Biomedical waste management at Bikaner, Rajasthan in context of willingness to pay of general public and cost-effectiveness of the waste treatment technologies

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Abstract-
Purpose of study:Assess the general public's Willingness to Pay (WTP) for the appropriate treatment of liquid bio-medical waste before its discharge from healthcare facilities in Bikaner district; and ensure cost-effectiveness. Examination of biomedical waste treatment technology employed for disinfecting contaminated waste.
Method: A structured questionnaire was utilised to gather data on individuals' perceptions of hospital wastewater and their willingness to pay for its proper disposal and a pollution-free environment. A sample of 60 respondents is selected for the study. Primary and secondary data on biomedical waste treatment methods were gathered through an interview with the representative of the central biomedical waste treatment plant located in Bikaner district. Environmental impact assessment was conducted to find and measure technological effectiveness, social effectiveness, and environmental effectiveness.
Main findings: There was a strong correlation between Willingness to Pay and various socio- economic variables such as age, employment status, per capita income of the family, distance of the respondent's house to the hospital (in km), andenvironmental consciousness of the general public in Bikaner District. However, there was no correlation between Willingness to Pay and socio-economic variables such as gender, educationlevel,andnumberofpeopleworking inthefamily.Autoclaves were determined to be more cost-effective and environmentally benign than incinerators for operation; yet, incinerators were found to be technologically superiorthanautoclaves.
Conclusion: Increased public knowledge of the health and environmental dangers linked to inadequate hospital wastewater disposal may lead to a rise in the general public's willingness to pay for the appropriate treatment of liquid biomedical waste. The autoclave, a biological waste treatment device, is environmentally friendly, cost- effective, and technologically advanced, making it a more inexpensive option compared to incinerators, which are costly, difficult, and not environmentally friendly.

Keywords: **Biomedical waste management, Willingness to pay, Cost effective analysis,Environmental impact assessment, Biomedical waste treatment technology.**

INTRODUCTION

As per the Bio-Medical Waste (Management & Handling) Rules 2016, Bio-Medical Waste refers to any waste produced during the diagnosis, treatment, or immunization of humans or animals, research activities related to them, production or testing of biological products, or in health camps, as outlined in Schedule – I. (Ministry of Environment, Forest, and Climate Change, Government of India, New Delhi, India. Biomedical waste ManagementRules,2016.) Biomedical waste includes two primary categories: hazardous and non-hazardous waste. Around 85% of garbage produced by healthcare institutions is classified as non- hazardous. This consists of food scraps, cardboard boxes, wrapping materials, fruit peels, and wastewater. Hazardous trash is categorized into potentially poisonous and possibly infectious waste. The hazardous waste category includes radioactive materials, chemical leftovers, and pharmaceutical waste. possibly infectious trash includes items such as dressings, swabs contaminated with blood or pus, laboratory discards, possibly infected objects, sharps, as well as blood and blood products. This classification method facilitates a thorough comprehension of the varied characteristics of biological waste and assists in executing suitable disposal procedures for each group. (Ebenezer, 2021) Biomedical waste consists of General Health Care Waste (80%), Pathological & Infectious Waste (15%), Sharp Waste (1%), Chemical and Pharmacological Waste

(3%), and Radioactive/Cytotoxic Waste, Pressurized containers, Broken thermometers, and spent Batteries (<1%). (Chartier et al., 2014) Medical waste incinerators release harmful air pollutants and hazardous ash residues that are the primary cause of dioxins in the environment. There is a risk that the hazardous ash leftovers disposed of in landfills might contaminate groundwater through leaching. The US Environmental Agency has identified medical waste as the third greatest known source of dioxin air pollution (National Center for Environmental Assessment, U.S), and a contributor of about 10% of mercury emissions to the environment from human activities (Keating, 1997). Dioxin is considered one of the most poisonous substances to humans. Dioxins are associated with cancer, immune system problems, diabetes, birth abnormalities, and disturbed sexual development. (Emmanueletal., 2001)

Unmanaged healthcare waste in landfills facilitates the dissemination of pathogenic microbes such Coliform bacteria, Enterobacter, Escherichia coli, Staphylococcus aureus, Salmonella sp., Pseudomonas sp., Bacillus cereus, Legionella, yeast, and moulds, leading to potential contamination of the water table. Exposure to healthcare waste can taint individuals and harm plant and animal life. (Lagis and Matthew, 2023) Biomedical waste management is a critical problem for healthcare professionals and facilities because the waste produced during healthcare operations has a higher risk of infection and harm compared to other types of trash (Mathur et al., 2011). Approximately 0.33 million tons of hospital trash are generated in India annually, with a waste generation rate varying from 0.5 to 2.0 kilograms per bed per day (Patil and Shekdar et al., 2001). Hospitals have a legal and social duty to manage such trash appropriately. The hospital trash has a substantial health impact on both healthcare professionals and the general population. Improper waste management may lead to infections from diseases such as HIV, hepatitis B, and hepatitis C viruses, as well as environmental contamination of water, air, and soil, which can harm the community and ecosystem (Malini and Eshwar et al., 2015). Hospital waste management has several consequences as it impacts the health of patients, healthcare personnel, and the public.

The advantages of Biomedical Waste Management include improved cleanliness and health in the environment, decreased rates of hospital-acquired and general infections, lowered expenses for infection control in hospitals, and minimized risks of disease and death from the reuse and repackaging of infectious disposables. Low occurrence of community and occupational health risks, decrease in waste management expenses and creation of income by properly treating and disposing of garbage. Enhanced reputation of the healthcare facility and enhanced quality of life. (Datta et al., 2018 and Ravindra et al., 2015).

Solid waste management (SWM) is a significant concern in the developing countries. Insufficient planning, governance, resources, and management have led to a significant issue of solid waste in developing nations, particularly in terms of inadequate collection and poor disposal. (Balasubramanian, 2019)

India is the seventh-largest country with a significant medical infrastructure throughout many states and cities, leading to a substantial amount of biomedical waste. Multiple medical facilities and research institutions generate biomedical waste (BMW) in a diverse manner, averaging around 1.5–2 kg per bed each day. The Government of India claims that BMW production in the nation is around 484 tons per day, with 10%–15% of it not being processed according to norms. This difficulty must be addressed at both the individual health-care institution level and the national level through increased awareness, understanding, and implementation of practices determined by the authorities. (Sharma et al., 2023).

The World Bank reports that high-income nations allocate around $100 per ton for waste management services, whereas underdeveloped countries pay $35 per ton. In developing nations, decision-makers face challenges related to fast urban growth and issues with inadequate environmental sanitation facilities and services due to limited resource mobilization (Kaso et al., 2022). Waste management in these countries typically consumes a significant portion, ranging from 30 to 50 percent, of municipal operational budgets (Mulat et al., 2019).

Effective waste management services require involvement from the commercial sector, local communities, and developmental partners. (Kaso et al., 2022) Public responsibility for solid waste management is frequently disregarded, since it is commonly assumed that administrative authorities and local specialists are solely accountable. Effective waste management techniques, implemented by both governmental and commercial entities, are crucial to reduce the worldwide impact of garbage. Public knowledge and engagement, as well as government actions such as decentralization and privatization, are essential for successful solid waste management. (Akhtar et al., 2017). The community's willingness to pay (WTP) indicates the importance they place on waste management facilities. (Ismail, 2021). Relevant regulations and recycling facilities should be established and implemented depending on consumers' behaviour and their willingness to pay (WTP) for recycling solid waste. Research on consumers' willingness to pay (WTP) or behaviour towards recycling solid waste has not received enough attention. (Song et al., 2016).

Rajasthan, situated in the northwest region of India, is the country's biggest state by area, covering around 342,239 square kilometers, which is 10.4% of India's total area. In 2019, the urban regions of the state produced a total of 6500 TPD2 of solid garbage. (Rajasthan Solid Waste Management Policy and Strategy, 2019). As per annual report 2019, by Rajasthan State Pollution control board, the biomedical waste generated in Bikaner was 417.2 kg/day. (Rajasthan

State Pollution Control Board, 2019) The primary aims of the Bio-medical Waste Management Rules are to reduce environmental pollution and health concerns. However, achieving these objectives is challenging without consistent financing and access to local technology solutions. Hence, it is crucial to explore the potential for cost sharing among households and involvement of the general public in social and environmental initiatives.

The study aimed to assess the general public's Willingness to Pay (WTP) for the proper treatment of liquid bio-medical waste before discharge from healthcare institutes in Bikaner district. It also compared the cost effectiveness of different bio-medical waste treating technologies, calculated the cost for disinfecting one kilograms of biomedical waste for each technology, evaluated the technological effectiveness of these technologies using environmental impact assessment (EIA) techniques, and assessed their social and environmental effectiveness.

METHODOLOGY

Willingness to Pay (WTP): The Contingent Valuation Method was employed to analyse the Willingness to Pay (WTP) of the general population in Bikaner district. A systematic questionnaire is utilized to gather data on individuals' perceptions of hospital wastewater and their willingness to pay for its proper disposal and a pollution-free environment. A sample of 60 respondents is selected for the study. Since a closed-ended referendum is employed, responses are recorded based on a dichotomous choice response. If respondents are willing to pay for safe and proper disposal of hospital waste water, the response variable is assigned the value '1'. If they are not willing to pay, the response variable is set as '0'. The tool's reliability will be assessed using Pearson's chi- square test. The respondents' socio-economic qualities significantly influence their willingness to pay for a cleaner and safer environment. Several variables related to these characteristics were also examined. The variables consisted of the respondent's age, gender, employment status, years of schooling (representing education level), per capita income of the family, number of working individuals in the family, distance from the respondent's house to the hospital, and the respondent's level of environmental consciousness. (Acharya, 2000 and Canter, 1996)

Table 1 : Description of the variables

Variable	Description
Willingness to (WTP)	Coded as 1 if respondent is willingness to pay and 0 otherwise.
AGE	Age of respondent in year
DFEM	Gender of respondent coded as “1” for female and “0” for male.
DEMP	Dummy variable which is equal to “1” if the respondent is employed and equal to “0” otherwise.
EDL	Education level of the respondent, which is coded as 0, if level of education of respondent is below primary school; coded as 1, if level of education of respondent is matriculate level; coded as 2, if level of education of respondent is High school; and coded as 3, if level of education of respondent is University level.
PCI	Per capita income of the family of the respondents.
WRPPL	No. of people working in the family.
DIST	Distance of the respondent’s house to the hospital.
DENV	Coded as 1 if respondent is environmentally conscious and 0 otherwise.

Assessment of cost effectiveness, technological effectiveness, and social & environmental effectiveness of autoclave and incinerator as bio-medical waste treatment technologies

Cost Effectiveness: Primary and secondary data on biomedical waste treatment methods were gathered through an interview with a representative of the principal biomedical waste treatment plant in Bikaner district. The investigator collected data on the operation and performance of the two technologies by personally visiting and monitoring the plant's processes. Public impression of the impact of technologies on human life and the environment was documented through informal interviews with residents living near the plant locations. An environmental impact assessment was conducted to identify and measure technological effectiveness, social effectiveness, and environmental effectiveness. **The weighting-rating approach** is utilized to assess and compare the chosen waste treatment systems. The weighted rating approach involves assigning relative relevance weights to choose factors and assessing them based on their influence on technical and environmental factors. The assessment for several alternative technical and environmental aspects is transformed into an "aspect sensitivity index" due to uncertainty regarding the costs and benefits of these technologies. The important weights for each choice element were multiplied by the rating

of each option. The resulting products (scores) for each alternative were then added together to create an overall composite index or final score for each medical waste treating technology.
Mathematically the composite index is represented as:

$$\text{Composite index} = \sum_{i=1}^{n} W_i * \text{"}ASI_i\text{"}$$

Where "Composite index" shows the technological/social & environmental effectiveness for comparing the technologies.
"W_i" is the importance weight of the decision factor. "ASI_i" is the Aspect Sensitivity Index.

Technological effectiveness: Factors such asprocess capacity, waste exclusion, waste size limitation, waste reduction, volume reduction, disfigurement and dryness, decontamination, performance statistics, process complexity, and operator training were taken into account when estimating technical efficacy.

Social and environmental effectiveness: The choice variables assessed for social and environmental efficacy were air emissions, liquid effluents, treated residue, permeability, public perception, and occupational health and safety hazards. The economic, technological, social, and environmental efficacy of the Autoclave and the Incinerator were calculated. (Acharya,2000 and Canter,1996)

RESULT

Willingness to Pay (WTP):

Table 2 : Descriptive Statistics

Variable	N	Minimum	Maximum	Sum	Mean
AGE	60	21	86	2610	43.5
DFEM	60	0	1	45	0.75
DEMP	60	0	1	45	0.75
EDL	60	0	3	110	1.83
PCI	60	3000	27000	748500	12475
WRPPL	60	1	4	105	1.75
DIST	60	2	8	305	5.0833
DENV	60	0	1	35	0.5833

Source: Researcher's calculation on primary data

In table 2, N represents the total number of respondents. As per table, the average age of the respondents was found to be 43.5 years. The total number of female respondents was 45 while the remaining 15 of them were males. Out of 60 respondents, 45 were employed and the maximum value of education level among the respondents was university level; the minimum per capita income of the family among the respondents was INR 3000 per month while the maximum was INR 27000 per month, the average per capita income being INR 12475 per month. The maximum number of working members in the family were 4. The minimum distance between the respondent's house and the hospital was found to be 2 km, while the maximum distance was 8 km, with the average distance being 5.08 km.

Association between Willingness to Pay and Socio-economic variable

Table 3 : Association between Willingness to Pay and Socio-economic variable

S. No.	Socio-economic variable	Willingness to Pay		Calculated X^2	Calculated p-value
		Yes	No		
1	Age			22.285*	$1.45X10^{-5}$
	a) 20 – Below 25 years	20	0		
	b) 25 – 29 years	0	0		
	c) 30 – 35 years	5	5		
	d) Above 35 years	10	20		
2	Gender			0.5714#	0.4496
	a) Male	10	5		
	b) Female	25	20		

3	Employment Status				
	a) Employed	30	15	5.1428*	0.0233
	b) Unemployed	5	10		
4	Education Level				
	a) School	5	5	5.1428#	0.1616
	b) Matriculate	5	0		
	c) High School	15	15		
	d) University Level	10	5		
5	Per Capita Income of			18.8571*	$8.04X10^{-5}$
	the Family				
	a) ≤ Rs 10,000	20	5		
	b) Rs 10,000 20,000	15	10		
	c) Above Rs 20,000	0	10		
6	No. of People Working in the Family			4.1632#	0.2443
	a) 0	0	0		
	b) 1	20	15		
	c) 2	5	5		
	d) 3	5	5		
	e) 4	5	0		
7	Distance respondent's House to Hospital (in Km.)			60.000*	$9.36X10^{-14}$
	a) 0-2	5	0		
	b) 3-5	30	0		
	c) 6-8	0	25		
8	Environmental Consciousness			25.9102*	$3.58X10^{-7}$
	a) Conscious	30	5		
	b) Not Conscious	5	20		

Pearson's chi- square (X^2) test was used to determine a significant association between Socio-economic variable and Willingness to Pay of general public of Bikaner District for better management of liquid biomedical waste. If calculated X^2 value is less than tabulated X^2 value, then null hypothesis is accepted i.e., there is no association between the two variables. If calculated X^2 value is greater than tabulated X^2 value, then null hypothesis is rejected i.e., there is a significant association between two variables. If Calculated p-value is greater than 0.05 then null hypothesis is accepted i.e., there is no association between the two variables at 5% Level of Significance. If Calculated p-value is less than 0.05, then null hypothesis is rejected i.e., there is a significant association between two variables at 5% Level of Significance.

* Signifcant at 5% Level of Significance.

Not significant at 5% Level of Significance.

An attempt was made to find out the association between Willingness to Pay and Socio- economic variable of general public of Bikaner District for better management of liquid biomedical waste. Table 3 shows that in case of Socio-economic variable such as Age, Employment Status, Per Capita Income of the Family, Distance of the respondent's House to Hospital (in Km.) and Environmental Consciousness of general public, the calculated X^2 value for Willingness to Pay was found to be greater than the tabulated X^2 value. Younger employed people, environmentally conscious people, family with increased per capita income, people which have less distance between their house and hospital were more Willingness to Pay for safe disposal of hospital waste water. On the other hand, the calculated X^2 value is less than the tabulated X^2 value for Willingness to Pay and Socio-economic variables of general public such as Gender, Education Level, No. of People Working in the Family. So, there is no association between Willingness to Pay and Socio- economic variable of general public such as Gender, Education Level, No. of People Working in the Family.

Respondent's willingness to pay for biomedical waste management services

Table 4 : Data related to Respondent's willingness to pay

Willingness to pay		Amount of willing to pay (in Rs.)				
Yes	No	≤ 50	51-100	101-150	151-200	> 200
35 (58.33%)	25 (41.67%)	1 (1.67%)	3 (5%)	7 (11.67%)	9 (15%)	15 (25%)

Table 4 represents the respondent willingness to pay for liquid biomedical waste management services. 58.33% of the respondents have willingness to pay but amount is very less. The willingness to pay of 1.67% of the respondents is less than INR 50, 5% of the respondents is between INR 51-100, 11.67% of the respondents is between INR 101-150, 15% of the respondents is between INR 151-200, and 25% of the respondents is more than INR 200 for improved liquid biomedical waste management services.

Assessment of cost effectiveness, technological effectiveness, and social & environmental effectiveness of autoclave and incinerator as bio-medical waste treatment technologies

Cost Effectiveness: For economical effectiveness of bio-medical waste treatment technologies is find out by calculating unit cost of waste treated by each technology.

Table 5 : Comparative Cost of Operation of Waste Treating Technologies

Cost Indicator	Incinerator	Autoclave
Operating cost for treating per Kg of biomedical waste	Rs 21/-	Rs 5/-

As presented in table 5, it can therefore be surmised that autoclaves was found to be the cheaper option compared to incinerators.

Technological effectiveness:

Table 6 : Preference Matrix for Technological effectiveness of Biomedical waste Treating Technologies
W=Weightage, ASI=Aspect Sensitivity Index, Score=W * ASI

Technological aspects	W	Autoclave ASI	Autoclave Score	Incinerator ASI	Incinerator Score
Process capacity	70	0.25	17.50	0.50	35
Waste exclusion	100	0.50	50	0.25	25
Waste size limitation	80	0.50	40	0.25	20
Weight reduction	100	1	100	0.25	25
Volume reduction	100	1	100	0.25	25
Disfigurement dryness	130	0.75	97.5	0.25	32.5
Decontamination	180	0.50	90	0.25	45
Performance data	80	0.25	20	1	80
Process complexity	80	0.50	40	0.75	60
Operator training	80	0.50	40	0.75	60
Total Score			595		407.5

The highest value on each scale is used as the aspect sensitivity index for the choice factor to simplify computations. The score for each choice element is calculated by multiplying the weightage by the ASI. The overall score is the total of scores for all choice variables. The composite index represents the technological efficiency of the two biomedical waste treatment methods being examined. Table 6 shows that the autoclave scored 595 in technological effectiveness, whereas the incinerator scored 407.5. This demonstrates that the Incinerator is superior to the Autoclave in terms of technology.

Social & environmental effectiveness analysis of biomedical waste treating technologies

Table 7: Preference Matrix For Social & Environmental Effectiveness of Biomedical Waste Treating Technologies
W=Weightage, ASI=Aspect Sensitivity Index, Score=W * ASI

Social Environmental aspects	W	Autoclave ASI	Autoclave Score	Incinerator ASI	Incinerator Score
Air emission	280	0.25	70	1	280
Liquid effluents	220	0.50	110	0.75	165
Treated residue	200	0.50	100	1	200
Permeability	80	0.25	20	1	80
Public perception	100	0.25	25	1	100
Occupational Health and safety issues	120	0.50	60	0.50	60
Total Score	1000		385		885

The overall social & environment effectiveness is estimated to be 385 and 885 for autoclave and the incinerator respectively and therefore it may be concluded that the eco-friendly waste treating technology is the autoclave. Incinerator has many adverse effects on the environment.

Over-all cost effectiveness analysis of Bio-medical waste treating technologies:

Table 8 : Over-all Cost effectiveness Analysis of Biomedical Waste Treating Technologies
W=Weightage, ASI=Aspect Sensitivity Index, Score=W * ASI

Type Effectiveness	W	Autoclave ASI	Autoclave Score	Incinerator ASI	Incinerator Score
Economic effectiveness	200	0.25	50	0.75	150
Technological effectiveness	400	0.60	240	0.50	200
Social Environmental effectiveness	400	0.40	160	0.90	360
Total Score	1000		450		710

Table 8 clearly indicates that overall economic effectiveness score for autoclave and incinerator is 50 and 150 respectively. This reveals that cost of per kg treatment is more for Incinerator than autoclave.

The scores for technological effectiveness are 240 and 200 for Autoclave and Incinerator respectively revealing that Incinerator is technologically very effective as compared to autoclave. The scores for Social and Environmental effectiveness are 160 and 360 for autoclave and the incinerator respectively indicating that autoclave has maximum Social and Environmental effectiveness.

DISCUSSION:

In present study we assessed Willingness to Pay (WTP) of the general public for the proper treatment of the liquid bio-medical waste; compared the cost effectiveness of bio-medical waste treating technologies; assessed economical, technological, social and environmental effectiveness of the bio-medical waste treatment technologies. Sustainable funding is a fundamental difficulty in waste management in poor nations, and the willingness-to-pay can be a crucial aspect of a sustainable financing system for enhancing solid waste management (Boateng et al., 2019). The WTP technique quantifies the monetary value individuals are prepared to pay to decrease the likelihood of experiencing a certain health threat. (Buzby, 2014)

Contingent valuation (CV) is a survey approach commonly employed to assign monetary values to environmental products and services that are not traded in the market (Carson, 2000).
Data was gathered using a structured questionnaire to assess individuals' views on hospital wastewater and their readiness to financially support its proper disposal for maintaining a pollution-free environment. The findings showed that willingness to pay (WTP) was correlated with younger individuals, employed individuals, and those with greater per capita income. A study demonstrated that an increase in income resulted in increased willingness to pay values, with older individuals exhibiting lower willingness to pay compared to younger individuals, (Ndau and Tilley, 2018)
significant association of WTP with level of education, training, attitude (Mitiku et al., 2020) monthly aggregate income, quantity of waste generated per week, access to solid waste management services and respondents' responsibility. (Tassie and Endalew, 2020)

Cost effectiveness was assessed by comparing the operational costs of an autoclave and an incinerator. The findings showed that using an autoclave was more cost-effective than using an incinerator. This conclusion aligned with research showing that the operational cost of an autoclave was lower than that of an incinerator. (Ferdowsi et al., 2013) In a case study of biomedical waste management in a hospital in Chennai, India, it was found that the operational cost of an autoclave was lower than that of plasma pyrolysis and incineration. (Suresh and Ramamurth, 2023)

Yet, the incinerator's technological efficiency surpassed that of the autoclave, as shown by the results. The results are in line with a previous study that compared the efficiency of incinerators and autoclaves. The author's conclusion suggests that while incinerators may have higher composite index scores, autoclaves are more cost-effective, safer, eco- friendly, and preferred by the public (Gupta, 2017). Research involved using simulated clinical solid waste contaminated with bacteria and processing it with a steam autoclave to explore alternative waste management methods instead of incineration. The duration of contact and temperature both played a significant role in the inactivation of bacteria, with higher temperatures resulting in faster and more efficient inactivation. Despite the
specific conditions being in place for Gram-negative and Gram-positive bacteria, there was an unforeseen bacterial regrowth six days post waste sterilisation. Therefore, the steam autoclave is not suitable as a replacement for incineration in clinical solid waste management. (Hossain et al., 2012)

According to another study, the incinerator's performance was found to be exceptional in terms of percent weight reduction, the amount of waste processed, improved fuel efficiency, and directly proportional to the total waste incinerated and the incinerator's capacity. However, the quantity of sharps waste being loaded into the incinerator was relatively small in comparison to the figures documented in the literature, while the fuel consumption was higher than that of similar capacity small-scale incinerators. (Veilla et al., 2015)
According to our findings, the autoclave was determined to be more environmentally friendly than incineration. Research has shown that incineration has a higher rate of depreciation compared to autoclave and is less energy efficient than autoclaves. Experts in environmental health recommend using autoclaves to decontaminate healthcare waste due to concerns about flue gases and water and soil contamination in landfills. (Ostadi et al., 2021).

An evaluation of biomedical waste management technologies suggests that hospitals should maximise the use of autoclaves for treating infectious medical waste and sterilising sharps medical waste. On the other hand, incinerating medical waste can result in the production of ash as a by-product of the combustion process. Ash resulting from the combustion process may contain heavy metals like chromium, zinc, and lead. (Atthar et al., 2022)
After evaluating the two methods of incineration and autoclave, it can be determined that each has its own set of pros and cons. Overall, it seems that the autoclave system is the better choice over incineration because of its notable environmental advantages and easier operation. (Preethi et al., 2022)

CONCLUSION

The study's findings indicate that, in spite of government legislation, hospital waste is still disregarded in almost all healthcare facilities at Bikaner district. The purpose of the study was also to examine the respondents' readiness to pay for improved biomedical waste management. Based on the result, it can be concluded that younger, employed people, and people with a higher family per capita income were willing to pay for the safe and appropriate disposal of biomedical waste management. Also, talking about biomedical treatment technology, autoclave was found to be eco-friendly, economical, and technologically sound and thus cost effective while incinerator is uneconomical, technologically complex and not eco-friendly. Taking all the study results into consideration; the investigator concludes that no one technology offers a panacea to the problem of biomedical waste disposal. Each has its advantages and disadvantages. Facilities have to determine which waste treating technology best meets their need while minimizing the impact on the environment, enhancing occupational safety and demonstrating a commitment to public health.

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