

CHAPTER V

SUMMARY, DISCUSSIONS AND RECOMMENDATIONS

This chapter is presented as summary, discussions and recommendations of the study.

5.1 Summary:

This study was a cross-sectional descriptive research using self-administered questionnaire for health professionals and interview for auxiliary staff. The study dwelled on assessing the behavior and factors affecting it, of the health care workers in infectious waste management at national referral hospital Thimphu, Bhutan. The study also seeks recommendations from health workers on proper management of infectious waste. Interview of 55 auxiliary staff was carried out by 2 trained interviewers. Self administered questionnaire returned were 80 technicians, 112 nurses and 36 doctors. The data was coded and entered in SPSS. For descriptive statistics mean, maximum, minimum, SD and proportion was used. Statistical analysis between independent and dependent variables were t-independent test, 2-independent sample-Mann Whitney's test and Chi-square tests were used.

The study results are as follows:

5.1.1 Socio-demographic results.

Age: 251 (88.7%) of the subjects were between 20-40 years. Maximum age was 62 years, minimum was 20 years and mean age was 32.45 years.

Gender: male: female ratio was 1:1.06

Level of education: Secondary and below was 38.2%, diploma was 42.4%, bachelor degree was 11.3% and masters degree was 8.1% of the subjects.

Job category: The study subject consisted of 55 auxiliary staff, 80 technicians, 112 nurses and 36 doctors.

80.9% of the subjects never had any training and 19.1% had training in infectious waste management. The maximum duration in service was 36 years and minimum was 0.17 years.

5.1.2 Descriptive data of health care workers on knowledge, attitude and behavior in infectious waste management.

5.1.2.1 Knowledge

281 (97.4%) of the subjects scored 8 or more and 2 technicians scored <7 marks out of 10 questions on knowledge. The mean knowledge score of auxiliary staff, technicians, nurses and doctors were 8.42, 9.21, 9.69 and 9.94 respectively. Question (Q3) on closing of infectious waste bag was correctly answered by only 70.3% of the subjects. Question (Q6) on action to be taken in case of spill of infectious waste was correctly answered by 68.9% of the subjects. High score in knowledge obtained were 14 (25.5%) auxiliary, 59 (73.8%) technicians, 102 (91.1%) nurses and 35 (97.2%) doctors with significant difference ($p < .001$).

5.1.2.2 Attitude

The attitude mean of all four categories of health workers were almost equal in all questions except for the 4 negative ones. For question 2 the attitude was least for technicians (2.86) and most for doctors (3.86). For questions 3, 5 and 10 attitude mean was least for auxiliary staff and most for doctors. When health workers were classified by level of attitude, 149 had positive and 134 had negative attitude. 72.22% of doctors, 58.03% of nurses, 51.25% of technicians and 30.90% of auxiliary staff had positive attitude with significant difference in attitude among the job categories ($p=.001$).

5.1.2.3 Behavior

Of the 10 questions on behavior, question 4 had the highest mean (4.92) and question 6 had the least mean (1.27). The mean behavior score for negative questions 2,3, and 6 were 2.77, 3.82 and 1.27 respectively which were all lower than the other questions. The behavior mean of 4 categories of health workers were almost evenly scored except on the negative questions 2 and 3. On question 2, the behavior mean was least for nurses (3.01) and most for auxiliary staff (3.78). On question 3, mean was least for auxiliary (1.80) and most for doctors (2.81). When the health care workers were classified by level of behavior, 27 (75%) doctors, 36 (64.45%) auxiliary and 60 (53.57%) nurses had good behavior while technicians had equal number 40 (50%) of good and bad behavior level.

5.1.2.4 Differences

Differences between no missing data subjects (250) and missing data subjects (33) were compared using statistical analysis like chi-square and T-independent test

against socio-demographic factors. No significant difference was found except in job category where a significant difference ($p=.005$) was seen. Therefore 33 (11.7%) subjects with missing data were left out of further statistical analysis.

5.1.3 Association between knowledge, attitude and socio-demographic factors and the behavior of health workers in infectious waste management.

Analysis of association between knowledge, attitude and behavior level showed that knowledge level has no significant association with attitude level ($p=.081$) or behavior level ($p=.258$) while attitude level was significantly associated with the behavior level ($p<.001$).

Socio- demographic factors had no significant association with the behavior level of health workers in the infectious waste management.

5.1.4 Comparison of behavior of professional and auxiliary health workers in infectious waste management.

Mann-Whitney test performed between professional and auxiliary staff against the 10 behavior questions showed that there is no significant difference in behavior between professionals and auxiliary in questions 4, 6 and 9. In question 3, professionals had better behavior than auxiliary with significant difference ($P=.026$). I rest of the questions auxiliary had better behavior than professionals with significant difference.

The Chi-square test between professional and auxiliary staff against knowledge, attitude and behavior showed that knowledge and attitude levels are higher among the professionals with statistically significant difference from the auxiliary staff ($p < .001$ for both knowledge and attitude). Although behavior level was better for auxiliary, there was no significant difference ($p = .350$) from the behavior of professionals.

5.1.5 Elaboration on policy, deployment of policy and recommendations.

Among the policy content, infectious waste management manual was ranked first, waste management policy second, legislation on waste management third and waste management team as fourth.

The deployment of policy mean score was ranked first as personal protective equipment (PPE) and waste management facilities, second as training and third as procedures for waste management and job responsibilities.

On comparing the policy mean among 4 categories of health workers, manual on infectious waste was ranked second by all.

On comparing mean of deployment of policy, PPE and waste management facilities were ranked top two.

The recommendations have been grouped as policy, implementation of waste management plan and research.

5.2 Discussion:

Discussion on the result of the study is done based on the specific objectives of the study.

5.2.1 Specific objective I and II are considered together that is assessing the knowledge, attitude and behavior of health workers in infectious waste management.

Knowledge: The mean knowledge scores from 10 questions were auxiliary 8.42, technicians 9.21, nurses 9.69 and doctors 9.94. All the questions are of equal importance as it covered the infectious waste production, segregation, collection, transportation, storage and treatment. Although most of the health workers scored ≥ 8 , two technicians scored 7 and 4. This is a disturbing finding as all health workers should have same knowledge about infectious waste management. Perhaps these two technicians were fresh in their jobs and they would need training in infectious waste management for their own safety and safety of others.

Question (q3) on tying of infectious waste bags, was incorrectly answered by 84 (29.7%) subjects and question (q6) after spill of infectious waste, action to be taken was incorrectly answered by 88 (31.1%) subjects. This would lead to improper management of infectious waste. Therefore it would be necessary to give them training or retraining in infectious waste management.

Attitude: The mean attitude score for 4 negative questions 2,4, 5, and 10 were 2.73, 3.74, 1.61 and 1.79 respectively which were all low compared to other questions.

On comparison of mean attitude of these 4 questions among the job categories, it was found that technicians and auxiliary had the least scores and doctors had the best scores. In the attitude level doctors had the highest positive attitude level (72.22%) while auxiliary had the least (30.9%). Not having good attitude in these questions is a serious concern for the hospital as it can lead to unsafe working environment and increased chance of occupational related injuries and infections. Therefore, there is urgent need to change the attitude of health workers.

Behavior: The mean score of behavior on questions 2 and 3 were less than other questions. Comparison of behavior mean among 4 job category found that for question 2, nurses had the least mean and for question 3, auxiliary had the least means. 75% of doctors, 65.45% auxiliary, 53.57% nurses and 50% technicians had good behavior. All these indicate that improvement in the behavior of health workers is desirable especially on the negative questions.

5.2.2 Specific objective III: Association between knowledge, attitude and socio-demographic factors and behavior of health workers in infectious waste management.

5.2.2.1 Association between knowledge, attitude and behavior of health workers in infectious waste management.

Knowledge is not associated with behavior ($P=.258$) of health workers in infectious waste management as was found in previous outcome evaluations of nutrition education programs demonstrated that changes in knowledge do not necessarily change eating behaviors (Centers for Disease Control, 1996). CDC

recommended that, to promote behavioral change there must be motivational strategies and multiple opportunities to practice these changes along with provision of knowledge. This finding is contrary to the findings of Nartrudee 2001, Tarinee 2002 and Suthat 2002.

Knowledge was not significantly associated with attitude ($P=.081$) of health workers in infectious waste management could be explained by the definitions of the two. Attitude refers to likes and dislikes, biases, views, feelings concerning a particular thing or issue (Thurston, 1967) while knowledge is reflection of immediate or general issues, methods, procedures, or situations, with focus on memory (Bloom et al, 1971). There may be other factors that may effect attitude, like effective training or communication.

Attitude was associated with behavior significantly ($P<.001$). Social psychologist Icek Ajzem and Martin Fishbein (1980) wrote that intention has the most influence on behavior. Intention is influenced by attitude, subjective norms and perceived control (Kaplan et al, 1993). Thus, if a person has the attitude to perform a behavior, then it is likely he or she will do so. This finding was also noted by Nartrudee 2001 and Suthat 2002.

5.2.2.2 Association between socio-demographic factors and behavior of health workers in infectious waste management.

Factors like age, gender, level of education, training in infectious waste management and duration of service showed no significant affect on behavior because

other factors like attitude and provision of waste management facilities could be influencing behavior more. Suthat, 2002. found that age, level of education, training and work experience had affect on practice of Universal precaution while gender had no significant on it.

5.2.3 Comparison of behavior of auxiliary and professional health workers in infectious waste management.

In behavior question 3, you recap needles after use had better mean by professionals (2.33) than auxiliary (1.83) with significant difference ($p=.047$) which could be caused by professionals dealing more needles and syringes while auxiliary rarely does. The behavior mean of auxiliary was better than professionals in q1, q2, q5, q7, q8 and q10 with high significance level which could be due to professionals are usually dealing with the infectious waste till the level of segregation after which the auxiliary staff looks after the rest of the process of management.

Knowledge and attitude level of professional is higher than that of auxiliary staff with statistically significant difference ($p<.001$). This could be because professionals are higher educated and more trained than the auxiliary.

The behavior of auxiliary is slightly better than the professionals but no significant difference had been observed. This could be auxiliary has more to deal with the infectious waste than the professionals. The professionals produce infectious waste and segregate them after which collection; transportation; storage and treatment are dealt by the auxiliary. Behavior could be affected by other factors like availability of

PPE and red plastic bags etc that is why there is no statistically significant difference in their behavior.

5.2.4 Specific objective V and VI are considered under this section that is elaboration of information on policy, deployment of policy and recommendations from health workers.

Manual on infectious waste in policy content and availability of PPE and red plastic bags and yellow box in deployment of policy were ranked top by all health workers. This indicates that the health workers are more concerned with what is actually happening in their job environment rather the content of policy which could have been adopted from else where.

Recommendations from health workers on proper management of infectious waste: Out of 283 subjects, no comments were made by 27 (9.54%), one comment made were 64 (22.61%) subjects and two comments were made by 192 (67.84%) subjects which means that the health workers do have interest in improving the management of infectious waste. 21 different recommendations have been made and are grouped under policy, implementation of waste management plan and research. Policy contents are commitment for adequate budget and human resource development for infectious waste management. Implementation of waste management plan includes training and retraining of health workers, making equipment and facilities available, providing adequate manpower and conducting periodic meetings. Research includes operational research and giving feedback to the policy and planning development.

5.3 Recommendations:

5.3.1 Suggestions for national referral hospital, Thimphu, Bhutan.

National referral hospital must ensure the safe collection, transport, storage, treatment and disposal of infectious hospital waste and health workers have a duty to reduce or eliminate the hazards of infectious waste management practices. Therefore, few proposals are suggested for the national referral hospital through the findings of this study.

5.3.1.1 Policy

National referral hospital is suggested to have a policy document on infectious waste management which includes health workers' health and safety, commitment for human resource development and keeping the environment safe for all the people.

5.3.1.2 Implementation of the policy

National referral hospital should ensure proper implementation of the infectious waste management policy through following strategies:

- a) Allocating sufficient financial and personnel resources to ensure efficient operation of the plan.
- b) Forming a waste management team to develop a written waste management plan for the hospital which includes job responsibilities of various stake holders.
- c) Training and retraining of the health workers in management of infectious waste and universal precaution.

- d) Setting up rules and regulations to strengthen the infectious waste management and universal precaution.
- e) Setting up surveillance and monitoring system for proper practice of infectious waste management and universal precaution and occupationally acquired injuries and infections.
- f) Providing adequate and constant supply of equipment for infectious waste management.

5.3.2 Suggestions for future study

5.3.2.1 Future studies on infectious waste management must be aware for the problem of collection of information from various categories of health workers by same the same questionnaire. Different job categories have different job responsibilities, so when questions are asked on other areas of infectious waste management, one may not get good information. Therefore it is desirable to have separate questionnaire for auxiliary and professional health workers.

5.3.2.2 This study conducted a quantitative assessment of behavior of health workers in infectious waste management only, therefore a qualitative assessment of the behavior of health workers would have confirmed or supported the findings of this study. More in-depth study using in-depth interviews with key informants or focus group discussion with health workers or

observation of the practices of infectious waste management to gain more insight is desirable in future.

- 5.3.2.3 Correlation study of the behavior of health workers could be studied in the same site or different sites after giving training or retraining. Such studies can give the change in behavior of the health workers.