A KNOWLEDGE, ATTITUDES AND PRACTICES STUDY OF BIOMEDICAL WASTE MANAGEMENT AMONG WITH HEALTH WORKER GOVERNMENT AND PRIVATE HOSPITAL

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I.   INTRODUCTION

Biomedical waste is the waste of the hospital which is generated from the lab, research centre, and patient treatment. It will be dangerous and harmful and contagious along with anything else if we are not properly isolated in our hospital.

Overwhelming increase in patient number in both public and private hospitals has led to concomitant increase amount of generated waste, which during the entire course of healthcare activities needs special consideration for its composition, quantity and their potential hazardous effect as compared to waste of other places and thereby requires particular attention for its management[1].

Moreover inadequate and inappropriate handling of healthcare waste not only has serious implications for the healthcare of those involved, but also carries a potentially significant risk to the environment as well.[2] Safe and reliable method for handling of biomedical waste which includes segregation at source into colour coded bags or containers and its collection and proper disposal should be ensured at every cost.[3] For proper management of biomedical waste the ministry of environment and forest has promulgated the biomedical waste (management and handling) rules. This came into enforcement in July 28, 1998. These rules are meant to improve the overall waste management of health care facilities in India. And encompasses all who involve in any step of biomedical waste generation and handling[4]. These rules get amendments in 2000, 2003 and again in 2011 (notified) under the Environmental Protection Act 1986.

For proper disposal of bio-medical waste, introduction of laws only is not sufficient enough but the development of healthcare system that creates awareness and promote effective enforcement of existing BMW management guidelines among all healthcare personnel assumes primary importance[5]. This study was done to assess the biomedical waste management awareness among health workers in selected government hospital and private hospital at Kanpur Nagar.

The Government of India describes that Hospital Waste Management is a chunk of hospital hygiene and maintenance activities. Bio-Medical Waste Management encompasses tasks for a scientific management of health care waste which is compulsory to be adopted by the hospitals. There are varieties of wastes which have been generated in the operational activities of the hospitals. These wastes are hazardous for the human life and also effect the environment very much. So greater attention is required to manage the bio-medical waste for the survival of human beings as well as for safeguard the environment from deteriorate.

The disposal of biomedical waste needs a particular process in the hospitals to safeguard the health of people as the wastes are very hazardous in nature. Improper waste management creates various types of problems in the society. Therefore, for effective management of bio-medical waste management is a primary concern for health of public and environment.

The bio-medical waste legislation elaborately mentions the suggestions for its management. Different methods developed for rendering sustainable biomedical waste management. The hazardous nature of the biomedical waste is due to the following:

- Infection
- Toxicity
- Exposure to radioactivity
- Injury

Biomedical Waste Management practices are getting attention due to environmental and health concern. There are various issues and challenges associated with biomedical waste management in India are as follows:

1. Lack of awareness and Training,
2. Unclear role of local authorities,
3. Lack of Segregation Practices,
4. Lack of Proper Operational Strategy,
5. Financial Constraints,
6. Waste-picking and Reusing,
7. Lack of adequate facilities.

In hospitals, it is necessary to bring the awareness amongthe health workers in government hospital and private hospital related to biomedical waste and its management techniques.

SIGNIFICANT OF STUDY

The biomedical waste management is an important aspect in the life of every doctors and staff member of the nursing homes, clinics, hospitals, dispensaries etc. In today's time the protection of the environment is essential part of the life of human beings to survive as well as for sustainable development and growth. The Government is also very concern about the biomedical waste management and it is the duty of every stakeholder to protect our environment. Therefore, it is essential to implement biomedical waste management techniques in hospitals to protect the environment. Therefore, "the research study is entitled the knowledge, attitudes and practices of a health worker in government hospital versus private hospital in Kanpur Nagar district" to analyze the awareness among doctors and staff members regarding biomedical waste management and implementation of its techniques in government hospital versus private hospital in Kanpur Nagar district. (Will cover at least 02 government and 02 private hospitals)

OBJECTIVE OF STUDY

A study to determine the knowledge and practice regarding Bio Medical waste management among health workers in selected government hospital and private hospital at Kanpur Nagar.

1. To assess the knowledge regarding Bio Medical waste management among health workers in selected hospitals.
2. To assess the practice regarding Bio Medical waste management among health workers in selected hospitals.
3. To find out the relationship between knowledge and practice regarding biomedical waste management.

II.   REVIEW OF LITERATURE

This chapter deals with Review of Literature related to biomedical waste management a review of related Literature is an essential aspect of scientific research. It involves the systematic identification. Location security and survey of written material that contain information of a research problem keeping this in mind the investigator probed into the accessible some & gained an in-depth understanding from the related studies.

STUDIES AND LITERATURE RELATED TO BIOMEDICAL WASTE MANAGEMENT.

Nandwani, S. (2010)has done the research in a private tertiary care situated at Delhi. In the research, researcher has found that the hospital staffs were not segregating the waste properly. The hospital has its own incinerator, but it was underutilized[6].

Radha, K.V. (2009)in the research found that the hospitals do not have any proper biomedical waste management. The staff members were also not trained and aware about the proper waste management system. So, the researcher suggested that proper training, education, and commitment is required in the hospitals to manage the biomedical wastes[7]

Singh K. (2004)conducted the research in the rural and urban areas of Chandigarh. The research included nursing homes, clinics, hospitals, dispensaries etc. The researcher has found that no proper waste management has been implemented and it needs to be improving in Chandigarh[8]

Kishore J. (2014) conducted the research in south and east zones of Delhi among the private hospitals. The research has found that biomedical waste management practices were not followed properly by these hospitals[9].

Pawan, P. (2014) emphasized the importance of training to create awareness among paramedical workers of a tertiary care hospital of Meerut. The research has found significant impact of training on the awareness and implementation of management practices in the hospitals[10].

According to Bhagawati G.,Nandwani S., Singhal S. (2015) in their study found that very less number of doctors, nurses and other staff members were aware about the number of categories of biomedical wastes[11].

Joseph, L. et al.(2015) study was conducted to find out the impact of training on the awareness of biomedical waste management in the hospitals[12].

Pullishery, F. et al. (2016)A cross-sectional study was conducted in Mangalore, Karnataka. The study found that the disposal of biomedical waste is not properly managed by the hospitals[13].

Anand M. Dixit et al. (2021)in their study suggested that the awareness of the biomedical waste guidelines and the importance of its implementation is the essential requirement in today's time[14].

Sharad Chand et al. (2021) study concluded that biomedical waste is a serious health concern. Further they suggested the importance of the guidelines given by the government to manage the biomedical wastes to protect the environment and whole community[15]..

Gupta S. Boojhet al.(2008) conducted a study in Balrampus hospital Lucknow. The study was conducted in Lucknow at the infectious and non infectious waste are dumped together with in the hospital premises resulting in a mixing of the two which are then disposed of with municipal waste at the dumping sites in the city. All type of wastes are collected in common bins places outside the patients wards for disposal of this waste the hospital depends on the generosity of the Lucknow municipal corporation. Whose employees generally collect it every 2 or 3 days. The hospital does not have any Treatment facility for infectious waste[16].

Vazhavandal G, Saranya SK, Vallab Ganesh Bharadwaj B, Ismail M, Uma A, ThirumalaiKolundu Subramanian PAccordinget al.(2022) to this study, 76% of the workers was aware of how much waste was produced per day. Doctors had a higher level of knowledge than nurses and support staff did. The effectiveness of CME programmes was inferior to that of theory and seminar-based learning. Even though 61.5% of the participants had already attended the refresher training session, 82% of them expressed interest in doing so, suggesting that those who had already received training wished to do it again in order to further their understanding. Only 86% of participants wanted to use the biohazard emblem to identify the bins, and only 79.8% of workers were aware that BMWM was being used. Only 55% of the workers were knowledgeable about the weighing of biological waste (BMW), keeping records, and auditing. But 93.5% of respondents concur that BMWM is a collaboration[17]

Pandit. WB etal (2003) this study was conducted assessing the level of knowledge. 30 beds randomly selected sample auxiliary staff had very poor knowledge there was no effective waste segregation, collection, transportation and disposal system .

III.   METHODOLOGY

Place of study: Kanpur Nagar

Study design: A cross sectional observational study.

Study Period: May to August 2022.

Sample Selection: Samples of medical personnel collected from two private hospitals and two government hospitals in Kanpur Nagar.

Area Of Study: Comparing government hospital and private hospital.

**Sample**: Out of a total of 185 responses, 87 were provided by private hospitals and 98 by government hospitals.

**Sampling technique:** Through a survey and an online Google form.

Sample Size: 185.

Study tool used in Data Collection: Responses and a health professional A self designed semi-structured questionnaire was used to collect data.

IV. RESULT

In this study, two government hospitals and two private hospitals are involved. The government hospitals' responses total 98, whereas the private hospitals' responses total 87.
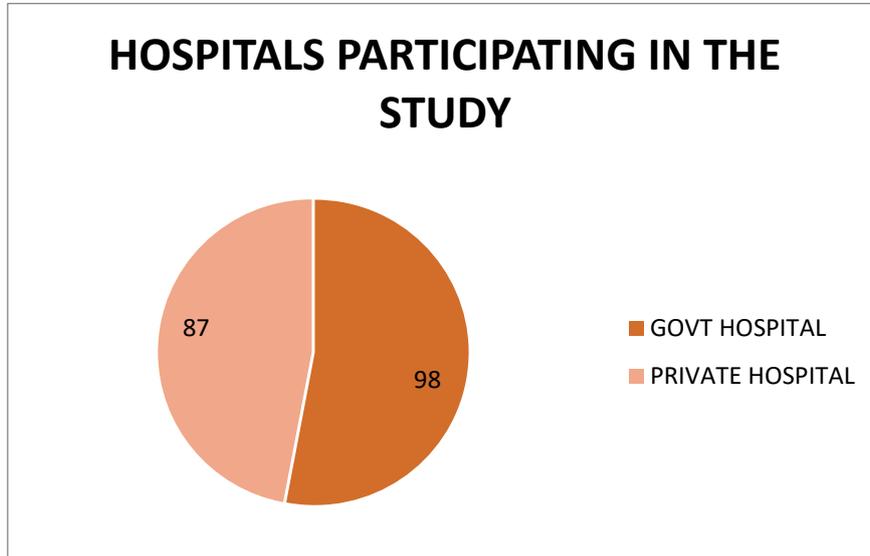
In this research study, there are 90 males and 95 females in total, including 48 men and 42 women from government hospitals and 50 men and 45 women from private hospitals.


	Government Employee	Private Employee	Total
Male	48	42	90
Female	50	45	95
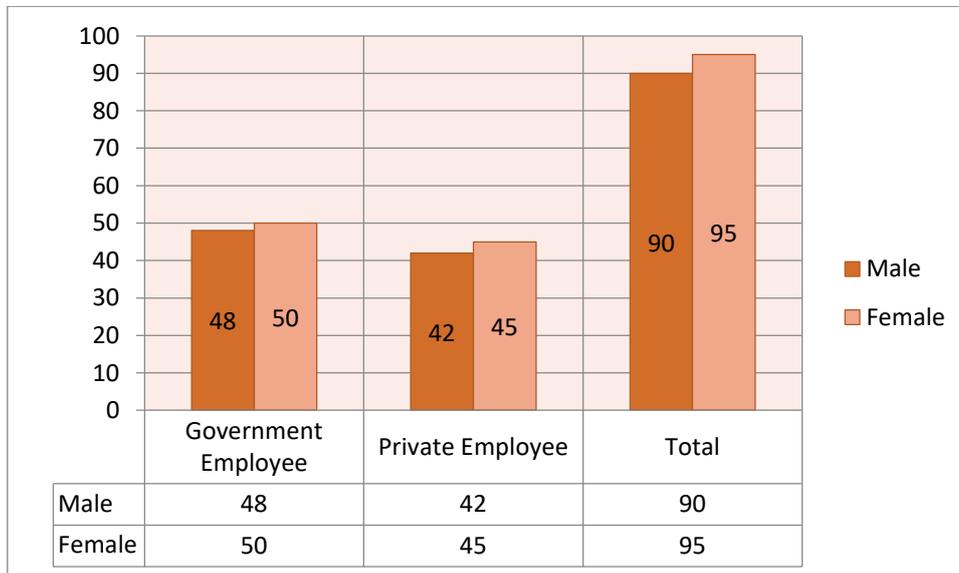
PARTICIPATION OF A HEALTH PROFESSIONAL IN THIS STUDY

According to their categorization as doctors, pharmacists, staff nurses, housekeepers, paramedics, staff, quality assurance, front line workers, ward boys, and ward ayas, the study population was divided into various strata.

S.No.	HEALTH WORKER	PRIVATE HOSPITAL	GOVERNMENT HOSPITAL	Total
1	Doctor	15	15	30
2	Pharmacist	18	23	41
3	Nurses	8	27	35
4	House keeping	17	7	24
5	Paramedical	11	4	15
6	Quality Assurance	2	3	5

| 7	Front line Worker	6	8	14
8	Ward Boy/ Ward Aya	10	11	21
	TOTAL	87	98	185
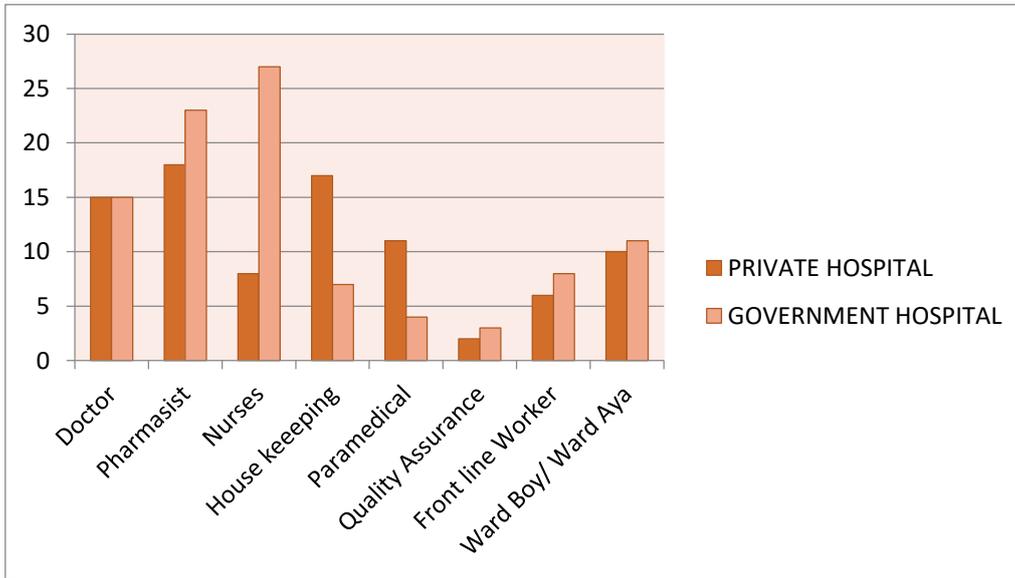
SEGREGATION OF [SOILED LENIN, BLOOD BAGS]
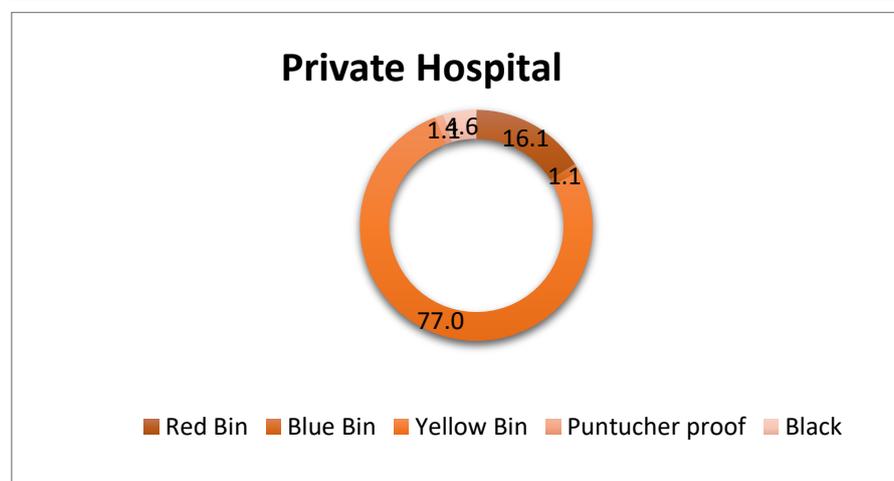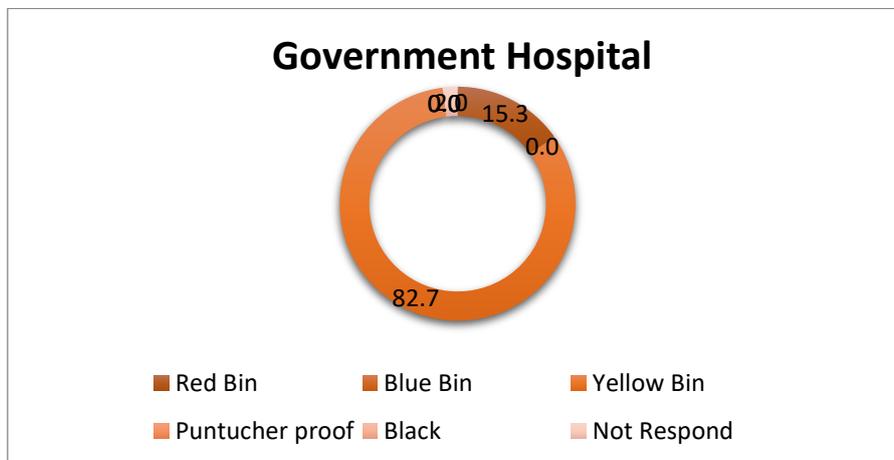
The government health worker handles 82.75% of dirty linen and blood bags, whereas private hospitals handle 77.0%. On the other hand, government hospitals segregate biological waste 15.3% in Red Bin in and do not

react 0%, whereas private hospitals are better at segregating linen and blood bags in yellow bins and 16% in red bins, 1.1% in blue bins, and 4.6% in not responding.

SEGREGATION OF[BOTTLES, URINE BAG, GLOVES]

|	Red Bin	Blue Bin	Yellow Bin	puncture proof container	Black	Not Respond
GOVERNMENT HOSPITAL RESPONCES	88.8	1.0	8.2	0.0	0.0	2.0
PRIVATE HOSPITAL RESPONCES	71.3	0.0	24.1	0.0	4.6	4.6
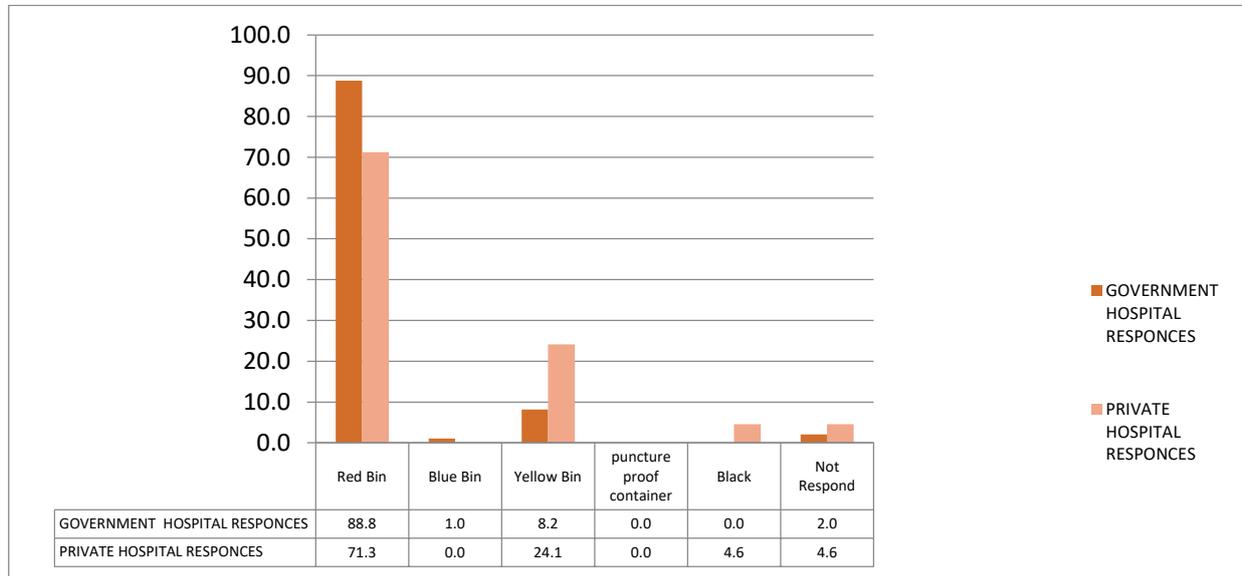
Even while adequate segregation is a good practise and public hospitals do better than private ones, bottles, urine bags, and gloves are separated by more than 75% in both types of hospitals. Health care workers at government hospitals perform in 88% of cases, whereas those at private hospitals perform in 71.3% of cases. In private hospitals, there are 24.1% more confused health workers than there are in government hospitals (8.2% in the former). In the hospital's red and yellow trashcans.

SEGREGATION OF [SCALPELS, BLADES, BURN NEEDLES]

	Red Bin	Blue Bin	Yellow Bin	puncture proof container	Black	Not Respond
GOVERNMENT HOSPITAL RESPONCES	3.1	19.4	1.0	67.3	4.1	5.1
PRIVATE HOSPITAL RESPONCES	5.7	32.2	6.9	40.2	14.9	3.4
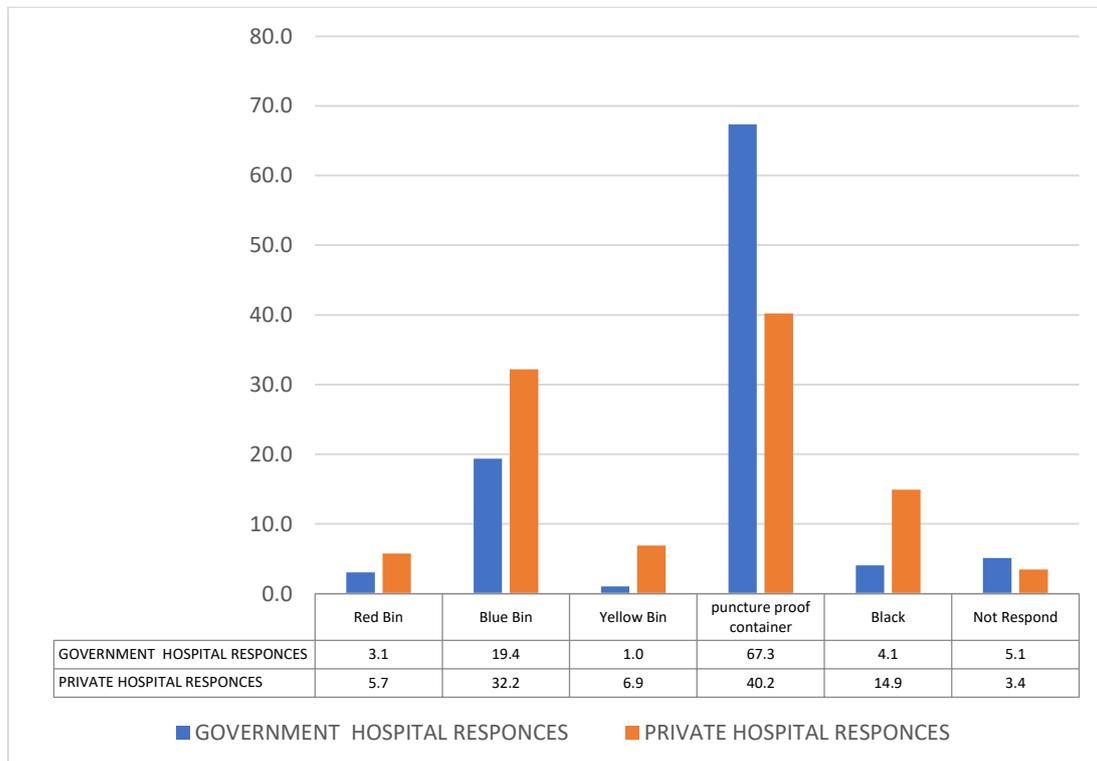
Most healthcare workers are aware that segregating biomedical waste in puncture proof container harmful to exposure to body injury, yet government hospitals have improved their practises to a level of 67.3%, and similarly, private hospitals have improved to a level of 40.2.

SEGREGATION OF [AMPOULES, CONTAMINATED GLASS, METALLIC BODY IMPLANTS]

	Red Bin	Blue Bin	Yellow Bin	puncture proof container	Black	Not Respond
GOVERNMENT HOSPITAL RESPONCES	6.1	87.8	3.1	1.0	0.0	2.0
PRIVATE HOSPITAL RESPONCES	17.2	72.4	3.4	1.1	5.7	3.4
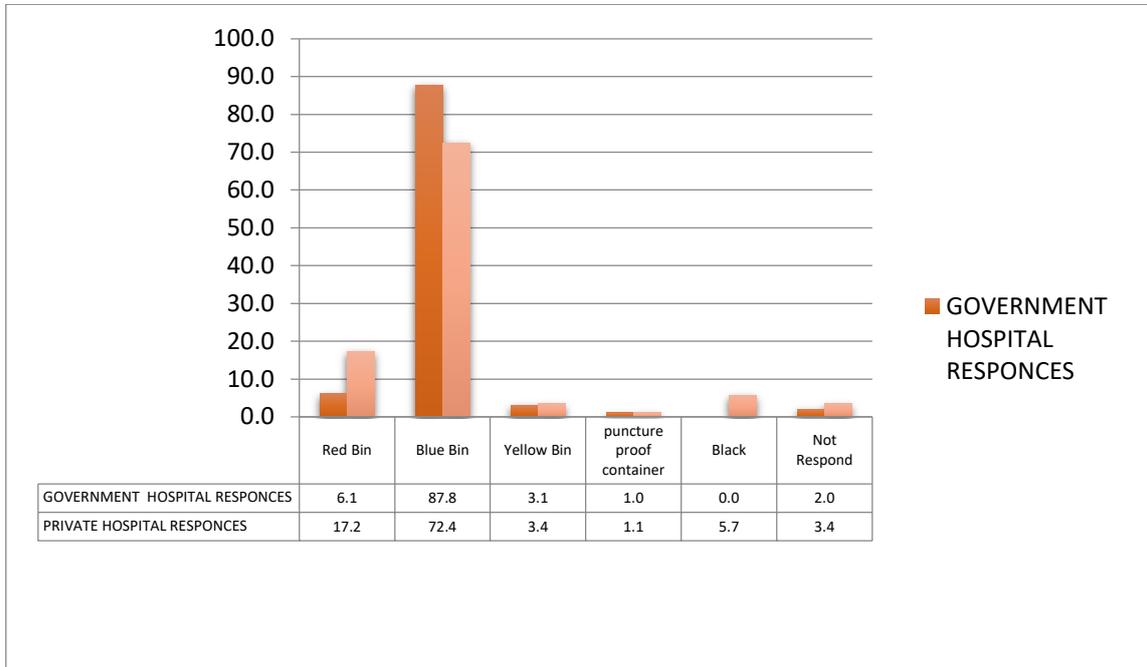
Even though the majority of healthcare professionals are aware that placing biomedical waste in blue bins increases the risk of exposure to bodily damage, government hospitals have improved their practises to a level of 87.8%, and similarly, private hospitals have improved to a level of 72.4.

CHI-SQUARE TEST

The alternative hypothesis is that private hospitals are superior to government hospitals, which is the reverse of the null hypothesis.

	Observed Value(O)%	Expected Value(E)%	$(O-E)^2$	$(O-E)^2/E$
Doctor	70.74	62.7	64.64	1.03
	77.4	62.7	216.09	3.45
Pharmacist	45.7	45.8	0.01	0.00
	62.6	62.4	0.04	0.00
Nurses	53	54.1	1.21	0.02
	75	73.8	1.44	0.02
House keeping	33	28.6	19.36	0.68
	35	39	16.00	0.41
Paramedical	54	51	9.00	0.18
	49	58.9	98.01	1.66
Quality Assurance	33	35	4.00	0.11
	45	51.7	44.89	0.87
Front line Worker	45	54	81.00	1.50
	50	55	25.00	0.45
Ward Boy/ Ward Aya	53	54	1.00	0.02
	55	58	9.00	0.16
TOTAL				**10.56**

Yellow indicates that it is a private hospital. White indicates that it is a government hospital.

Chi-Square Formula:

$$X^2 = \sum (O - E)^2 / E$$

$$X^2 = 10.56$$

Degree Of Freedom $= (r - 1)(c - 1)$

$$= (2 - 1)(8 - 1)$$

$$= 7$$

Table Value of 7 is 14.067

$$V = 7, \quad X^2_{0.05} = 14.067$$

The calculated value of X^2 is less than the table value. Then thenull hypothesis hold true. The observational study of attitude, knowledge and practices between the government and private health worker

V. DISCUSSION

According to **Singh K. (2004),** Chandigarh's hospitals need to improve their waste management, but no such steps have been made. **Radha, K.V. (2009)** found that hospitals lack proper biomedical waste management in his study. The current survey found that the majority of doctors and staff members are knowledgeable about how biomedical waste is managed at their hospital. They are knowledgeable with the colour-coding system for biological waste and are aware of how to avoid the dangers related to it. According to **Nandwani, S. (2010),** hospital staff members were not effectively sorting the garbage.

The paramedical and auxiliary personnel in private hospitals performed better overall and had a larger percentage of the questions correctly answered, according to **Rajpal S, Garg SK, et al. (2018)**. In comparison to private hospitals, the current study demonstrates that government hospitals perform better in terms of knowledge, practises, and segregation of biomedical waste.

In a tertiary care hospital in Meerut, **Pawan, P. (2014)** underlined the value of paramedical staff training to raise awareness. In my study, training creates best practises for healthcare workers and keeps them safe from exposure to infectious diseases brought on by biomedical waste, which has been demonstrated to have a substantial impact on management practises in hospitals.

Bhagawati G., Nandwani S., and Singhal S. claim (2015) discovered that very few doctors, nurses, and other staff members were aware of the variety of biomedical waste categories, whereas in my study, the majority of them were aware of the infection risk posed by biomedical waste in 2022, but they were not carrying it out properly due to a lack of a heavy work load in the hospital. Therefore, training repeatedly produces effective practises and alters behaviour and knowledge with regard to biomedical waste.

Balrampus Hospital in Lucknow was the focus of a study by **Gupta S. Boojh (2008)** The study was carried out in Lucknow, where both contagious and non-infectious trash is thrown onto hospital property and mingled before being thrown into landfills with other municipal waste. The hospital depends on the kindness of the Lucknow municipal corporation, whose employees typically pick it up every two or three days, to dispose of all waste types. The majority of hospitals are aware of the distinction between biological trash and general garbage, so they separate them, but they lack a facility to treat contagious waste. disposal of biomedical waste through authorised agencies and firms to dispose of municipal trash in a methodical manner.

VI. CONCLUSION

In comparison to technicians, ward Boys/Aya, and sweepers, nurses showed the highest level of general awareness. The paramedical and auxiliary employees of private hospitals scored higher and had a higher percentage of right answers for most questions when compared to workers at public hospitals. Strict Bio medical waste management regulations should be implemented in every hospital with ongoing monitoring in order to increase general understanding and practises connected to BMW management and its handling.The training of healthcare staff at approved training facilities should be mandated for healthcare establishments. These training sessions ought to be an ongoing procedure that takes into account patient feedback in various healthcare facilities, and updates ought to be made on a frequent basis whenever the government issues new regulations or suggestions. To teach and retrain all of the staff, an intensive training programme should be

conducted on a regular basis. This programme may incorporate question- and problem-solving techniques. Prizes and consolation can be extremely effective positive reinforcement techniques for staff training on how to handle a BMW.The study's sample size is too small, but future research that incorporate several investigators from various universities and places will be able to increase it. Our study highlights the value of biological waste management procedures in hospitals and highlights the requirement for continual and as-needed individual training in BMW management for all cadres of healthcare professionals.

VII.   RECOMMENDATION

To improve overall knowledge and practices related to BMW management and its handling strict implementation of Bio medical waste management rules should be enforced in each and every hospital with regular monitoring.

To organized training programmed at regular time interval should be done repeatedly to train and retrain all the staff.

ANNEXURE-1

CHI-SQUARE(X2) DISTRIBUTION TABLE

Degrees of freedom	Probability (alpha) that the tabulated value is exceeded			
	0.10	0.05	0.01	0.001
1	2.71	**3.84**	6.63	**10.83**
2	4.61	5.99	9.21	13.82
3	6.25	7.81	11.34	16.27
4	7.78	9.49	13.28	18.47
5	9.24	11.07	15.09	20.52
6	10.64	12.59	16.81	22.46
7	12.02	14.07	18.48	24.32
8	13.36	15.51	20.09	26.13
9	14.68	16.92	21.67	27.88
10	15.99	18.31	23.21	29.59
11	17.28	19.68	24.73	31.26
12	18.55	21.03	26.22	32.91
13	19.81	22.36	27.69	34.53
14	21.06	23.68	29.14	36.12
15	22.31	25.00	30.58	37.70
16	23.54	26.30	32.00	39.25
17	24.77	27.59	33.41	40.79
18	25.99	28.87	34.81	42.31
19	27.20	30.14	36.19	43.82
20	28.41	31.41	37.57	45.32

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