

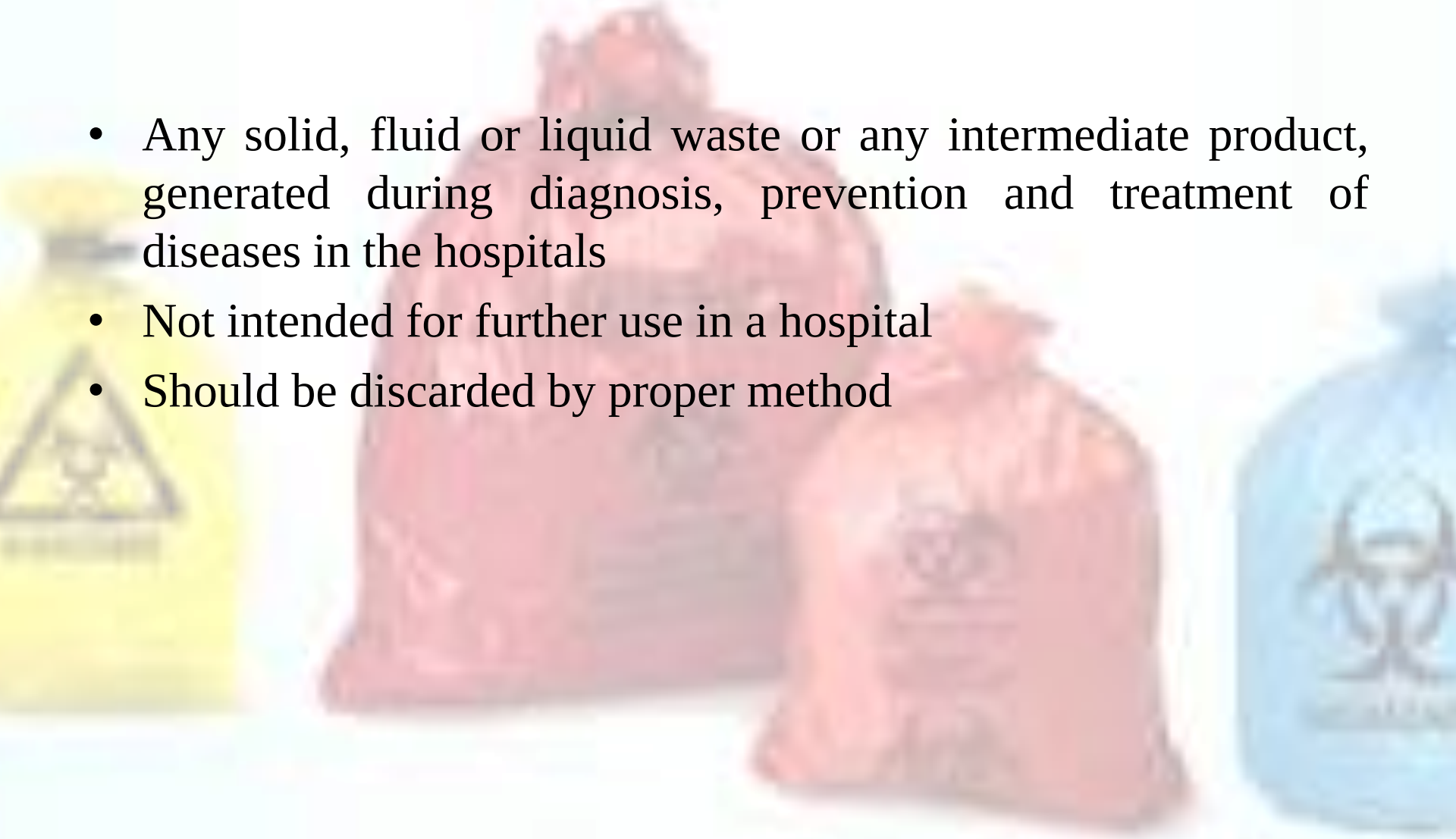


STUDY ON BIO-MEDICAL WASTE MANAGEMENT IN A DISTRICT HOSPITAL

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BIO-MEDICAL WASTE

- Any solid, fluid or liquid waste or any intermediate product, generated during diagnosis, prevention and treatment of diseases in the hospitals
- Not intended for further use in a hospital
- Should be discarded by proper method



HOSPITAL WASTE

Non-hazardous waste
75-90%

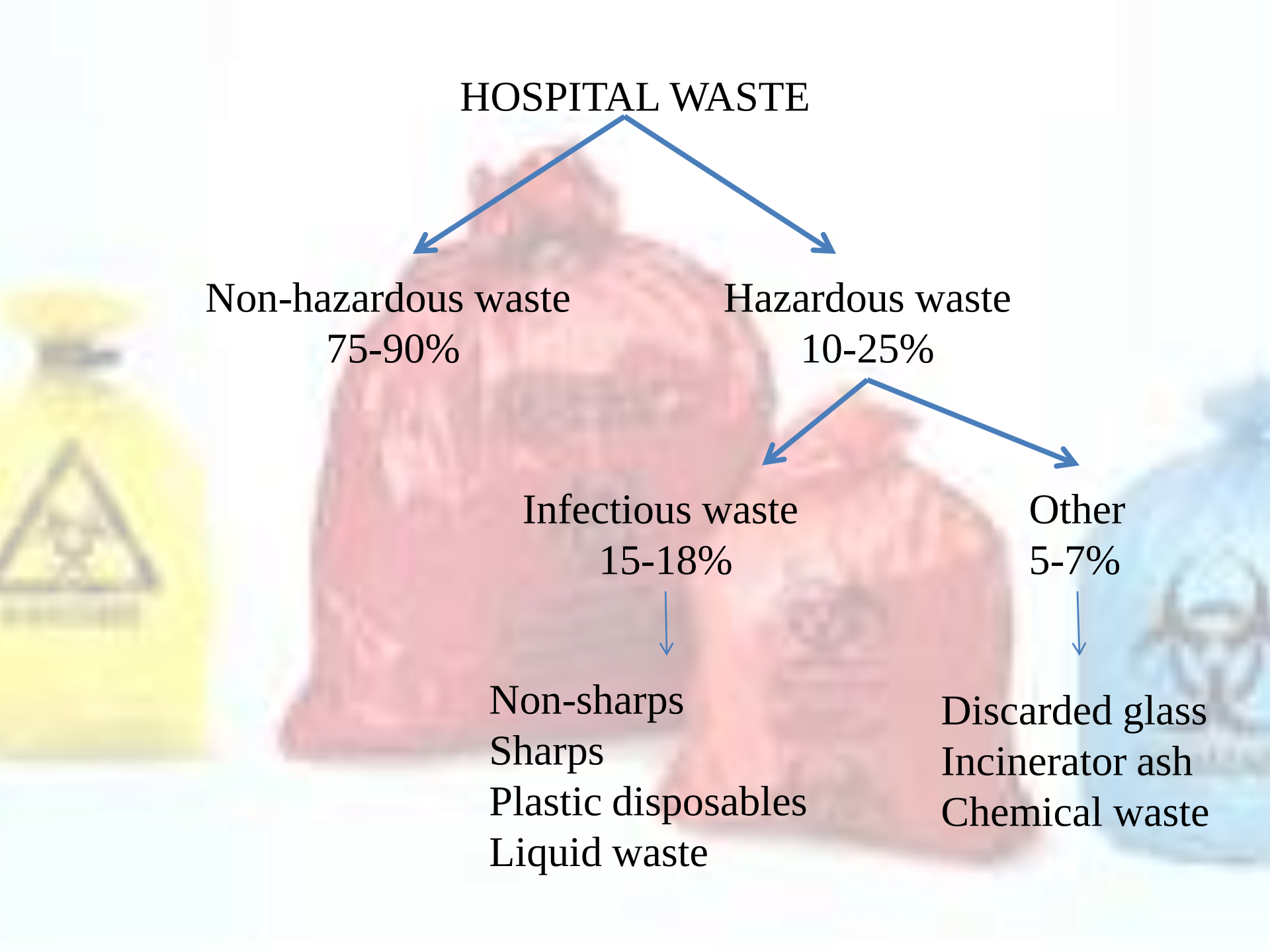
Hazardous waste
10-25%

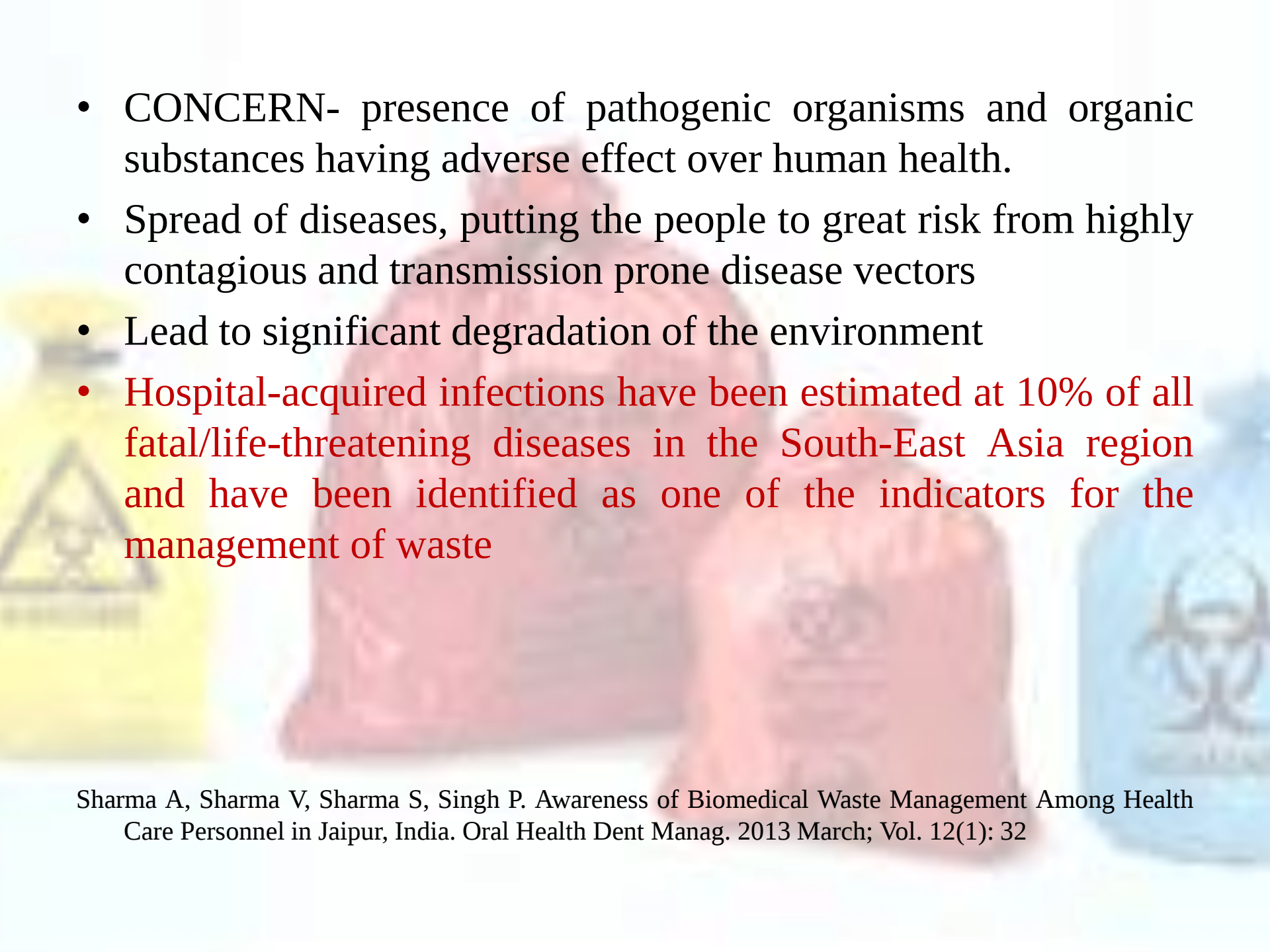
Infectious waste
15-18%

Other
5-7%

Non-sharps
Sharps
Plastic disposables
Liquid waste

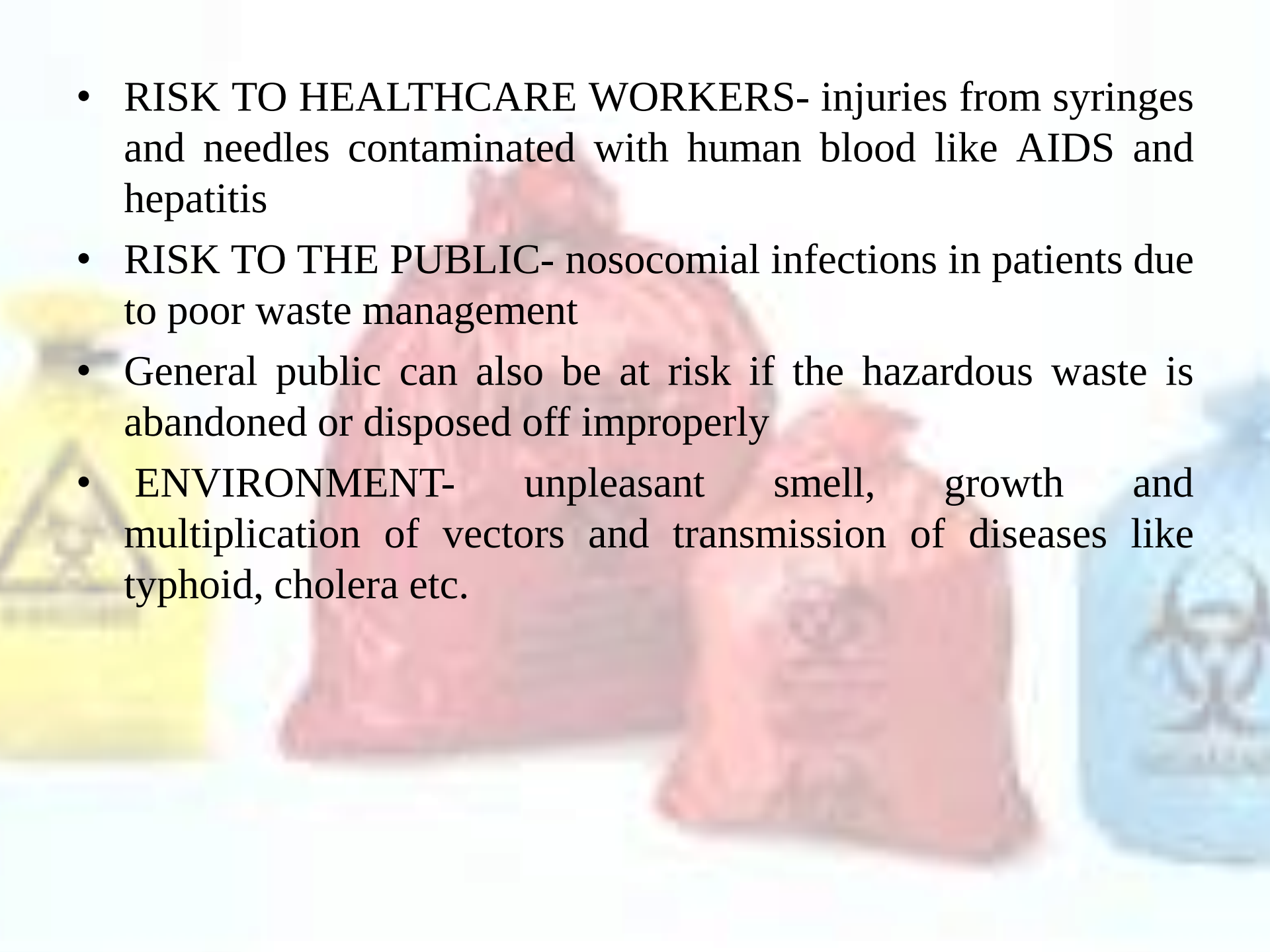
Discarded glass
Incinerator ash
Chemical waste



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- CONCERN- presence of pathogenic organisms and organic substances having adverse effect over human health.
 - Spread of diseases, putting the people to great risk from highly contagious and transmission prone disease vectors
 - Lead to significant degradation of the environment
 - Hospital-acquired infections have been estimated at 10% of all fatal/life-threatening diseases in the South-East Asia region and have been identified as one of the indicators for the management of waste

Sharma A, Sharma V, Sharma S, Singh P. Awareness of Biomedical Waste Management Among Health Care Personnel in Jaipur, India. Oral Health Dent Manag. 2013 March; Vol. 12(1): 32

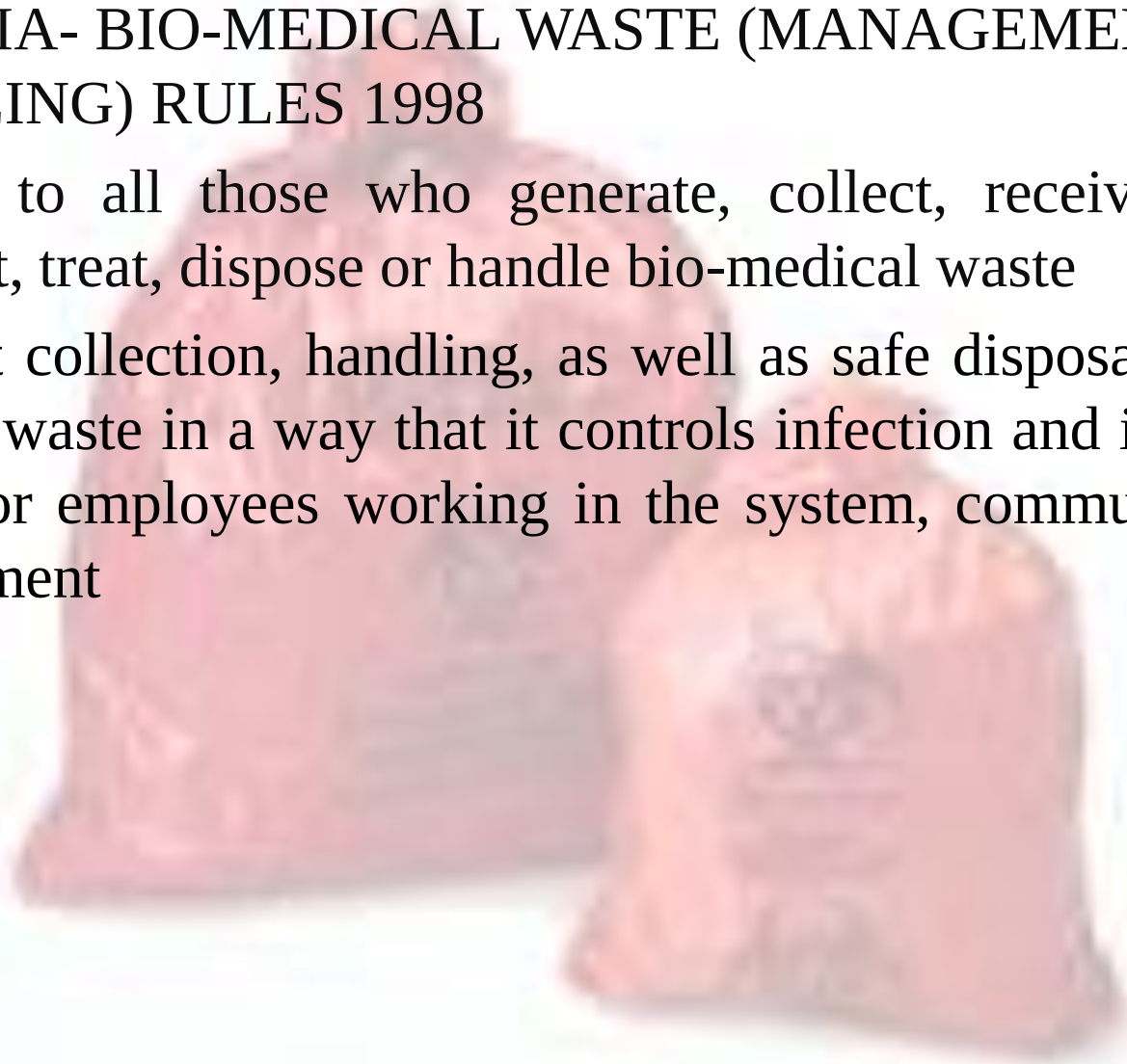
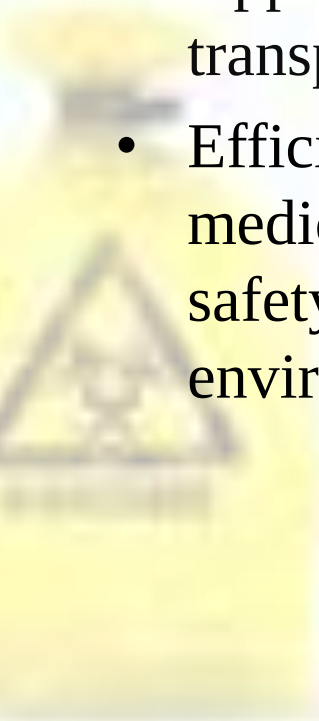
- RISK TO HEALTHCARE WORKERS- injuries from syringes and needles contaminated with human blood like AIDS and hepatitis
- RISK TO THE PUBLIC- nosocomial infections in patients due to poor waste management
- General public can also be at risk if the hazardous waste is abandoned or disposed off improperly
- ENVIRONMENT- unpleasant smell, growth and multiplication of vectors and transmission of diseases like typhoid, cholera etc.



- To avoid the hazards caused due to indiscriminate bio-medical waste management, discriminate waste management system should be implemented in hospital infrastructure
- Ensures proper hospital hygiene and safety of health care workers and communities



- MINISTRY OF ENVIRONMENT FOREST, GOVERNMENT OF INDIA- BIO-MEDICAL WASTE (MANAGEMENT AND HANDLING) RULES 1998
- Applies to all those who generate, collect, receive, store, transport, treat, dispose or handle bio-medical waste
- Efficient collection, handling, as well as safe disposal of bio-medical waste in a way that it controls infection and improves safety for employees working in the system, community and environment



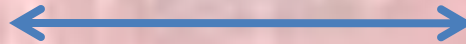
CATEGORIES OF WASTE

Category	Type	Treatment
1	Human anatomical waste	Incineration/deep burial
2	Animal anatomical waste	Incineration/deep burial
3	Microbiological and biotechnological waste	autoclaving- /microwaving/incineration
4	Sharp waste	Chemical disinfection/microwaving/ autoclaving/shredding
5	Discarded waste and cytotoxic waste	Incineration/ landfill
6	Soiled waste	Autoclaving/microwa- ving/incineration
7	Solid waste	Chemical disinfection/microwaving/ autoclaving/shredding
8	Chemical waste	Chemical treatment and drainage

Management of bio-medical waste

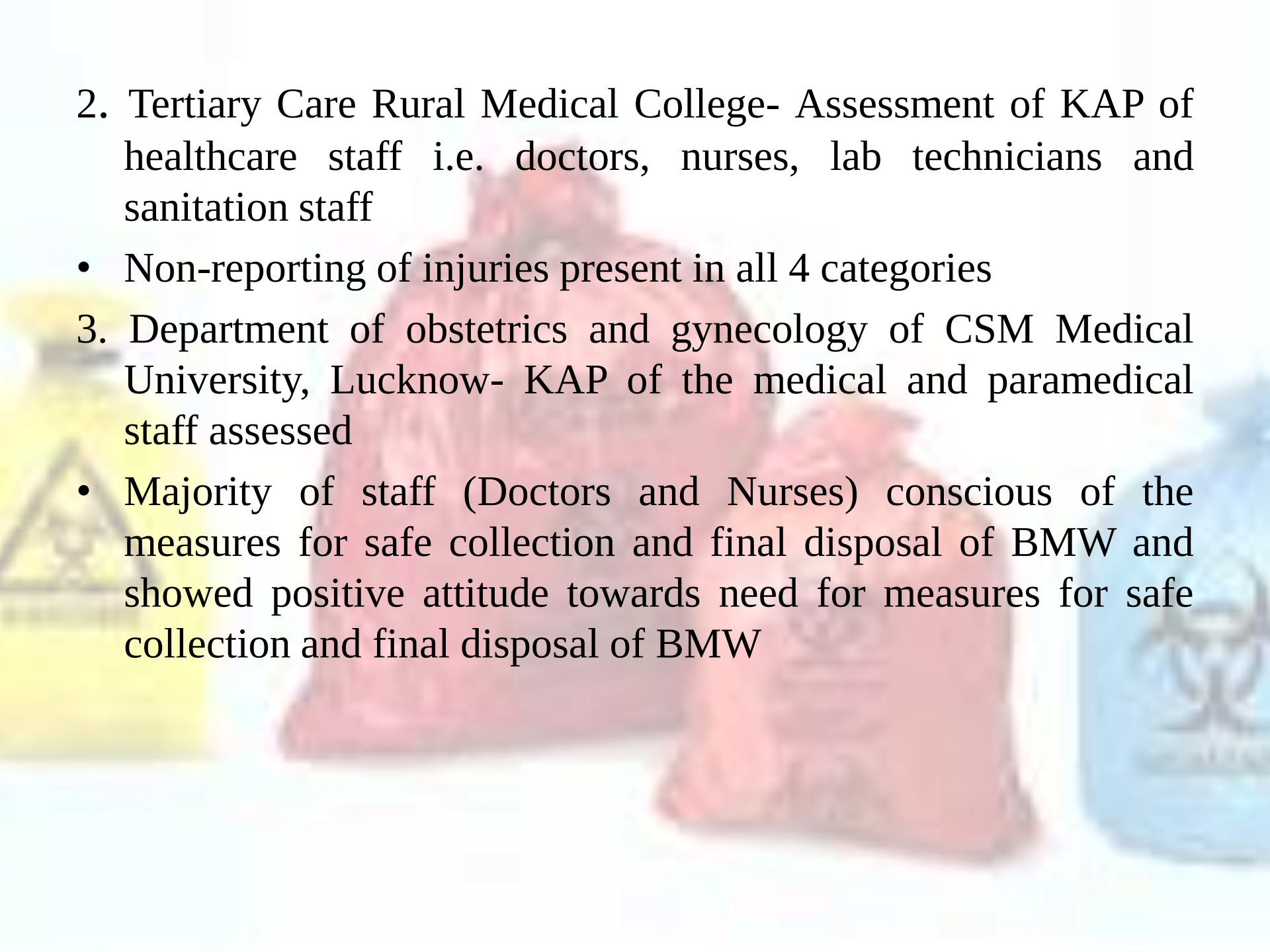
Segregation
Collection
Disposal
Transportation

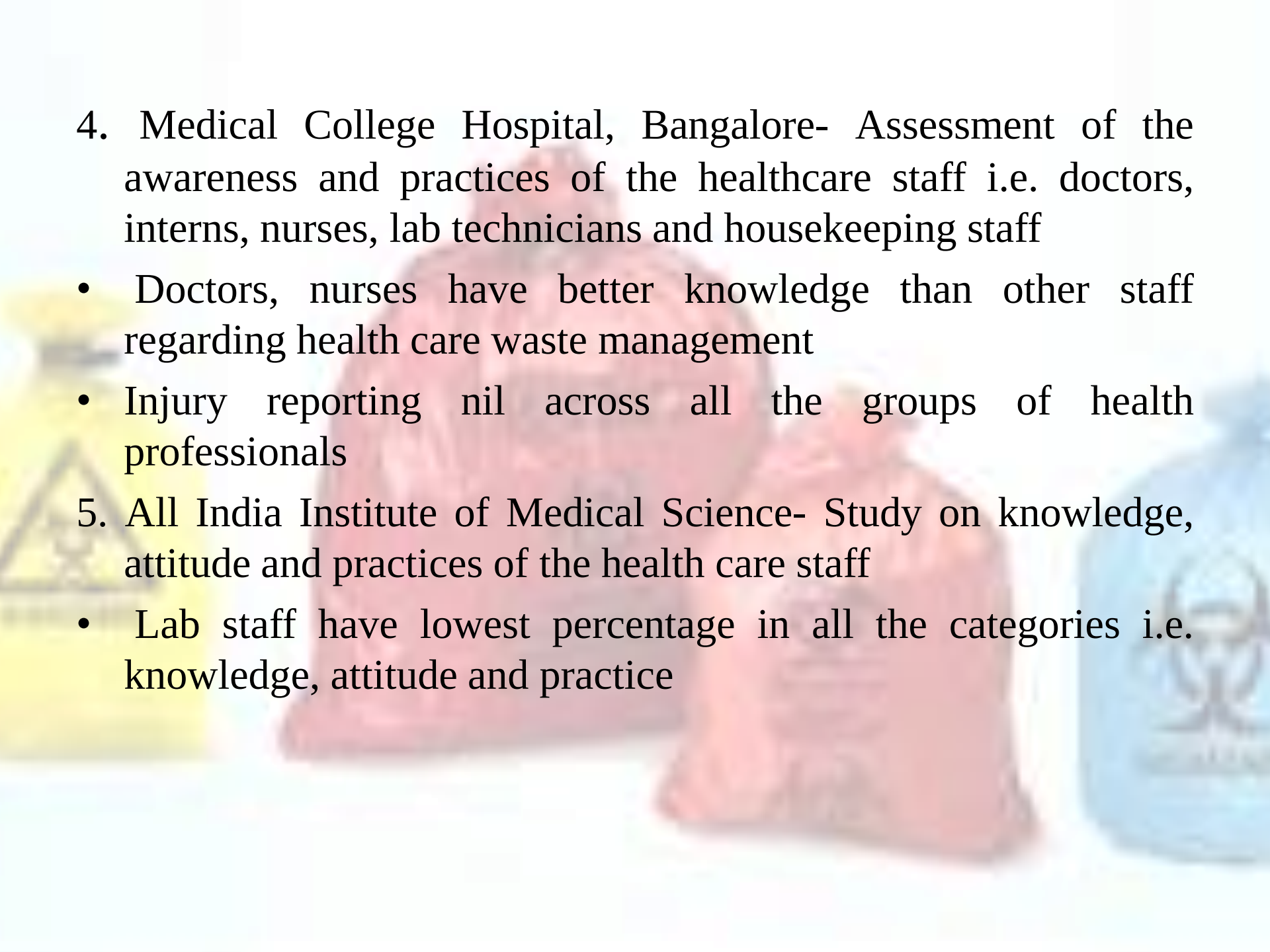
Training and supervision of
the staff handling bio-
medical waste



LITERATURE REVIEW

1. Hamidia Hospital, a 900 bedded hospital- Cross-sectional to assess the KAP of the staff
 - Respondents have good knowledge
 - Knowledge more among doctors and nurses as compared to ward boys and sweepers
 - All doctors and nurses aware of health hazards caused due to improper management of the BMW but same is not in case of the ward boys and sweepers

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2. Tertiary Care Rural Medical College- Assessment of KAP of healthcare staff i.e. doctors, nurses, lab technicians and sanitation staff
- Non-reporting of injuries present in all 4 categories
3. Department of obstetrics and gynecology of CSM Medical University, Lucknow- KAP of the medical and paramedical staff assessed
- Majority of staff (Doctors and Nurses) conscious of the measures for safe collection and final disposal of BMW and showed positive attitude towards need for measures for safe collection and final disposal of BMW

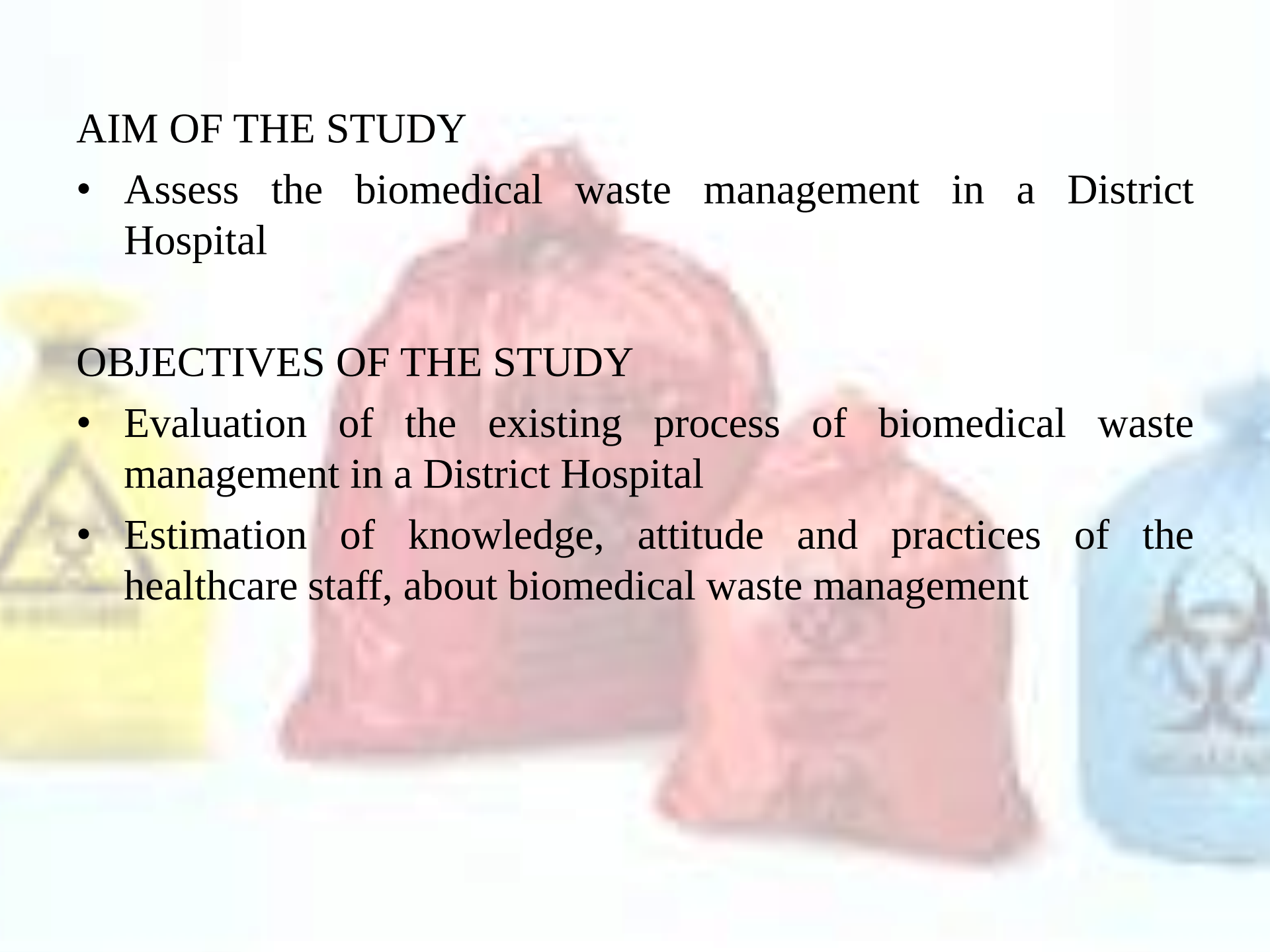
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4. Medical College Hospital, Bangalore- Assessment of the awareness and practices of the healthcare staff i.e. doctors, interns, nurses, lab technicians and housekeeping staff
 - Doctors, nurses have better knowledge than other staff regarding health care waste management
 - Injury reporting nil across all the groups of health professionals
 5. All India Institute of Medical Science- Study on knowledge, attitude and practices of the health care staff
 - Lab staff have lowest percentage in all the categories i.e. knowledge, attitude and practice

AIM OF THE STUDY

- Assess the biomedical waste management in a District Hospital

OBJECTIVES OF THE STUDY

- Evaluation of the existing process of biomedical waste management in a District Hospital
- Estimation of knowledge, attitude and practices of the healthcare staff, about biomedical waste management



METHODOLOGY

- Study location- Civil Hospital, Mohali, Punjab
- 120 bedded secondary care centre
- Two storey building with OPD, emergency, OT, ICU, diagnostics, labour room, NBSU, wards, dialysis, blood bank, de-addiction centre, pharmacy, MRD, laundry and mortuary
- Study design- Cross sectional approach
- Sampling technique- Stratified sampling technique
- Study tools- Checklist for evaluating the existing process of bio-medical waste management of the hospital
- Structured close-ended questionnaire- for estimating the knowledge, attitude and practices of the healthcare staff
- Study technique- observation of the BMWM process with the help of the checklist

Assessment of KAP of the hospital staff with the help of self administered questionnaire

Evaluate the existing process of biomedical waste management in a District Hospital

1. Necessary requirements- color coded bins & plastic bags with biohazard sign
puncture proof containers for sharps
syringe cutters
calibrated weighing machine
sodium hypochlorite
record register of weight of bio-medical waste produced by the hospital every day

Hospital did not have provision of personal protective equipment for the staff handling bio-medical waste

2. Segregation of bio-medical waste

Color-coded	Category of waste
Yellow	Soiled, infectious waste and anatomical waste
Blue	Solid waste like tubings and catheters
White	Sharps
Transparent	Unbroken glass waste
Green	General waste

Collection, transportation and storage

- Bins used for collecting bio-medical waste emptied by sanitation staff twice-thrice every day or when $\frac{3}{4}$ filled
- Waste carried in wheel barrows, to a separate collection centre situated outside the hospital
- A predefined route used to carry bio-medical waste to the collection centre
- Disposal outsourced
- Bins emptied within 48 hours and cleaned in the collection centre

Management of waste streams

- Syringes cut and disinfected with 1% sodium hypochlorite at the source of generation, before disposal
- IV sets, bottles, latex gloves, catheters cut with scissors and disinfected with 1% sodium hypochlorite for 1 hour before disposing off
- Slides disinfected with 1% sodium hypochlorite for 1 hour before disposal
- Liquid waste from lab treated with 4% sodium hypochlorite for 4-5 hours, then drained
- Blood bags disinfected with 5% sodium hypochlorite for 5 hours before disposal
- Staff handling bio-medical waste were seen wearing latex gloves while managing bio-medical waste since the hospital did not have provision of personal protective equipment



Estimation of knowledge, attitude and practices of the healthcare staff, about biomedical waste management

- The percentage of responses

Doctors- 91.4% (32/35)

Nurses- 75.5% (37/49)

Lab technicians- 100% (6)

Sanitation staff- 100% (20)



Percentage of staff with knowledge of bio-medical waste management

		Staff			
Knowledge		Doctors	Nurses	Lab technicians	Sanitation staff
Bio-medical waste	Number	32	37	5	16
	%	100%	100%	83.3%	80%
Color coded bins	Number	32	37	5	15
	%	100%	100%	83.3%	75%
Yellow bin	Number	32	37	5	14
	%	100%	100%	83.3%	70%
Blue bin	Number	32	37	5	14
	%	100%	100%	83.3%	70%
White bin	Number	32	37	5	16
	%	100%	100%	83.3%	80%
Green bin	Number	32	37	6	20
	%	100%	100%	100%	100%
Chemical	Number	32	37	5	14
	%	100%	100%	83.3%	70%

		Staff			
Knowledge		Doctors	Nurses	Lab technicians	Sanitation staff
PPE	Number	26	25	4	2
	%	81.3%	68%	66.7%	10%
Hours	Number	32	37	5	13
	%	100%	100%	83.3%	65%
Hazards	Number	32	37	4	9
	%	100%	100%	66.7%	45%
t/t of infectious waste	Number	30	22	4	7
	%	93.8%	60%	66.7%	35%
t/t of human anatomical waste	Number	32	25	4	11
	%	100%	67.6%	66.7%	55%
t/t of solid waste	Number	32	25	4	0
	%	100%	67.6%	66.7%	0%
Liquid waste from lab	Number	32	23	4	12
	%	100%	62.2%	66.7%	60%

Attitude of the staff

		Staff			
Attitude		Doctors	Nurses	Lab technicians	Sanitation staff
Segregation	Number	32	37	6	20
	%	100%	100%	100%	100%
Team work	Number	32	37	6	20
	%	100%	100%	100%	100%
Financial burden	Number	10	12	1	17
	%	31.2%	32.4%	16.7%	85%
Burden on work	Number	0	9	0	17
	%	100%	24.3%	0%	85%
Training programmes	Number	32	37	6	5
	%	100%	100%	100%	25%
Disinfection	Number	32	37	6	14
	%	100%	100%	100%	70%
Significance of PPE	Number	32	28	6	9
	%	100%	75.7%	100%	45%

Practice of the staff

		Staff			
Practice		Doctors	Nurses	Lab technicians	Sanitation staff
Segregation	Number	32	37	5	14
	%	100%	100%	83.3%	70%
Disinfection	Number	28	34	5	13
	%	87.5%	91.9%	83.3%	65%
BMW record	Number	32	37	6	20
	%	100%	100%	100%	100%
Hub cutters	Number	28	34	5	15
	%	87.5%	91.9%	83.3%	75%
Injury reporting	Number	0	6	0	0
	%	0%	16.2%	0%	0%
PPE	Number	10	12	2	2
	%	31.3%	32.4%	33.3%	10%

Practice		Sanitation staff
Use of wheel barrows	Number	18
	%	90%
Spill kits	Number	15
	%	75%

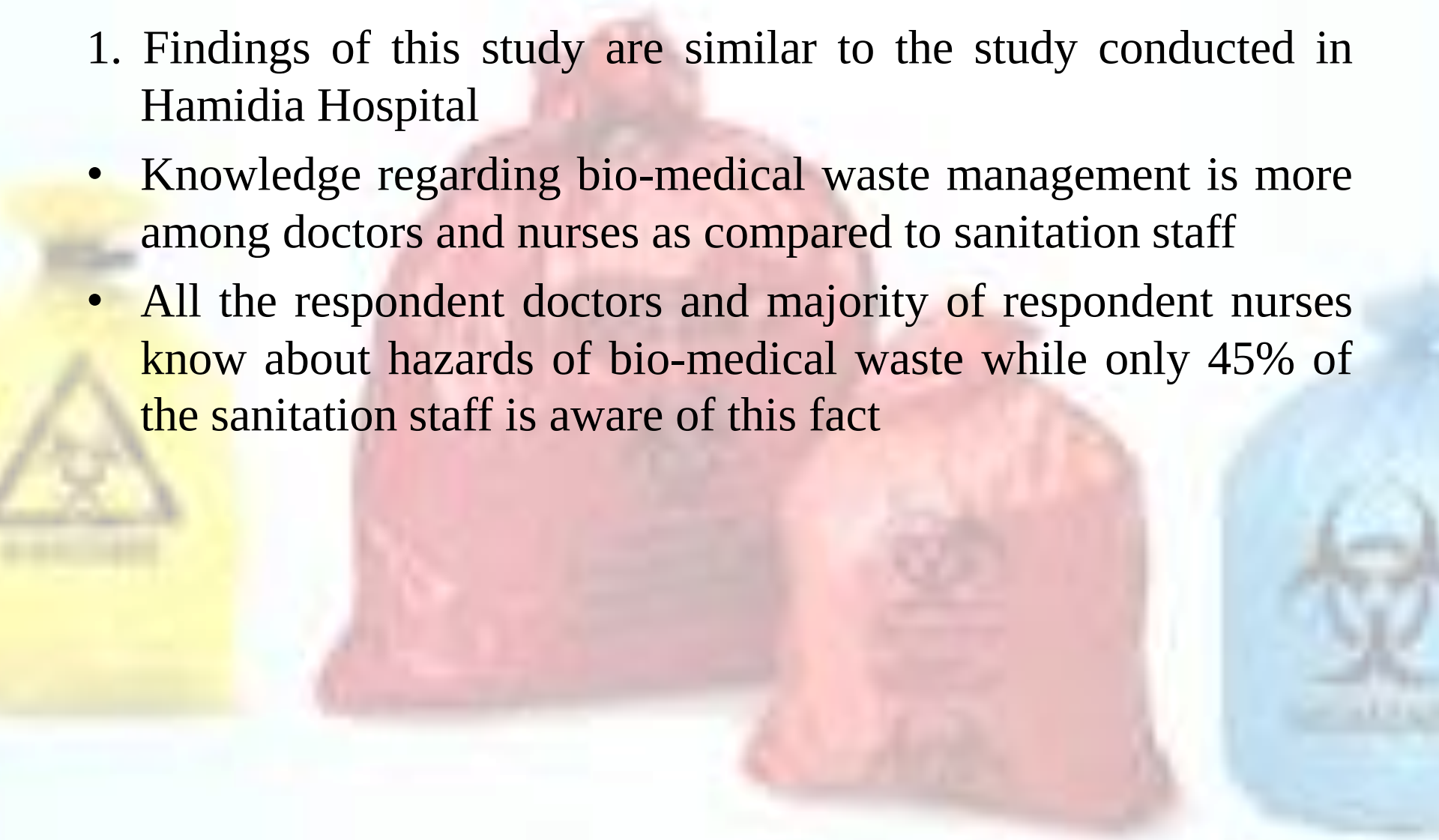


DISCUSSION

- Majority of the respondent doctors, nurses and lab technicians have knowledge, positive attitude and practice of management of bio-medical waste
- Sanitation staff - knowledge of bio-medical waste segregation
- Poor knowledge of disinfection of waste, hazards and PPE
- Positive attitude and practice of segregation, disinfection
- Negative attitude towards training programmes
- Financial burden on hospital, extra burden on work.
- All respondents- non-reporting of injuries, did not practice wearing personal protective equipment
- Can be linked to non-availability of personal protective equipment in the hospital and special forms for injury reporting

DISCUSSION

1. Findings of this study are similar to the study conducted in Hamidia Hospital
 - Knowledge regarding bio-medical waste management is more among doctors and nurses as compared to sanitation staff
 - All the respondent doctors and majority of respondent nurses know about hazards of bio-medical waste while only 45% of the sanitation staff is aware of this fact



2. Similar finding to study conducted in Medical College Hospital, Bangalore by S. Madhukumar and in Tertiary Care Rural Hospital by R. Radha

- No injury reporting by the staff of the hospital

3. Similar finding to the study conducted in CSM Medical University, Lucknow

- Majority of doctors and nurses conscious of the measures for safe collection and final disposal of BMW and have positive attitude towards the need for safe collection and final disposal of BMW.

4. Findings contrary to that of study conducted in AIIMS

- Majority of lab technicians have good knowledge, positive attitude and practices regarding bio-medical waste management.
- Sanitation staff has good knowledge regarding segregation of bio-medical waste but only few have knowledge regarding treatment of waste, hazards associated with bio-medical waste and PPE
- Majority of respondent doctors have good knowledge, attitude and practice with respect to management of bio-medical waste.

CONCLUSION

- Knowledge and attitude of majority of respondent doctors, nurses and lab technicians more as compared to sanitation staff.
- Majority of respondent staff has good practice of segregating, disinfecting and transporting bio-medical waste
- No injury reporting and personal protective equipment while handling bio-medical waste
- Possible relation with non-availability of PPE in the hospital and special forms for injury reporting

SUGGESTIONS

- Personal protective equipment
- Injuries reported timely on a prescribed format to the person in-charge of bio-medical waste
- Education of sanitation staff stressed specially regarding disinfection of bio-medical waste, hazards and significance of wearing PPE
- Bio-medical waste committee meet regularly to discuss monthly progress reports on bio-medical waste management.
- Strict supervision in day-to-day hospital waste management activities especially regarding protective gear.

- Information about the risks linked to BMW displayed
- Training sessions followed by tests and best scores awarded
- Audio-visuals to reflect proper management of bio-medical waste



LIMITATIONS OF THE STUDY

- Results of the study cannot be generalized since study population is less.
- Socio-demographic data not collected which could have link to knowledge, attitude and practice regarding bio-medical management
- The results of different category of staff with respect to KAP, can be biased due to difference in the methods of data collection.
- Since the questionnaire was self administered there can be difference in the actual practice and results obtained from each category of staff.

The image shows four biohazard waste bags against a light blue background. On the left is a yellow bag with a black biohazard symbol. In the center are two red bags, one larger than the other, both with black biohazard symbols. On the right is a blue bag with a black biohazard symbol. The text 'THANK YOU' is centered over the red bags.

THANK YOU