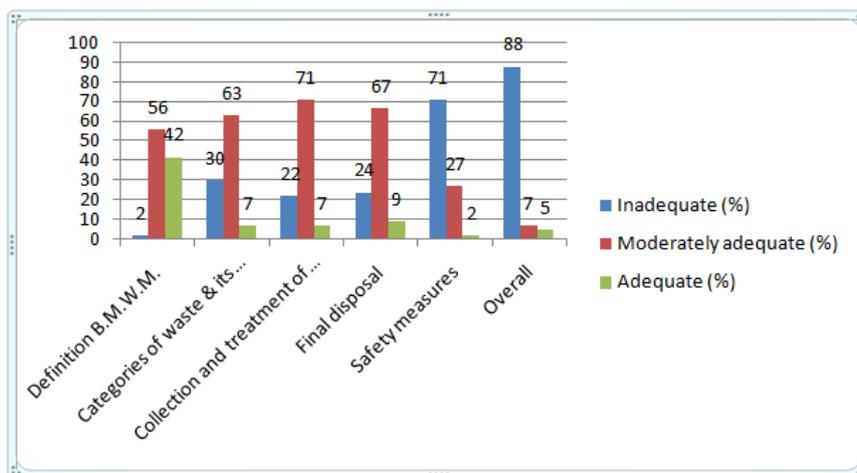
Fig. 3:Pre-test level of knowledge of staff nurses on B.M.W.M.

In this section, the knowledge level of the staff nurses on B.M.W.M. using pre-test knowledge questionnaire has been assessed. Fig. 3 shows the pre-test knowledge level of respondents. 2% respondents have inadequate knowledge in the definition of B.M.W.M. and 42% have adequate knowledge and 56% have moderately adequate knowledge. If the pre-test knowledge level of the respondents in the field of category of waste and its segregation is considered only 7% have adequate, 63% have moderately adequate and 30% have inadequate knowledge level. Similarly only 7% respondents have adequate knowledge about the collection and treatment of waste, 71% have moderately adequate and 22% have inadequate pre-test knowledge about the collection and treatment of waste. Only 9% have adequate knowledge, 67% have moderately adequate and 24% have inadequate knowledge level about the final disposal of B.M.W. as many as 71% respondents have inadequate knowledge about safety measures and only 2% respondents have adequate knowledge in this field. Only 5% respondents have adequate knowledge about overall B.M.W.M. and 88% have inadequate knowledge in this field.

In this section, knowledge of the staff nurses on B.M.W.M. using post-test knowledge questionnaire has been assessed.
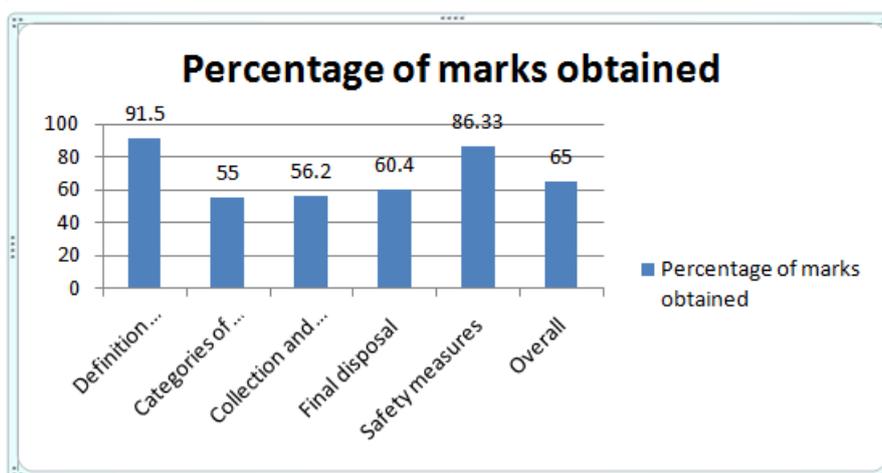

Fig. 4:Post-test knowledge of staff nurses on B.M.W.M.

Fig. 4 shows the post-test knowledge of respondents in different knowledge areas. In the field of definition of B.M.W.M. respondents get 91.50% marks and score 55% in the area of categories of waste and its segregation in the area of collection and treatment of waste the score of respondents is 56.20%. In the area of final disposal, respondents got 60.40% marks. In the area of safety measures the score is 86.33 and overall score of the respondents is 65%.

Fig. 5 shows the post-test knowledge level of respondents. As many as 83% respondents acquire adequate knowledge and 17% respondents acquired moderately adequate knowledge level in the area of definition of B.M.W.M. There is no candidate who fall in the category of inadequate it means that at this stage all the respondents have knowledge about the definition of B.M.W.M. 4% respondents have inadequate knowledge about category of waste and its segregation 81% moderately adequate and 15% have adequate

knowledge in this area. As many as 22% respondents acquires adequate knowledge in the area of collection and treatment of waste while 76% have moderately adequate, 2% have inadequate knowledge in this area. In the area of safety measures 68% respondents have adequate knowledge, 30% moderately adequate and 2% have inadequate knowledge. As many as 76% have moderately adequate, 10% have adequate and 14% have inadequate knowledge on the overall bases.
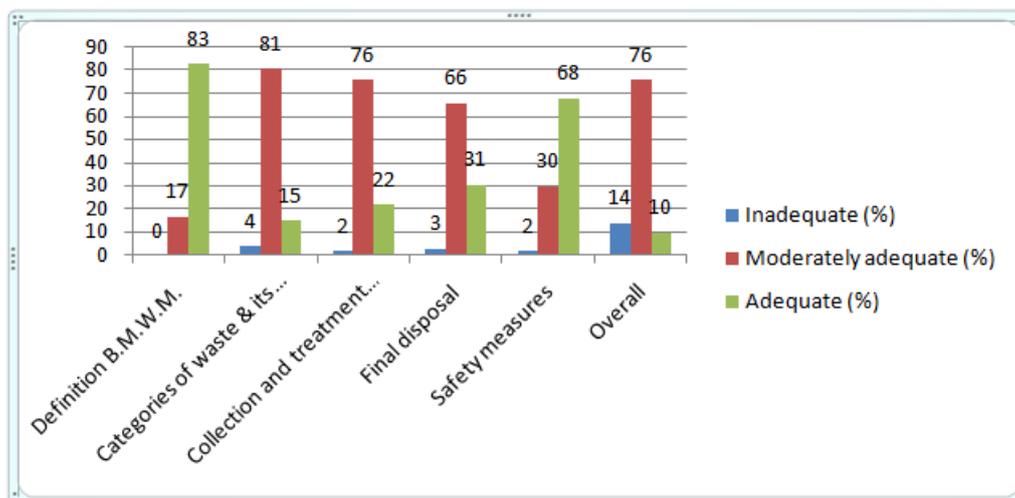

Fig. 5: Post-test level of knowledge of staff nurses on B.M.W.M.

A. To determine the effectiveness of structured teaching program regarding bio-medical waste management

Fig. 6 shows the mean score of pre-test and post-test of knowledge areas. The pre-test mean score is 1.40 while mean score of post-test is 1.83 in the definition field respectively, the pre-test mean score is 1.96 while mean score of post-test is 2.75 in the segregation field, the pre-test mean score is 2.89 while mean score of post-test is 2.81 in the treatment of waste field, the pre-test mean score is 2.03 while mean score of post-test is 3.02 in the final disposal field. If we talk about the area of safety measures pre-test mean score is 1.28 and post-test mean score is 2.59. Hence, the overall mean score of pre-test is 8.56 and post-test mean score is 13.00.
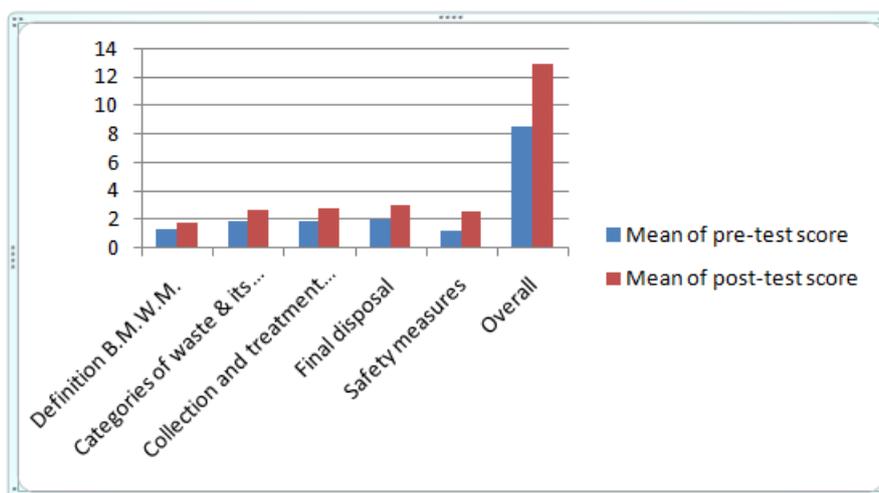

Fig. 6: Mean score of knowledge in pre-test and post-test in various areas of B.M.W.M.

A. To find the association between post-test knowledge score and selected demographic variables
In this section, the difference of mean knowledge percentage in pre-test and post-test in various areas of B.M.W.M.
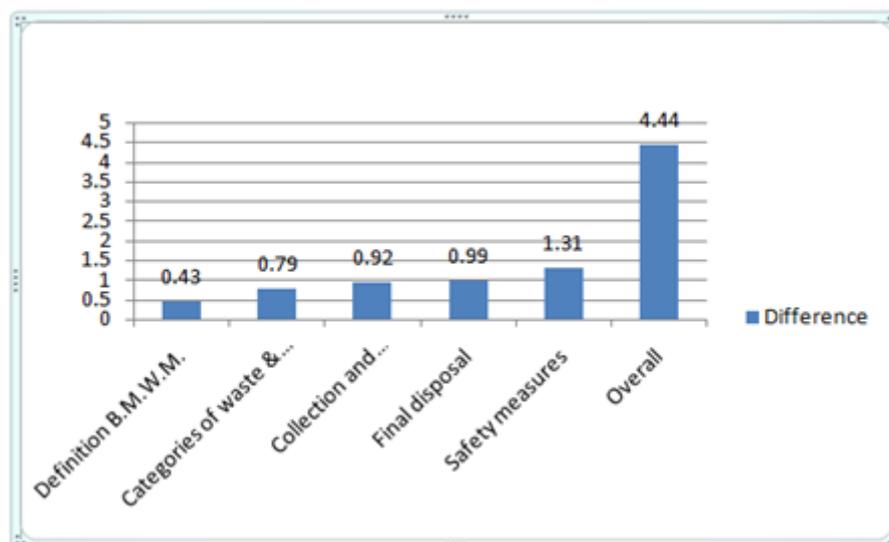
Fig. 7: Mean knowledge percentage for pre-test vs. post-test in various areas of B.M.W.M.

Fig. 7 shows the difference of mean score of pre-test and post-test of knowledge areas. The score is improved in all categories in knowledge area. In the area of definition the enhancement is 0.43, waste and its segregation is 0.79, collection and treatment is 0.92, final disposal is 0.99 and in the safety measures the difference is 1.31. Hence, the overall improvement between pre-test and post-test is calculated as 4.44.

V. Conclusion

The biomedical waste management is the key factor of research these days. In the present paper, effort has been made to assess the existing knowledge of staff nurses of the selected hospital. Then the effectiveness of teaching program has been measured and finally the association between pre-test and post test knowledge score has been compared.In the present study the overall post-test knowledge score 65% of subject were significantly higher than pre-test percentage score (42.88%). The comparison of pre-test and post-test knowledge on B.M.W.M. among staff nurses (S.N.) of selected hospital reveals that overall improvement of percentage was 22.12%. This study shows the benefit of teaching program on B.M.W.M. In the present study there was significant association between the pre-test post-test knowledge score of S.N. and selected demographic variables. In this study researcher found the maximum selected S.N. gained knowledge and adequate trained through teaching program on B.M.W.M.

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