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Magnitude of Knowledge Attitude and Practice (KAP) towards Biomedical Waste Management among Health Care Professionals in Bule Hora Hospital, Ethiopia

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Abstract

Hospital are the kernel of heal and also of infectious waste procreation. Insufficient and Inappropriate waste management of health care waste may have grave health influence and substantial impact on the public health and environment. The intention of the study was to magnitude the knowledge attitude and practice (KAP) towards Bio medical waste management (BMWM) among health care professionals in Bulehora hospital, Ethiopia. Present study was piloted among 162 health personnel (doctors, nurses, lab technicians, pharmacist, midwives and sanitary workers) in Bulehora hospital, Ethiopia, for a period of two weeks (October 25 to November 10). The questionnaire was used to evaluate their knowledge of bio medical waste disposal. Data were collected and analyzed using the statistical package for the SPSS version 25 software and narrated by using tables and graphs.

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162 health care workers take part in, sanitary workers incorporated 40.7% of the participants and more than half of the participants had $(26-35)$years (53.1%). Overall the level of knowledge was good at 70.0% that of attitude was favorable at 65% and that of practice was poor at 66.7%. Boundless the knowledge attitude and practice of mean at 13.3, SD at 26.85 MD at $(21-33)$ $t-$ values at 0.793 and $p-$ value at 0.855 significantly low. Health care workers have good knowledge and favorable attitude about bio medical waste management. This can be utilized to enrich the practices in regard to bio medical waste manages at Bule Hora hospital to elude hazards rising due to health care waste. Nevertheless accentuated to have a substantial impact on bio medical waste riddance and practices.

Key words: Knowledge; Attitude; Practice; Bio Medical Waste Management; Health Care Workers.

1. Introduction

Bio medical waste is elucidate as the waste generated during the diagnosis, treatment or immunization of human being or animals or is research pursuit pertaining to or in the producing or testing of biological and includes categories mentioned in non hazardous and bio hazardous [1– 4]. The hospital waste is made up of general waste and biomedical waste, pathological waste, sharps, chemical waste, pharmaceutical waste, waste with high heavy metal contents, Nano –medicines/ material waste, radioactive waste, genotoxic waste and pressurized waste [5].Inappropriate waste management generally verdict in adverse effects on the environment and public health [2]. Unacceptable handling of BMW can spread many diseases but the gravest ones are Hepatitis B, Hepatitis C and AIDS and also a cause of water, air and soil pollution [3, 6].Bio medical waste can transmit more than 30 dangerous blood borne pathogens [7]. WHO states that 85% of hospital wastes are absolutely non-hazardous, although 10% infectious 5% and non infectious by they are incorporated in hazardous wastes. About 15% to 35% of hospital waste is regulated as infectious waste. This range is depending on the total amount of waste generated [7,8,14]. USA is reported to generate just about 3.6 million tons of HCW per year, albeit in South Africa 42,000 tons of HCW were generated in 2010 with cost of its safe disposal approximated to be in the region of R. 71million/year [9]. The enormity of infectious risk associated with waste is high in low-income countries [10]. The BMW should be segregated at source in to color coded bags or containers and its collection and proper disposal should be substantial treat for both medical personnel and the institution involved in such waste generation [7, 11]. Unsuitable medical waste management can lead to injuries from sharp instruments, contamination of the environment by hazardous chemicals and disease transmitted by infectious agents [9]. Presently BMW disposal in HCFs has become an increasing affair and acceptable confiratiation showed that BMWM across Ethiopian health institutions is still insufficient [7]. In Ethiopia there was expeditious opening of health care facilities in response to MDG goals and population growth which results in enormous generation of HCW [2,13] Nevertheless, research in this censorious matter has been very limited and there is grave need of facts on this issue for planning and policy decision in the fourth coming [12]. BMW management studied in different parts of Ethiopia is one of the major reasons for insufficient and inappropriate health care waste management, measuring the level of knowledge; evaluating the attitude and assessing the practice of health care providers on BMWM are the key intention to contemplate for safe health care practice.

1.1. Materials and Methods

1.1.1. Study design, setting and period

Institutional based cross sectional study was conducted in Bulehora hospital among health care workers to assess their KAP towards Bio medical waste management. This zone is found in south of Addis Ababa which is the capital city of Ethiopia and is away from the centre by $(470 - 570)$ km. In this zone there are 1 general hospital, 4 district hospitals, 54 health centers and around 200 health posts with 1582 health care workers. In Bule Hora hospital currently 172 health care workers are there. The Study will be conducted from October 25 to November 10^{th} 2020 G.C

1.1.2. Population

This study was done on Health Care Workers working in Bulehora hospital, from the selected health care facilities, all health care workers who direct or indirect contact with patients and worked for at least six months and above were included in the study. Health care workers who were on annual vacation, sick leave and delivery vacation and who are not voluntary to participate were excluded in the study.

1.1.3. Sampling Technique

The required number of health care workers will be included in the sample by simple random sampling technique.

1.1.4. Measurement

The questionnaires used in this study consist of four parts. Socio demographic, Knowledge, Attitude and Practice. To measure the knowledge of Bio medical waste management 10 questions were used. The correct answer were assigned '1' point and incorrect answer considered as '0' point. To measure the attitude of Bio medical waste management 10 questions were used. The questions were answered by 'Yes' and 'No' and to measure the practice of Bio medical waste management 10 questions were used. However the HCW who were score more than 60% considered as having good knowledge, favorable attitude and good practice of Bio medical waste management. And those score less than 60% categorized as poor knowledge, unfavorable attitude and poor practice of Bio medical waste management.

1.1.5. Data collection tools and procedure

Self-administered semi structured questionnaire was used for data collection. It includes four parts; the first part containing socio demographic characteristics such as age, sex, marital status, educational status, work experience, profession, waste management, and professional training programme. The second part elicits about knowledge, the third part contains questions about attitude and the last part includes practice assessment questions towards Bio medical waste management. Before data collection one day training was given for data collectors and supervisor regarding the study, the questionnaires and data collection procedure by the main investigator. Pre-test in 10% of the sample size was done in Yabelo hospital Ethiopia, which was not included in the actual study. The respondents encouraged to respond to all items in the questionnaire within the

time they involved.

1.1.6. Data analysis

The data was entered, cleaned and analyzed by using SPSS version 25 software and described by using tables and graph.

1.1.7. Ethical Consideration

Ethical clearance was obtained from Bule Hara University, College of Health Science Institutional Review Board (IRB). Permission from respective authorities and verbal consent of respondents' were secured by explaining the objective of the study before the data collection. To get full co-operation, respondents' were reassured about the confidentiality of their response. They were also be ensured their voluntarily participation and right to take part or terminate at any time they wanted. The research assistants were trained by the principal investigators on how to keep the confidentiality and anonymity of the responses of the respondents in all aspect.

2. Results

2.1. Socio-demographic characteristics of the study participants

Result of the present study revealed total 162 participants, half of the study participant's fall under 26-35 years of age. 83 (51.2%) respondents were males and rest 79 (48.8%) were females. Most of the participants 91 (56.2%) were married, 32.1% of study participants were educated at the diploma level. One third of the respondents were sanitary workers. 48 (29.7%) were nurses, 24.5% of the study participants were working at outpatient departments. 76.5% of the respondents were having less than 5 years experience, half of the participants have no idea of the BMW management committee in the hospital.

Table 1: Socio demographic Variables

Variables	Responses & coding		Frequency (f)	Percentage (%)
Age	a.	< 25 years	69	42.60
	b.	26-35years	86	53.10
	c.	>36 years	07	04.30
Gender	a.	Male	83	51.20
	b.	Female	79	48.80
Marital Status	a.	Single	71	43.80
	b.	Married	91	56.20
Educational Level	a.	Below Diploma	49	30.30
	b.	Diploma	52	32.10
	c.	Degree	43	26.50
	d.	Masters & above	18	11.10
Job Category	a.	Doctors	16	09.90
	b.	Nurses	48	29.70
	c.	Midwifes	16	09.90
	d.	Health Officer	01	00.60
	e.	Lab Technician	08	04.90
	f.	Pharmacist	06	03.70
	g.	Radiologist	01	00.60
	h.	Sanitary Workers	66	40.70
Working Department	a.	OPD	38	24.50
	b.	Wards Medical surgical	30	18.50
	c.	Obs & Gyn departments	28	17.20
	d.	Operation Theatre	11	06.80
	e.	Emergency Dept.	16	09.90
	f.	Pediatric ward	07	04.30
	g.	Intensive Care Unit	12	07.40
	h.	Laboratory	10	06.20
	i.	Pharmacy	08	04.90
	j.	X-ray	02	01.20
Working Experience	a.	0-5years	124	76.50
	b.	> 6 years	38	23.50
Availability of waste management guideline	a.	Yes	59	36.40
	b.	No	85	52.50
	c.	Not sure	18	11.10
Availability of BMW management committee in the hospital	a.	Yes	62	38.30
	b.	No	78	48.10
	c.	Not sure	22	13.60

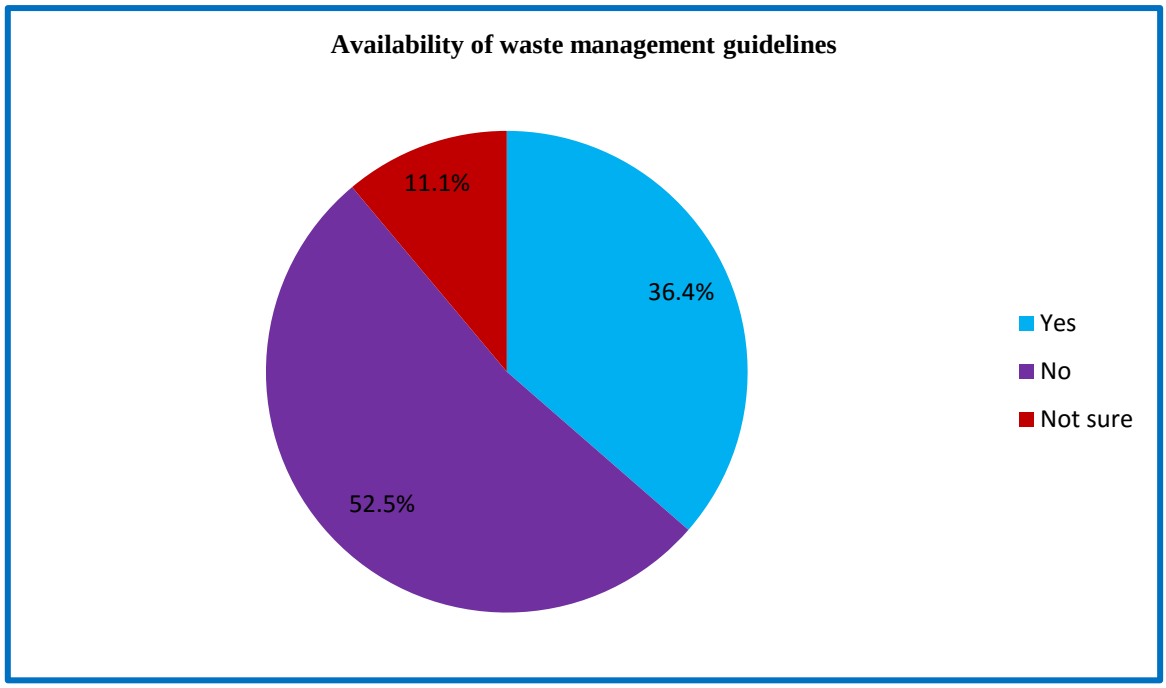

Figure 1: Socio demographic Variables

2.2. Explanation about Figure – 1

Half of the participants had knowledge about the availability of waste management guidelines. 36.4% participants had no and 11.1% participants had had not sure.

2.3. Health care workers knowledge towards Bio Medical Waste Management

Finally 115 (70%) health care workers had good knowledge and the remaining 47 (30%) of participants had poor knowledge towards BMW management. Nevertheless the majority of the participants had good level of knowledge about what do you mean by BMW. 85.2% of participants had good level of knowledge about Steps involved in the management of BMW, and be made aware of risk involved in handling BMW and use of PPE. 73.5 % of participants had good knowledge about storage time for BMW as per BMW rules. 66.7% of respondents had knowledge an inappropriate BMW disposal cause health hazards. Half of the respondents had poor knowledge about the BMW disposal in an institution problem & extra burden.

Table 2: Knowledge towards Bio Medical Waste Management

Characteristics		Frequency (*f*)	Percentage (%)
What do you mean by BMW	a. Waste from house hold	11	6.8
	b. Waste usually generated during various activities like diagnosis, treatment, immunization, in medical, dental or laboratory set-up.	149	92.0
	c. Don't know	02	1.2
How BMW should be disposed of	a. Dump directly into garbage bin.	34	21.0
	b. Handing it over to BMW	120	74.1
	c. management	08	4.9
Are they any guidelines for BMW disposal by Government	a. Yes	89	54.9
	b. No	34	21.0
	c. Don't know	39	24.1
Steps involved in the management of BMW	a. Segregation collection & storage - transportation-Treatment & Disposal	138	85.2
	b. Collection-Transportation-Disposal	15	9.3
	c. Don't know	09	5.5
Storage time for BMW as per BMW rules	a. 24 hours	27	16.6
	b. 48 hours	119	73.5
	c. Don't know	16	9.9
BMW handlers should	a. Be made aware of risks involved in handling BMW	10	6.2
	b. Use PPE	12	7.4
	c. Both of above	138	85.2
	d. None of above	02	1.2
Do you have BMW disposal charts in the departments	a. Yes	75	46.3
	b. No	51	31.5
	c. Never noticed	36	22.2
Can inappropriate BMW disposal cause health hazards	a. Yes	108	66.7
	b. No	35	21.6
	c. Don't know	19	11.7
BMW disposal is an institutional problem & extra burden	a. Yes	52	32.1
	b. No	94	58.0
	c. Don't know	16	9.9
Would you like to have training programmed to enhance knowledge regarding BMW	a. Yes	105	64.8
	b. No	26	16.1
	c. Not sure	31	19.1

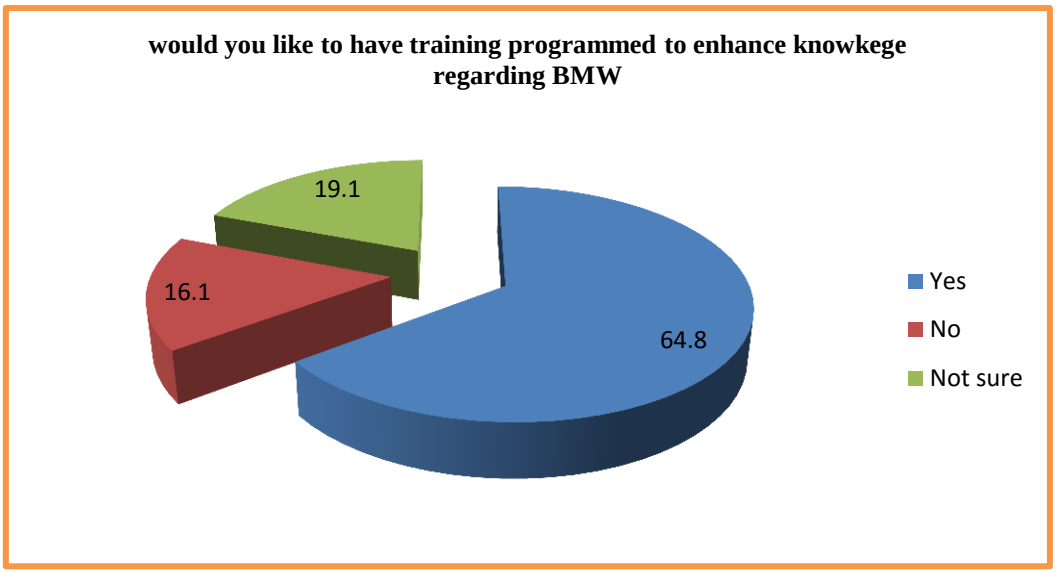

Figure 2: Knowledge towards Bio Medical Waste Management

2.4. Explanation about Figure – 2

64.8% of participants had good knowledge about the training programmed to enhance the knowledge regarding BMW, remaining participants had no and not sure.

2.5. Health care workers attitude towards Bio Medical Waste Management

Table 3: Attitudes towards Bio Medical Waste Management

Characteristics	**Yes**		**No**	
	Frequency (f)	**Percentage (%)**	**Frequency** (f)	**Percentage (%)**
Segregation of waste at source increases the risk of injury to waste handlers.	107	66.1	55	33.9
Decontamination/ disinfection reduces chances of infection	113	69.8	49	30.2
Infectious waste should be put in yellow colored plastic bag with bio hazard symbol.	122	75.3	40	24.7
Containment of sharps does not help in safe management of hospital waste.	97	59.9	65	40.1
Occupational safety of waste handlers is a must wear gloves	123	75.9	39	24.1
Reporting of needle stick injury is a must	75	46.3	87	53.7
Use of color code for segregation of waste is a must	113	69.8	49	30.2
Hepatitis B immunization prevents transmission of hospital acquired infection	68	41.9	94	58.1
Post exposure prophylaxis should be initiated as soon as possible	106	65.4	56	34.6
Excess mercury/ amalgam should be stored in water of fixer solution	93	57.4	69	42.6

Overall the report indicates that 106 (65%) found favorable attitude albeit 56(45%) got unfavorable attitude, half of the participants had favorable attitude towards segregation of waste at source increase the risk of injury to waste handlers, and also disinfection reduces chances of infection and one third of respondents had favorable attitude regarding infectious waste should be put in yellow colored plastic nag with bio hazard symbol. And also occupational safeties of waste handlers must were gloves. Less than half of the participants had unfavorable attitude towards reporting of needle stick injury is a must during on work, 65.4% of respondents had favorable attitude regarding post exposure prophylaxis should be initiated as soon as possible.

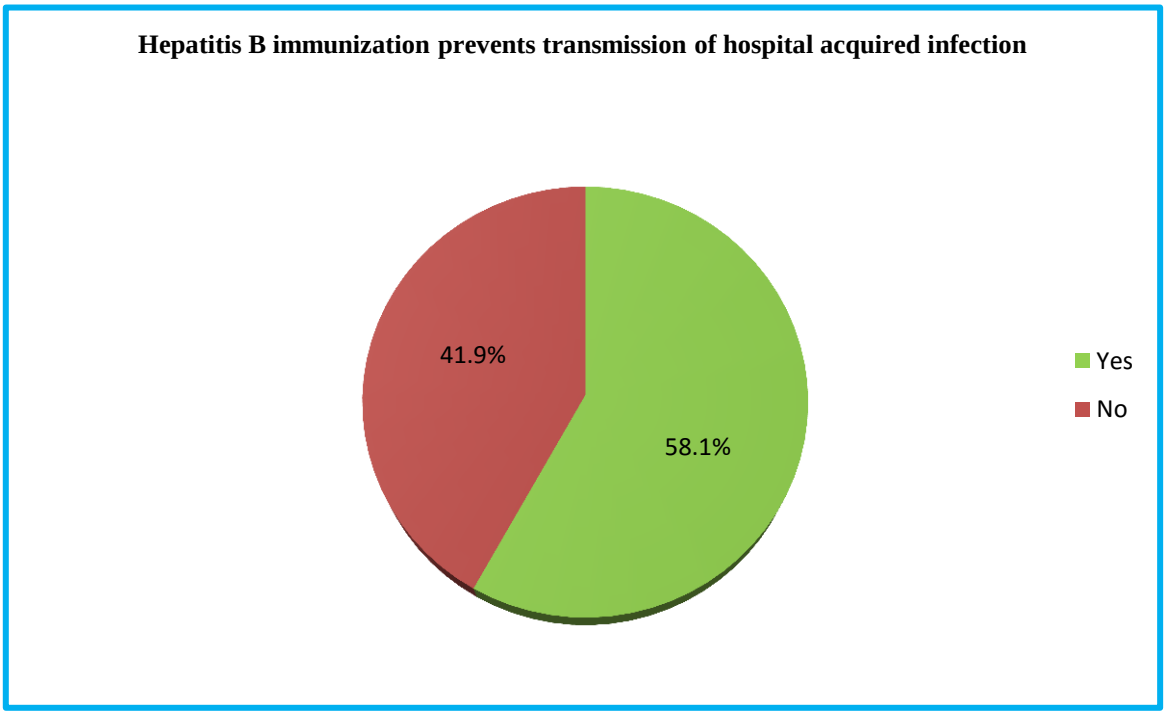

Figure 3: Attitudes towards Bio Medical Waste Management

2.6. Explanation about Figure – 3

substantial collection of 58.1% of responsive had favorable attitude about the importance of Hepatitis B immunization will not prevents the HAI.41.9% of respondents they did not had the idea about Hepatitis B immunization.

2.7. Health care workers practice towards Bio Medical Waste Management

Wide reaching the result showed that majority of the participants had poor practice, 33.3% participants had good practice. half of the respondents not following color-coding of BMW, one third of the respondents had experience in the waste disposal practice is not correct in the respected hospital, 80% of the participants had poor practice of soiled dressing and used impression materials are disposed of in, and also extracted teeth and human tissue are disposed of in. 91% of participants had poor practice in disposal of Plaster of Paris.

Table 4: Practice towards Bio Medical Waste Management

Characteristics		Frequency (f)	Percentage(%
Do you know about color-coding segregation of BMW	a. Yes	102	63.0
	b. No	33	20.4
	c. Not sure	27	16.6
Do you follow color-coding for BMW	a. Yes	55	34.0
	b. No	88	54.3
	c. Not sure	19	11.7
Is the waste disposal practice correct in your hospital	a. Yes	51	31.5
	b. No	80	49.4
	c. Cannot comment	31	19.1
Document with confidential patient information are to be disposed in to the paper recycling bin		64	39.5
	a. True	51	31.5
	b. False	47	29.0
	c. Do not know		
Are different colored bags used to dispose different types of waste		78	48.2
	a. Yes	54	33.3
	b. No	30	18.5
	c. Don't know		
Used disposable plastic items (eg. Catheter) are disposed of in		44	27.2
	a. Yellow bag	52	32.1
	b. Red bag	41	25.3
	c. Black bag	25	15.4
	d. Don't know		
Solid dressing and used impression materials are disposed of in		50	30.9
	a. Blue / white bags	36	22.2
		54	33.3
	b. Red bag	22	13.6
	c. Black bag		
Used sharps and needles are disposed of in a puncture proof container	d. Don't know	53	32.7
		64	39.5
	a. Yellow bag		
	b. Rigid / puncture proof container	26	16.1
		19	11.7
	c. Red bag		
Extracted teeth and human tissue are disposed of in	d. Don't know	31	19.1
		47	29.0
	a. Yellow bag	55	34.0
	b. Red bag	29	17.9
	c. Black bag		
Plaster of Paris is disposed of in	d. Don't know	41	25.3
		15	9.3
	a. Yellow bag	35	21.6
	b. Red bag	71	43.8
	c. Black bag		
	d. Don't know		

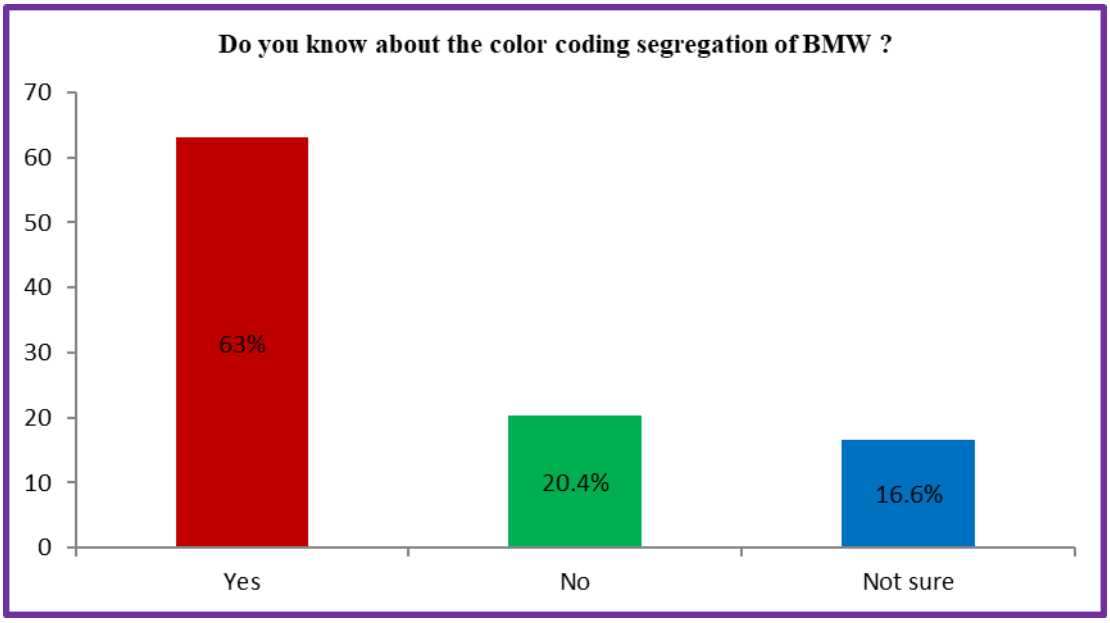

Figure 4: Practice towards Bio Medical Waste Management

2.8. Explanation about Figure – 4

63.0% respondents had good practice about color-coding segregation of BMW; remaining respondents had poor practice about color-coding segregation of BMW

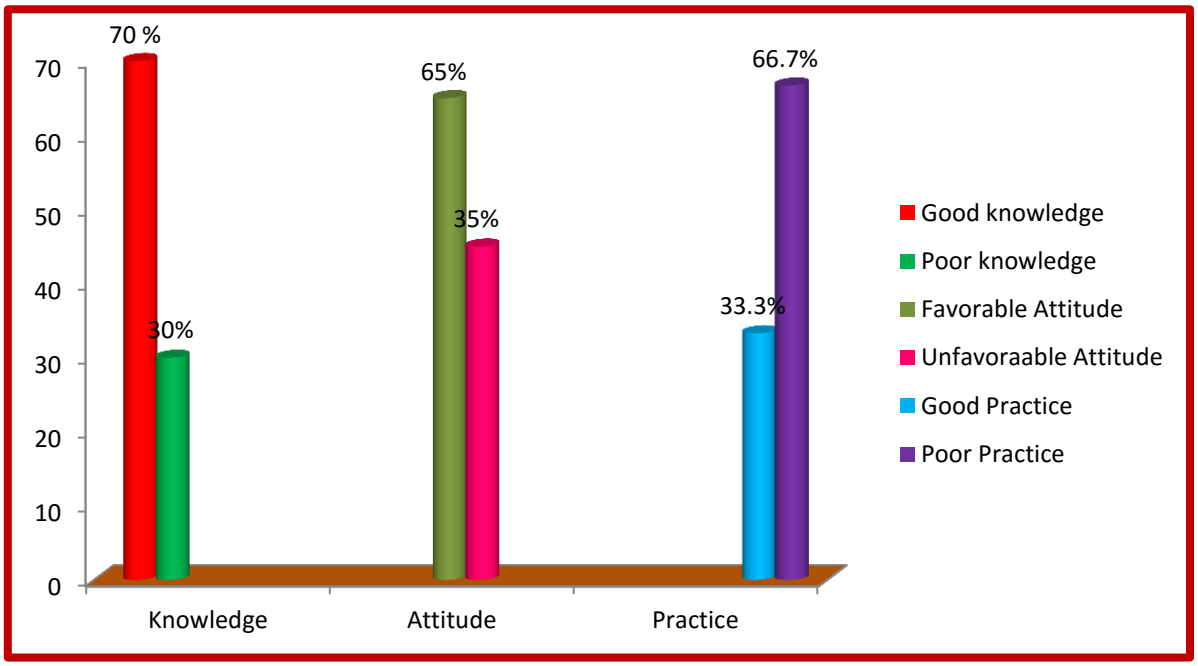

Figure 5: knowledge attitude and practice towards biomedical waste management among health care workers

2.9. Explanation about Figure – 5

Demonstrate that knowledge attitude and practice of bio medical waste management towards health care workers, was found 70%, 65%, 33.3% had good knowledge, favorable attitude and good practice, and also 30%, 35%, 66.7% had poor knowledge, unfavorable attitude and poor practice respectively.

Table 5: Mean, Standard Deviation, Mean Difference, t- value and p-value on Biomedical Waste Management

Group	Mean	SD	MD	t −value	p −value
Good Knowledge	13.3	26.85	21.33	0.793	0.855
Poor knowledge					
Favourable Attitude					
Un favourable Attitude					
Good Practice					
Poor Practice					

3. Discussion

The institutional based cross sectional study was a distinctive chance to come up with facts regarding a topic which is considered as global issue by [15]. This study also can be useful to admit the interlude inevitable action needed in forthcoming for alteration of BMWM at dissimilar levels in hospital. In the present study results showed 83 (51.2%) of participants were male and 79 (48.8%) were female. The similar findings were reported by [16, 17] in their study reports revealed by the same. In this study 70% of HCW accomplished good knowledge which was in line with the study piloted in Tertiary level health care hospital which was divulged as one third of the participants had good knowledge appropriately [18]. On the other hand this finding is analogously higher than similar study conducted in [19, 10] which give a description of 61.4% and 50.0% of participants found good knowledge. In the present study 30% of HCW had poor knowledge which is lesser than a study led in District hospital Kwazulu-Natal which was delineated as 42.7% of the participants scoring poor knowledge. Therefore unveil study shows one third of the participants were had good knowledge about the storage time for BMWM as per BMW rules. These findings were alike with the results in the [20] which manifest knowledge amid doctors 68%, 52% nurses, 56% paramedical and 24% class IV workers. In the prevailing study it was observed that majority of respondents got knowledge regarding steps involved in the management of BMW. Indistinguishable study brought by [21] 75% of participants had good knowledge regarding waste disposal management and the seriousness of the disease transmission. In the present study 64.8% had good knowledge for training programmed to enhance the BMW. Similar finding was also reported

by [22] in their study conducted in one of the associated hospital of Government Medical College Srinagar 100% of sanitary staffs had training programmed for enhance the knowledge of BMW. In the current study results exhibit that 66.7% practitioners accepting that inappropriate BMW disposal cause health hazards and also a similar study conducted in Chennai by [23] which reported at 55% of the practitioners are accepting safe management of BMW I an issue. Boundless attitude of the study participants were 45% unfavorable attitude, which was in line with the study brought Yaounde [10] which was described as 83% of HCW obtained unfavorable attitude. In the present study revealed that more than half of the participants had unfavorable attitude for reporting of needle stick injury in a must. This is unbefitting a study conducted by [24] 95.2% of study participants were concerned about the needle stick injury and also 3-80% of participants reported in other studies [25]. In the prevailing study 69.8% were had favorable attitude about use of color code for segregation of waste is a must. Which is lesser than a study piloted by [26] which was revealed as majority of the respondents had favorable attitude of proper color coding bin to dispose the waste?

Overall this study 33.3% were had good practice which was line in study conducted in district hospital in [9] which will be reported 53.9% of HCW had good practice respectively and also in the present study 66.7% were had poor practice. On the other hand this finding is relatively higher than similar study conducted in [10] which reported as 50.0% of participants had poor practice. Regarding practice about MWM it was found that 39.5% were discarding the BMW according to the color-code which is lower than a study led in [18] which was delineated as 94.3% nurses were had good practice regarding disposal of waste in specified color coded containers. In the present study less than two third of the study participants were disposing sharps in puncture proof containers. A similar study revealed the same reports [27] on the other hand this report is relatively lesser than similar study conducted by [28,29] which give an account of 72%, 90% of participants found good practice respectively. Considering the important safety and medico-legal implications for staff and patients, the HCW management practices in the hospital were disappointing with majority of participant having poor practice very less number of staff with good practice reported in this study. In addition this study has shown that there was inadequate effort made to ensure with hospital policy. Lack of in-service training on HCW as well as inadequate supervision and monitoring of their practices. These results point to lack of mechanisms and system within the hospital to ensure that good practices are known and consistently followed. Other studies have shown that training and ongoing monitoring is essential if policy is to be implemented [9].

4. Conclusion

Majority of the respondent's attained good knowledge and high level of favorable attitude and one third of them got good practice. Therefore the health care workers are aware of infectious disease causing pathogenic organisms, and also they not exclusively following the BMWM guidelines. So the hospital administration has to implement strong rules and regulations and to provide necessary equipments to follow the BMWM.

4.1. Recommendations

The current study recommends the following:

- Updating knowledge and practice of nurses through continuing in-service educational programs.
- Providing training programs for newly nurses about BMWM and at regular intervals.
- To encourage the health care workers to involve in research activities

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