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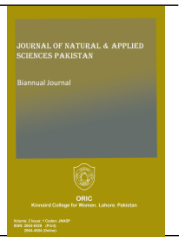

WILLINGNESS TO PAY FOR IMPROVED SOLID WASTE MANAGEMENT SERVICES IN SELECTED AREAS OF LAHORE: A SURVEY

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Abstract

The municipal waste generation rate is increasing rapidly due to increase in population and urbanization. This has raised the issue of solid waste management worldwide. A study was carried out to determine the existing solid waste management (SWM) facilities and the households' willingness to pay (WTP) for improved waste collection in Kahna Nau and Faisal Town, Lahore. The study also focused on identifying the socio-economic factors that influence WTP for better SWM services study areas. Primary data was collected through questionnaire survey from 200 randomly selected households and analyzed using descriptive statistics and ANOVA. According to the survey results, majority of the respondents paid between Rs. 100 and Rs. 500 monthly for waste collection while others were willing to pay more than Rs. 500 for improved waste management services in the study areas. The ANOVA results revealed significant relationship only between income level and WTP while education, occupation and household type were statistically insignificant in both areas. The current solid waste management service provided by the authorities in both study areas has low collection efficiency and lacks adequate location of waste containers. Therefore, waste storage and collection facilities need to be upgraded in order to improve the health of people and environment.

1. Introduction

Human beings are in constant struggle to make their lives better and improve their living standards by any means. But due to immense anthropogenic activities, Earth has lost its balance. In the past few decades, natural environment has degraded to a great extent. This degradation has reached to such an alarming level where survival of living organisms has become extremely difficult and competitive. The

solid waste generation rate has increased due to increase in population that is negatively affecting normal activities of human beings.

Municipal Solid Waste (MSW) is the waste generates by public on daily basis. It includes everyday items that people use and after using they discard them. It is garbage which is managed by local governments. It includes waste from household and commercial sources. The end of this waste is either incineration or landfill. The rate of MSW generation is increasing day by day due to increase in population, urbanization, industrialization, improved living standards and world's economy. It has caused Solid Waste Management issue worldwide. Developing countries are facing this problem more than developed countries because population growth rate is high among them. For managing waste in cities, municipalities are responsible. Increase in solid waste generation increases land pollution. This affects the lives of all living organisms. Inadequate and improper solid waste management practices cause many problems like leachate generation which results in groundwater pollution, fly ash generation which affects air quality, odor etc. (Hamid & Asghar., 2018).

According to World Bank report, an estimated quantity of MSW generation annually is 2.01 billion tons worldwide out of which 33% is not managed by municipalities in an ecofriendly way. Globally, 0.74kg/day is an average waste generated per person but it varies according to living standard. Developed countries produces 34% of the total world's waste. In near future, solid waste generation will increase by 70% (Solid Waste Management Report ,2019).

East Asia and Pacific Region generate most of the world's waste i.e. 23%. Only 6% is produced by Middle East and North Africa. It is expected that by 2050 generation rate will be double or triple. Most of the countries do not follow solid waste management practices properly. In these countries, solid waste is dumped openly in the streets and open lands. It has serious impacts on environment, health, economic growth and world's prosperity (Environment Database-Municipal waste, 2020)

According to World Bank report, 3.34 million tons of waste was generated by South Asian countries in 2016. In these countries, an estimated average per capita daily generation rate was 0.52kg. People living in urban areas generate more solid waste as compare to those who lives in rural areas. 57% of total waste generation in South Asia comprises of food and green waste. The SWM system is not highly developed in these regions (Kaza *et al.*, 2018).

Every year Pakistan generates 48.5 million tons of SW. Pak-EPA report states that 87000 tons of waste is generated by major cities of Pakistan. Karachi, the largest city of Pakistan, alone generates 13500 tons of SW per day. Different cities of Pakistan face some major SWM problems due to various contributing factors (Japan Official Development Assistance for Pakistan)

Pakistan being a developing country must solve the issue of increasing SWG due to rapid increase population and urbanization. Pakistan Economic Survey (2015-2016) states that per capita SWGR in Pakistan ranges between 0.283 to 0.612 kg per capita per day and growth rate of MSW generation in the country is 2.4 percent. Serious environmental issues have been generated in Pakistan due to absence of proper SWM infrastructure. The general public is exposed to unhealthy environment and various health threats due to frequent dumping of untreated wastes in vacant lots and open burning of the solid waste (Japan Official Development Assistance for Pakistan).

The most populous province of Pakistan, Punjab, generates approximately 16.43 million tons of waste annually as stated by World Bank's report "What a Waste" (2012). There has been an immense population increase and urbanization in Lahore, the capital of Punjab, over the years that resulted in increased MSW generation. Per capita, per day waste generation ranges between 0.5 to 0.65 kilograms in Lahore and annual MWG rate has reached up to 5 million tons (0.84 kg/c/d) (Hamid & Asghar., 2018; Kaza *et al.,* 2018; Japan Official Development Assistance for Pakistan; Masood *et al.,* 2014).

The composition of almost 250, 00,000 tons of garbage in Pakistan is mainly cap bottles, food scrapes and plastic bags. A study conducted on SWM in Lahore stated that 65% of the total waste (by weight) generated is mainly organic waste and 15% (by weight) of total waste generated is paper waste (Masood *et al.,* 2014)

Inadequate, improper and poor management practices of SW in Pakistan are mainly due to lack of technological development in the country's environmental sector. Lack of urban planning, improper waste collection system and in sufficient management equipment results in open dumping of waste with little to no collection for final safe disposal. Controlled landfill sites are absent and open burning is common. The citizens are unaware of the fact that the public and environmental health problems are associated with open and monitored waste disposal. These are some of the contributing factors behind increase in MSW generation in Pakistan (Masood *et al.,* 2014).

Each year waste related diseases become the death cause of more than 500000 people in Pakistan. The applicability of efficient waste management processes is hindered due to ever increasing SW production as a result of population explosion. Inadequate SWM practices throughout the country also result from mismanagement of available resources, untrained workers and slow or poor technological development. Land pollution is the main contributor of numerous diseases and environmental contamination (Ozcan *et al.,* 2016).

A lot of studies have been conducted on SWM throughout the globe since it is one of the crucial problems the world is facing at present. Despite large portion of budget being utilized in the

municipal sector, the developing countries still struggle to deal with this problem. In order to effectively deal with the ever-increasing solid waste, a combined approach, involving people and the authorities together, must be taken. This will develop a sense of responsibility among the citizens and will help the authorities to find and lessen the gaps in their management system affectively.

Solid waste management is a growing and crucial problem throughout the globe especially in developing counties. Overpopulation, urbanization, industrialization and better living standards are the main sources for increasing municipal solid waste. Various studies have been conducted in different cities around the world to determine households' willingness to pay (WTP) for improved solid waste management services and socio-economic factors influencing WTP.

Households' willingness to pay for improved waste management services was determined in Macau through questionnaire survey. The survey results found positive attitude of residents towards source segregation of waste, recycling of waste and willingness to pay for improved solid waste management services in Macau. The mean WTP was estimated 38.5 MOP per household per month. Statistical analysis revealed significant relationship between education level and WTP (Song *et al.,* 2016*).*

Similarly, willingness of households to pay for better waste collection services and factors that influence WTP were evaluated in Gorkha municipality of Nepal. According to the results, majority of the households are willing to pay an average of NRs. 73.38 per month. Monthly household income and education level were found significant factors that influence households` willingness to pay (Maskey & Singh., 2017).

Moreover, in different cities of Nigeria such as Ibadan, Kawara State, Abeokuta City, households' WTP and its determinants were examined for private solid waste system and improved residential solid waste management. In Ibadan, income, assets owned, education and occupation were found significant determinants that influence the households WTP for better solid waste disposal. They all were positive and significant ($p < 0.01$) (Rahji, & Oloruntoba 2009). While in Kwara State, the results showed that residents are willing to pay an average amount of 3,660 Nigerian Naira (US $24) per year. Income and education had positive and significant influence on households' willingness to pay for improved SWM services Ezebilo, 2013)

In Silchar municipality of Assam, India, a study was conducted to investigate the willingness of households to pay for better waste management and socio-economic factors influencing WTP. It was found that high income earners, large families, aware and educated people are more willing to pay for better SWM services. Income, household size and education was found statistically significant related to households' WTP (Roy & Deb., 1951).

Similar study was also conducted in semi-urban areas of Madurai, India to find out household willingness to pay for improved solid waste management of 150 households. The results showed that people of that area are willing to pay Rs. 24 (US$ 0.34) for a cleaner environment in their residentiary. More than 95% respondents were willing to pay for SWM in Madurai (Balasubramanian, 2019).

In Pakistan, many studies related to solid waste management have been conducted over the years mainly focusing on generation, collection and disposal of waste. A questionnaire study was carried out in Islamabad to analyze the willingness to pay for SWM and maximum willingness to pay of respondents. 65.4% of total respondents were willing to pay according to the logistic regression estimation. A monthly mean willingness to pay was Rs. 289.15 revealed by multiple regression, which is quite affected by age, education, household income and environmental awareness. This collected data can help in formulating the SWM facilities and improving the environment in general (Anjum, 2013).

To determine household's willingness to pay for SWM, a research study was conducted in Peshawar district, Pakistan. Questionnaires were filled by 400 households from 5 different localities of Peshawar by multistage sampling technique. The results exhibited that 75% of the respondents are willing to pay by using logistic regression estimation, also multiple regressions reveal that a mean WTP of PKR 163 per month and a median WTP of PKR 100 is established over their current payments. However, it mainly depends on the income level and condition of SWM in those localities. These results can be helpful to policy makers to design strategies for SWM in Peshawar district (Rafiq *et al.*, 2017).

A research regarding the households' demand for better environmental setting through SWM was investigated through their willingness to pay (WTP). Questionnaire survey was conducted in both rural and urban areas of Abbottabad, Pakistan. The binomial logit regression method was used to find out the respondents' willingness to pay for SWM facilities to improve environmental conditions. Certain factors such as Education, awareness, income, location and household size played a role in respondents' WTP. The result was that household were willing to pay for SWM if proper facilities were delivered to them (Mustafa *et al.*, 2014).

Another study was conducted to determine the public's willingness to pay for better SWM in urban areas of district Peshawar in September-October 2008. The findings revealed that 49% of the respondents were willing to pay for improved SWM services and 53% of respondents were content with existing SWM facilities. The results confirmed that Education, Household size and income are the factors that influence household's willingness to pay for better SWM condition (Khattak *et al.*, 2009).

Similar research study was carried out in residentiary of main Boulevard Gulberg, Lahore to access the existing condition of SWM in the

area and respondent's willingness to pay for improved SWM. Questionnaire survey was conducted to for this purpose. It was revealed that existing SWM system is okay but need a little improvement when it comes to collection efficiency and rates, segregation of waste at storage and recycling bins. The results exhibited respondents despite belonging to middle class were willing to pay up to USD 4.8 for better conditions of SWM in area. The locality lacks a regular collection of waste, therefore upgradation of waste collection and storage, segregation of waste at source and introduction of recycling process is required. The collection and storage sites of waste should be monitored on regular basis and waste disposal should be on scientific basis into sanitary landfills (Akhtar *et al.,* 2017).

Pakistan is a developing country that lacks proper SWM system and disposal mechanism. Lahore, the heart of Punjab, does not have proper Solid waste treatment and disposal. Informal sector recycles 27% of generated solid waste and many private firms are working for solid waste collection, treatment and disposal in Lahore.

The aim of the study was to determine the willingness of households to pay for improved solid waste management and to identify different socio-economic factors that influence WTP in Faisal town and Kahna Nau areas of Lahore.

2. Materials and Methods

2.1.Description of Study Sites and Existing Solid Waste Management

Lahore is a second most populous city of Pakistan. It is a wealthiest city having GDP $59.15 billion. The climate of Lahore is hot and semi-arid. The city's total population was 6.5 million in 1998. Now, it has risen to 10 million. It is considered to be 42nd most populated city in the world. The solid waste collection and transportation efficiency in Lahore is about 68%. There is no proper solid waste management system in Lahore. Informal sector recycles about 27% of waste by weight in Lahore.

We have selected two areas of Lahore i.e. Faisal town and Kahna Nau. Faisal Town is a union council and neighborhood of Gulberg Tehsil in Lahore, Punjab, Pakistan. Faisal Town is divided into four residential blocks - A, B, C and D. The solid waste is collected from each house of Faisal town by waste collectors. These waste collectors manually separate the waste and pass it on to the solid waste management companies such as Lahore Waste Management Company which further manages the waste by either disposing it on landfill or incinerating it.

Kahna Nau is a town of Lahore District on Ferozpur road which is 15 km away from Lahore in Punjab. The population as of the 2017 census is 79,301. The existing solid waste management facility comes under a Turkish Company named Al-Bayrak. It works under Lahore Waste Management Company (LWMC). Al-Bayrak collection vehicles come at 8am in

the morning. Door to door collection of waste by the carts is also available in this area. The carts do not collect waste on daily basis. The carts throw the waste in large containers placed near the main road. Then the waste is loaded into LWMC trucks which take the waste to Lakhodair landfill site.

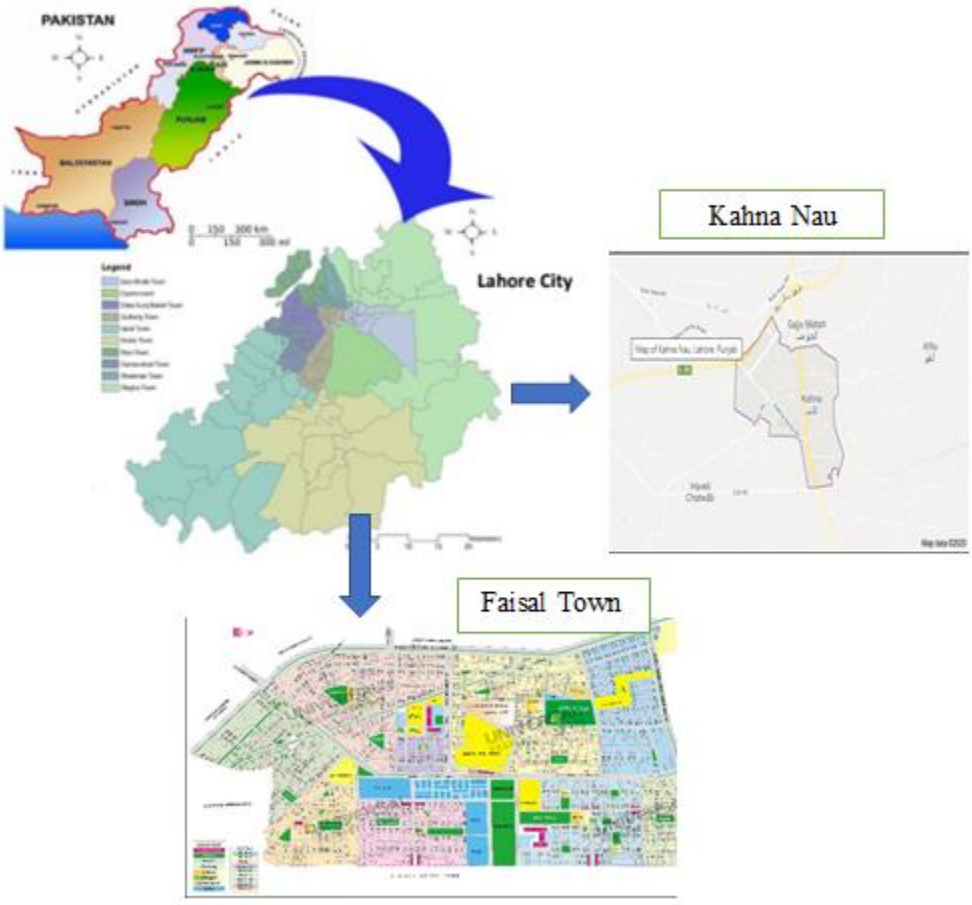

Figure 1: Location map of study areas

2.2.Questionnaire and Survey Design

The study was based on door to door survey of 200 randomly selected households (100 households from each area). Respondents were requested to fill the questionnaire. The data was then compiled and statistically analyzed by using IBM SPSS. Applied statistical tests include Pearson's Chi-Square, Cramer's V and ANOVA one-way test.

3. Results and Discussion

The results of socio-economic background of the respondents are presented in Table 1. Demographic information indicates that majority of respondents belong to age group of 25-34 years old, followed by the group of 18-24 years old, >18 years old and <35 years old. Gender of the respondents was 42% males and 58% females. Out of 200 respondents, 63% respondents were employed while 37% were

unemployed. Educational status of respondents in a selected household exhibited that out of 200 respondents investigated, 13.5% of respondents were educated up to metric, 19% were up to intermediate level, 35.5% had education up to undergraduate level, 25% had education up to graduate level and 7% had postgraduate education. Absence of illiterates was one noticeable aspect. According to income level, 31% of respondents had monthly income below 20,000 Pakistani rupees, 19% had monthly income in the range of Rs. 20,000 to Rs. 50,000, 40% had monthly income in the range of 50,000 to 1 lac Pakistani rupees and 10% of respondents earned monthly income above Rs. 1 lac. With respect to household type, 40.5 % of respondents had flats and 59.5% respondents had portions. With respect to the area of household, 18% of respondents lived in 3 marla houses, 44.5 % had 5 marla houses, 30% had 10 marla houses, 6.5 % lived in 1 kanal houses and 1% had houses with area greater than 1 kanal.

Table 1: Socio-economic Background of the Respondents

Variables	Category	Frequency		Total
		Kahna Nau	Faisal Town	
Age	Under 18 years old	14	22	36
	18 to 24 years old	36	29	65
	25 to 34 years old	40	34	74
	> 35 years old	10	15	25
Gender	Male	43	41	84
	Female	57	59	116
Occupation	Employed	39	35	74
	Unemployed	61	65	126
Education	Matric	12	15	27
	Intermediate	19	19	38
	Undergraduate	39	32	71
	Graduate	24	26	50
	Postgraduate	6	8	14
Income	Below Rs 20,000	27	35	62
	Rs 20,000 to Rs 50,000	19	19	38
	Rs 50,000 to Rs 1 lac	46	34	80
	Above Rs 1 lac	8	12	20
Household Type	Flat	37	44	81
	Portion	63	56	119
Household Area	3 Marla	15	21	36
	5 Marla	47	42	89
	10 Marla	32	28	60
	1 Kanal	5	8	13
	More than 1 Kanal	1	1	2
		100	100	200

The results of solid waste management in Faisal town and Kahna Nau are presented in Table 2. The majority 60.5% of households had the availability of metal or plastic container while 23% did not have such facility. With respect to availability of waste collection system, 82.5% of respondents answered yes and 17.5% answered no. The frequency of emptying the trash containers was observed, 8.5% of the respondents agreed trash containers are emptied several times each day, 62.5% respondents claimed that containers were emptied on daily basis, 25 % of respondents said that process of trash removal was conducted once a week and 4% of respondents said the process was less frequent. With respect to the responsible authority for waste collection in selected areas, 8.5% of respondents considered local government as responsible authority, 28% of respondents agreed on public authority, 54% responded with private company as a responsible authority for waste collection in selected areas and 9.5% of the respondent did not know that which authority was responsible waste collection in their area. 58% of households availed scrap collection service while 42% of households did not utilize this service. The 32% of respondents considered recycling as best method for solid waste disposal followed by solid waste treatment plant 26%, landfill 20%, burning 14% and waste to energy plant 8%. This contrasted with survey conducted in Swat, Pakistan where majority 95% of respondents considered waste to energy plant as best method for solid waste disposal. With respect to concern for environmentally safe waste disposal, 74% of respondents answered yes, 6.5% answered no and 19.5% did not know about it. The lack of awareness about environmental safety regarding waste disposal lads to mismanagement of waste disposal. When asked about the location of emptying of container, 62% people answered Beside roadside for collection by vehicle, 16% said Large container in same building, 8.5% responded with Communal container in neighborhood, 5.5% responded that their household waste is carried to open pile to be emptied and 7.5% of respondents did not know about it. 16% of the respondents were highly satisfied with the available service, 38% were reasonably satisfied and 46% of respondents were not satisfied. When reason for not being satisfied with the service was asked, 22% of respondents replied with unreliable service, another 22% of respondents replied with unsatisfactory collection frequency, 20% of respondents said unsatisfactory location of communal bin, 21.5% responded with lack of clean appearance as the reason, 8.5% respondents had expensiveness as the reason, 6% of respondents gave improper disposal as their reason. Current amount being paid for cleaning the neighborhood was in range of 100-500 Pakistani rupees

Table 2: Current Condition of Solid Waste Management in Kahna Nau and Faisal Town

Variables	Category	Frequency		
		Kahna Nau	Faisal Town	Total
Availability of plastic and metal containers in households	Yes	68	53	121
	No	19	27	46
	Don't know	13	20	33
Availability of waste collection service	Yes	86	79	165
	No	14	21	35
	Don't know			
Frequency of emptying of container	Several times each day	9	8	17
	Daily	69	56	125
	Once a week	18	32	50
	Less frequently	4	4	8
Authority responsible for waste collection service in the area	Local government/local		17	17
	Public authority		56	56
	Private company	93	15	108
	Don't know	7	12	19
Utilization of scrap collection service	Yes	63	53	116
	No	37	47	84
Best method performed for solid waste disposal	Recycling	38	26	64
	Landfill	16	24	40
	Burning	11	17	28
	Solid waste treatment plan	27	25	52
	Waste to energy plant	8	8	16
Concerned for environmentally safe final disposal of waste?	Yes	75	73	148
	No	5	8	13
	Don't know	20	19	39
Location of emptying of container	Beside road side for collection by vehicle	90	34	124
	Large container in same building		32	32
	Communal container in neighborhood	2	15	17
	Open file		11	11
	Final disposal site		1	1
	Don't know	8	7	15

Level of satisfaction with current service	Very satisfied	14	18	32
	Reasonably satisfied	42	34	76
	Not satisfied	44	48	92
Reason for not being satisfied with the service	Unreliable service	25	19	44
	Unsatisfactory collection frequency	19	25	44
	Unsatisfactory location of communal bin	19	21	40
	Lack of clean appearance	22	21	43
	Expensiveness	10	7	17
	Improper disposal	5	7	12
Current amount being paid for cleaning the neighborhood	None	1	4	5
	Less than Rs 100	45	36	81
	Rs 100-500	44	45	89
	More than Rs 500	10	15	25
		100	100	200

The results of Willingness to pay for improved solid waste management facilities in Faisal town and Kahna Nau are given in Table 3. 6.5% respondents are not willing to pay for cleaning of the Neighborhood, 31% are willing to pay less than Rs. 100, 35.5% are willing to pay Rs100 to Rs.300 and 27% are willing to pay more than Rs.300 for cleanliness of neighborhood. With respect to willingness to pay for for improved collection and disposal service, 8% were willing to pay nothing, 29.5% were willing to pay less than Rs. 100, 31% were willing to pay Rs 100-500 and 31.5% were willing to pay greater than Rs. 500. When asked the reason for not willing to pay a fee to cover the full cost of a waste collection service from the government or a private company, 15.5% said that they don't believe that service will be good, 23% of the respondents don't consider the service important enough to pay, 45% of respondents believe that general taxes should cover the cost of service and 16.5% have some other reasons. With respect to preferred authority for improved solid waste management facility (improved collection and disposal) in the area, 26.5% respondents answered local government, 43% respondents answered private company, 20% respondents replied with there is no difference between local government and private company and 10.5% did not know about this

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Table 3: Willingness to pay for improved solid waste management facilities in study areas

Variables	Category	Frequency		
		Kahna Nau	Faisal Town	Total
How much amount will you be willing to pay for cleaning of the neighborhood?	None	8	5	13
	Less than Rs 100	33	29	62
	Rs 100-300	34	37	71
	More than Rs 300	25	29	54
How much will you be willing to pay for improved collection and disposal service?	None	9	7	16
	Less than Rs 100	32	27	59
	Rs 100-500	30	32	62
	More than Rs 500	29	34	63
Reason for not willing to pay a fee to cover the full cost of a waste collection service from the government or a private company	Don't believe that service will be	18	13	31
	Don't consider the service important enough to pay	18	28	46
	Believe that general taxes should cover the cost of service	51	39	90
	Other	13	20	33
Preferred authority for improved solid waste management facility (improved collection and disposal) in the area		28	25	53
	Local government	42	44	86
	Private company	22	18	40
	There is no difference	8	13	21
	Don't know			
		100	100	200

3.1.Statistical Analysis

The data obtained was statistically analyzed using Pearson's Chi Square test and Cramer's V test to determine the correlation between two variables i.e. income and willingness to pay for improved solid waste management practices. The ANOVA test was performed to determine the significance of different variables including education, occupation, household type and income with reference to the willingness.

According to Chi Square test (Table:4), there was a significant relationship between income and willingness to pay for improved solid waste management facilities in both study areas as $p<0.01$ [x^2=45.549 (Kahn Nau), x^2= 48.629 (Faisal Town)]. The Cramer's V test (Table:5) also showed similar results. There was an evidence of a direct relationship between level of income and WTP for the improved SWM facilities [$p<0.01$, v=.390 (Kahna Nau), v=.403 (Faisal Town)]. This implies that with the increasing household income in these areas, people are more willing to pay for improved SWM facilities.

Table 6 and 7 shows a significant relationship between willingness to pay for improved solid waste management facilities and occupation, education, household type and income (monthly) of both areas, Kahna Nau and Faisal Town respectively. The ANOVA test was performed to find significant relationship between WTP and education, occupation, household type and income level. Only significant relation was found between income level and WTP in both areas. Rest of the variables showed significance level beyond $p<0.01$ and hence held no positive significant relation with WTP for improved SM facilities in the area.

The results are consistent with the studies conducted by Tariq and Rashid in Swat, Pakistan, Ashish and Uttam in India and S. Akhtar et al. in Lahore Pakistan that showed a relationship between income level, education level and willingness to pay. However, in the current study, no evidence was found for education level to be associated with WTP for improved SWM facilities (Roy & Deb., 1951; Akhtar *et al.*, 2017; Tariq & Rashid., 2014).

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Table 4: Pearson's Chi-Square Test

Study Area		Value	df	Asymp. Sig. (2-sided)
Kahna Nau	Pearson Chi-Square	45.545[a]	9	.000
Faisal Town		48.682[a]	9	.000

Table 5: Cramer's V Test

Study Area		Value	Approx. Sig.
Kahna Nau	Cramer's V	.390	.000
Faisal Town		.403	.000

Table 6: Analysis of Variance in Kahna Nau

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Occupation	Between Groups	.138	1	.138	.146	.703
	Within Groups	92.452	98	.943		
	Total	92.590	99			
Education	Between Groups	.675	4	.169	.174	.951
	Within Groups	91.915	95	.968		
	Total	92.590	99			
Household Type	Between Groups	3.300	1	3.300	3.621	.060
	Within Groups	89.290	98	.911		
	Total	92.590	99			
Income (monthly)	Between Groups	13.705	3	4.568	5.559	.001
	Within Groups	78.885	96	.822		
	Total	92.590	99			

Table 7: Analysis of Variance in Faisal Town

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Occupation	Between Groups	.910	1	.910	1.018	.315
	Within Groups	87.600	98	.894		
	Total	88.510	99			
Education	Between Groups	3.928	4	.982	1.103	.360
	Within Groups	84.582	95	.890		
	Total	88.510	99			
Household Type	Between Groups	.176	1	.176	.195	.660
	Within Groups	88.334	98	.901		
	Total	88.510	99			
Income (monthly)	Between Groups	13.858	3	4.619	5.940	.001
	Within Groups	74.652	96	.778		
	Total	88.510	99			

4. Recommendations

The final suggestions regarding improvement of SWM system in both areas are:

- Improvement of waste management body including training of personnel, collection frequency, satisfactory pick-up point and well maintained and properly covered waste containers
- Involvement of community and private sector
- Provision of incentives for cleaner neighborhood.

5. Conclusion

At present, waste management practices are fluctuating for residential and industrial productions, rural and urban areas, and developing and developed countries. The price of providing management of solid waste in under developing countries is remarkably high. Unplanned and improper waste handling and disposal practices lead to increments in solid waste management costs. Thus a proper waste management system not only ensures the safety of the people and environment but is also cost effective. Current study shows that although waste management facilities were provided by the authorities in both study areas; yet their efficiency was low, and most of the residents were unsatisfied with the present facilities. The survey revealed that both areas lack segregation of waste at source and the location of containers was unsatisfactory. Therefore, SWM system needs to be upgraded in order to improve the health of the people and the environment. Although most of the people of these areas belong to middle income households yet they were willing to pay Rs. 100-300 and the high-income households were willing to pay greater than Rs 500. The statistical analysis showed that there was a direct relation between income level and WTP for improved SWM facilities.

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