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Solid Waste Disposal Practices Among Rural Community in Pasir Mas, Kelantan, Malaysia

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Abstract. Nowadays, improper solid waste disposal is a severe issue due to its impacts on environment, social, and economic sustainability. This manuscript aims to identify the knowledge and awareness of the rural community in Kg Tok Uban, Pasir Mas, Kelantan about solid waste disposal. Besides that, the socio-demographic factors that influence the knowledge and awareness of respondents have also been explored. The data was collected using an online survey questionnaire. A total of 232 respondents participated in this study through the convenience sampling method. The findings indicated that most respondents have good knowledge of proper solid waste disposal. Besides that, this study also revealed that most respondents have a good awareness of the impact of improper solid waste disposal. However, this study found that the respondents have moderate solid waste disposal practices. Even though people have good awareness and knowledge, it doesn't lead them to good practices in solid waste disposal. Different gender, age, and income of respondents are significantly influence the knowledge and awareness of respondents. The findings of this study are significant for local governments to strive toward effective solid waste management in rural areas.

1. Introduction

Nowadays, the urbanisation process is inevitable. One of the issues of urbanisation is the over-extraction of natural resources [1]. Malaysia has consistent economic growth and low unemployment rates, fuelled by stable political conditions and abundant resources [2, 3]. Rapid urbanisation and industrialisation in Malaysia have altered the characteristics of solid waste generated. Malaysians' demand for a higher living standard causes the rising yearly waste generated rates [4].

Waste collection in Malaysia almost covers all communities in urban areas, but only about 66% of the populations in rural areas of Malaysia are covered [2, 5]. Consequently, waste is dumped in rural areas on the streets and drains [6]. This situation brings severe environmental and social threats like flooding, breeding of insects and rodent vectors and the spreading of diseases. On the other hand, poor and ineffective waste management can contribute to poor solid waste disposal practices, leading to many problems such as uncontrolled burning, illegal dumping, and unregulated management practices. According to Boateng et al. [7], this traditional method was creating ugly scenes and causing various environmentally related diseases like malaria, typhoid, and cholera.

After that, Malaysia strived and planned for many initiatives to solve the solid waste management problems. According to Sakawi [8], the Malaysian Government initiated the privatisation of the country's waste management system by issuing a call for proposals. This initiative aims to improve service quality, promote efficiency, and provide better facilities across the country. Besides that, since

Malaysia depends on the landfill method, general observation indicated that incineration might be feasible where landfill is scarce and poses a threat to the aquifer or are remote from the actual municipal solid waste generation centre. Modern incineration technologies make solid waste disposal environmentally acceptable [9].

This study highlighted the solid waste disposal practices among the community in rural areas. Poor solid waste disposal can be referred to as improper and ineffective disposal of solid waste, creating unsanitary conditions and polluting the environment. Proper and effective solid waste disposal practices are needed to sustain a good environment, health concerns and economic stability. Studying solid waste disposal practices in rural areas is significant to ensure the population's health and environment are in good condition, besides sustaining the economy regarding money used for waste collection and cleaning activities.

2. Methodology

2.1. Study area
This study was conducted in a rural area in Tok Uban village which is located in Pasir Mas, Kelantan, Malaysia. Tok Uban village or Kg Tok Uban, has a total population of 2,987. Approximately 580 households inhabit Kg Tok Uban. This study area was chosen due to the cost, time and travelled area limitations because of pandemic covid-19. Besides that, this area was chosen due to residents' culture of selling recyclable materials to the scavenger, wastes are stagnated in one open dumping for burning, and food wastes being used for cattle feeding.
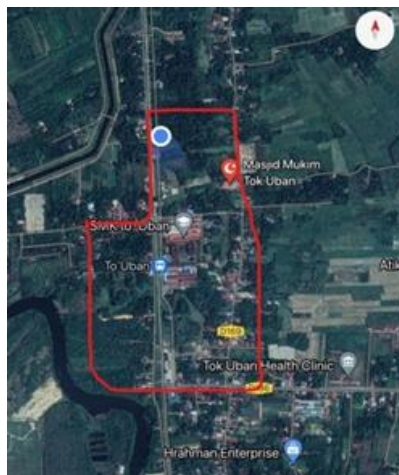
Figure 1. Location of the study area in rural area Kg Tok Uban (Source from: Google Map)

2.2. Data collection
2.2.1. Instrument development.
The questionnaire was divided into four sections which are: the first section consisted of ten questions collected about the socio-demographics of respondents in terms of their gender, age, educational level, occupation, and family size. The second section contains ten questions that identified information on respondents' level of knowledge on solid waste management in terms of recycling on which waste can and cannot be recycled, segregation and waste classification. The third section consists of nine questions on awareness of effective solid waste management practices through environmental impact, health hazards, solid waste issues and policies implementation regarding solid wastes. The fourth section consists of twenty-four questions that analysed respondents' practices in managing their solid wastes, comprised of the method used for waste disposal and items related to solid waste practices. An expert validated the validation of the questionnaire to demonstrate adequate reliability and validity for the expected outcomes. Before conducting the full survey, a pilot survey was carried out to test the reliability of the questionnaire in a smaller sample size of 30 respondents. The pilot test was done to

get people's feedback and comment on the actual survey's improvement. Then, the questionnaire was revised and adjusted in accordance with the feedback and comments received from the respondents.

2.2.2. Reliability test analysis.
Table 1 shows the reliable test analysis. The Cronbach's alpha value recorded is 0.78. Based on Bougie & Sekaran [10], the acceptable value of Cronbach's alpha is more that 0.7. Therefore, all the questions are consistent and reliable enough to be proceed for the real survey.

Table 1. The results of reliability test

Cronbach's Alpha	N of Items
0.78	40

2.2.3. Sample size.
The Krejcie and Morgan's sample size calculation was utilized to select the 232 household-respondents from the study area [11]. The selected 232 households were determined using this calculation out of the 580 households. The calculation was used to determine the number of samples according to the population sizes, 95% confidence level and 0.05 margin of error.

2.2.4. Sampling technique.
An online survey of google form was conducted to collect data from respondents in achieving the objectives using convenience sampling method. An online survey can simply obtain information at a low cost without the lack of representativeness from respondents living in different parts of the study area. In order to avoid the biased from respondent's participation and control them from participated more than once in one household, the questionnaire was distributed by sending survey link individually.

2.3. Data analysis
2.3.2. Normality test analysis.
The normality test was done using skewness and kurtosis test to decide whether the data gain was normally distributed or not. Table 2 shows the data distribution was not normal. According to Byrne [12] data is normal distributed if skewness is between -2 to +2 and kurtosis is between -7 to +7. In this study, non-parametric test was used to measure the relationship between variables.

Table 2. The results of normality test (skewness and kurtosis)

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Knowledge	-3.361	.160	2.568	.318
Awareness	-4.856	.160	3.783	.318
Practices	3.194	.160	-4.682	.318

2.3.3. Descriptive analysis.
In this study, descriptive statistic was used to analyse data from the questionnaire distributed towards the household-respondents. The frequency (*f*) counts and percentage (%) was used to describe respondents' profile. To analyse the result from questionnaire in term of level of knowledge, awareness, and practices of the selected rural residents, it was employed using mean. Frequency and percentage were used to address questionnaire survey part 1 which is on the gender, age, educational level, occupation, and family size. To make the data more meaningful, the percentage was counted from the frequency for the presentation. The second, third and fourth part of questionnaire consists of knowledge, awareness and practices will be utilized by mean analysis. The list of indicators was provided for the household-respondents to access their level of knowledge, awareness, and practices in

solid waste management. In interpreting the knowledge and awareness section from respondents' answer, it was guided by the scoring interpretation of low, average, and high [13]. In interpreting the practice section from respondents' answer, it was guided by the scoring interpretation of poor, moderate and good practice [14].

2.3.4. Inferential analysis.
Mann-Whitney U test was applied to compare and determine whether there is a significance difference between the mean within group. In this study, to compare difference between gender (male or female) and their level of knowledge or awareness on solid waste management practices either male or female have the high level of knowledge and awareness. Next, the Kruskal-Wallis test was done to compare the mean within more than two group of elements whereas to compare the differences between ages groups and their level of knowledge or awareness on solid waste management practices either younger, adult or older have the good knowledge and awareness.

In this study, the hypothesis as follow:
  i. H_0 1: differences in levels of socio-demographic status did not affect knowledge of SWM practices.
  ii. H_0 2: differences in levels of socio-demographic status did not affect awareness of SWM practices.

Then, the correlation analysis method was done to study the strength of relationship between level of knowledge, awareness, and practice. Since the data was non-parametric, the indicator that was used to determine this relationship is Spearman's Rho correlation. Spearman's correlation coefficients range from -1 to +1. The sign of the coefficient indicates whether it is a positive or negative monotonic relationship. A positive correlation means that as one variable increases, the other variable also tends to increase. A negative correlation signifies that as one variable increases, the other tends to decrease. Values close to -1 or +1 represent stronger relationships than values closer to zero.

3. Result and Discussion
3.1. Socio-demographic profile.
Table 3 shows that 70.3% of the total respondents are male and the female involved consists of 29.7% respondents. From the level of the percentage, it can be seen that there was a huge difference between the numbers of male and female as the question was focusing on the gender of the head household. In terms of ethnicity, Malay comprises the highest percentage; 94.8% followed by Chinese; 3.9%, Indian; 0.9% and the least percentage is Other with 0.4%. This can be explained that most of the community in Kg Tok Uban is Malay with the highest percentages observed compared with other ethnics. Majority of respondents (62%) are middle adulthood with age between 30-49 years old.

Besides that, majority of the respondents had education level of skills certificates with 81 respondents represented by 34.9% while the least number of respondents categorized in no formal education with only two respondents represented by 0.9%. Respondents with secondary school educational level accounts for 28.9% with 67 respondents followed by Diploma holder with 41 respondents (17.7%) and Degree holder with 31 respondents (13.4%). For respondents in secondary school and from postgraduate, both were comprised of 6 respondents (2.6% and 4 respondents (1.7%) respectively.

The respondents were divided into income categories and grouping based on household income classification in Malaysia which are B40 represents the Bottom 40%, M40 represents the middle 40%, whereas T20 represents the top 20% of Malaysian household income according to the table above. From the results, most of the respondents were from B40 group in level B2 with a total respondent of 77 out of 232 represented by 33.2%. There were 74 respondents from B1 equal to 31.9% while 29 respondents in group of B3 with 12.5%. There were 20 respondents (8.6%) categorized in B4 group followed by 10 respondents (4.3%) with household income in M2 income group and 7 respondents (3%) for both income group M1 and M4. There were 6 respondents (2.6%) that categorized in T20 group and the least number of respondents with 2 out of 232 presented by 0.9% were categorized in

income group of M3. From the result, the highest numbers in total respondents were from B40 family of the income classification by household which range from below RM 2500 to RM 4,849.

In term of working status, almost half of the respondents were self-employed comprised with 103 respondents presented by 44.4%. The least number of respondents comprised with 13 people out of 232 were unemployed presented by 5.6%. There were 59 respondents who worked in government sector with 25.4% while 34 respondents worked in private sector with 14.7%. Out of all respondents, 23 respondents were retiree with 9.9%. Majority of the respondents worked as self-employed as the focus survey area were an outskirt area which had little industry compared to main city. Moreover, majority of the respondents had 3 to 4 family members with the 99 out of 232 respondents presented by 42.7% and the least percentage was comprising respondents with more than 7 family members with 31 total respondents presented by 13.4%. The result of family size within 5 to 6 members account for 57 total respondents with 24.6%. Other than that, there were 45 respondents who had below 2 members in their family comprises in 19.4%.

Table 3. Sociodemographic profile of respondent

Variable	Frequency (*f*)	Percentage (%)
Gender of Head of Household		
• Male	163	70.3
• Female	69	29.7
Ethnicity of Head of Household		
• Malay	220	94.8
• Chinese	9	3.9
• Indian	2	0.9
• Siamese	1	0.4
Age of Head Household		
• ≤ 29 years old	63	27.2
• 30 - 39 years old	77	33.1
• 40 - 49 years old	67	28.9
• ≥ 50 years old	25	10.8
Educational Level of Head Household		
• Primary school	6	2.6
• Secondary school	67	28.9
• Skills certificates	81	34.9
• Diploma	41	17.7
• Degree	31	13.4
• Postgraduate	4	1.7
• No formal education	2	0.9
Monthly Household Income of Respondents		
• ≤ RM2,500 (B1)	74	31.9
• RM2,501 - RM3,170 (B2)	77	33.2
• RM3,171 - RM3,970 (B3)	29	12.5
• RM3,971 - RM4,850 (B4)	20	8.6
• RM4,851 - RM5,880 (M1)	7	3
• RM5,881 - RM7,100 (M2)	10	4.3
• RM7,101 - RM8,700 (M3)	2	0.9
• RM8,701 – RM10,970 (M4)	7	3
• ≥ RM10,971 (T20)	6	2.6
Working Status of Head Household		
• Unemployed	13	5.6
• Self-employed	103	44.4
• Government	59	25.4
• Private	34	14.7

Variable	Frequency (*f*)	Percentage (%)
• Retiree	23	9.9
Household Size		
• ≤ 2 members	45	19.4
• 3-4 members	99	42.7
• 5-6 members	57	24.6
• ≥ 7 members	31	13.4

3.2. Knowledge on the sustainable solid waste disposal.

Table 4 illustrates the knowledge of the respondents regarding the solid waste management practices with 232 total respondents. 97.4% of all respondents stated that they know and have knowledge about the 3R practices which is reduce, reuse and recycle while only 2.6% of them didn't know about the 3R practices. More than half respondents with 62.5% answered the statement correctly about the recyclable materials which are paper, plastic bottle and cardboard while apart from the respondents answered them wrong. However, for the non-recyclable materials, majority of the respondents with 58.2% answered yes for the food packaging, plastic bag and glass are recyclable materials while inversely they are categorized as non-recyclable item. Majority of the respondents agreed that open burning can cause air pollution and breathing difficulty with total percentage 96.6%, so it showed that the respondents are already aware with the problem or implication occurred from this method. Besides, they also showed the same behaviour with the statement improper waste management will attract pests showing the higher percentage 96.1% for the yes answer and only 3.9% didn't agreed with this statement.

For the next three statement on knowledge, they showed the same percentage which is 97.8% and they are the highest among the other statements. Majority of the respondents agreed that stagnant rainwater in garbage will be a breeding ground for mosquitoes. The same result can be seen for both the improper waste in open dump will tarnish the image of the village as well as caused an unpleasant odour and they also agreed that by practicing recycling, a waste generated can be reduced. About 97% of all respondents agreed that proper waste management will utilise the cost for cleaning and overhaul. Moreover, majority of the respondents (96.6%) agreed that regular and sustainable waste management will result in cleanliness and care for nature.

Table 4. Respondent's knowledge on the sustainable solid waste disposal

Statements	Mean (SD)	YES *f* (%)	NO *f* (%)
3R stand for Reduce, Reuse & Recycle?	0.97 (0.159)	226 (97.4)	6 (2.6)
Paper, plastic bottle and cardboard are non-recyclable materials?	0.63 (0.485)	87 (37.5)	145 (62.5)
Food packaging, plastic bag and glass are recyclable materials?	0.42 (0.494)	135 (58.2)	97 (41.8)
Poor waste management such as open burning can cause air pollution and breathing difficulty.	0.97 (0.183)	224 (96.6)	8 (3.4)
Improper waste management will attract the pests like rats and flies.	0.96 (0.194)	223 (96.1)	9 (3.9)
Stagnant rainwater in garbage leads to the breeding of Aedes mosquitoes.	0.98 (0.146)	227 (97.8)	5 (2.2)
Waste in open dump will tarnish the image of the village and cause the unpleasant odors.	0.98 (0.146)	227 (97.8)	5 (2.2)
Through recycling practices, we can reduce the quantity of waste generated.	0.98 (0.146)	227 (97.8)	5 (2.2)
Proper waste management practices will reduce expenses for cleaning and overhaul	0.97	225	7

work.	(0.171)	(97)	(3)
Regular and effective solid waste management can maintain the cleanliness and nature.	0.97 (0.183)	224 (96.6)	8 (3.4)

3.3. Awareness on the impact of unsustainable waste disposal.

Table 5 shows that majority respondents (92.2%) aware they need to segregate the wastes first before disposing them to reduce its quantity in landfill. As for the current practice situation, majority of the respondents with a total percentage 78.9% thought that the current solid waste management practice is a problem in their area while the other 21.1% didn't think the same way. Besides, majority of the respondents also agreed that they were aware about the waste open burning method will cause the global warming with total percentage 97.8%. They are also aware that the stagnant rainwater in solid waste will be a breeding ground to mosquitoes with the result comprises 97.4% of all respondents.

Besides that, majority of respondents with percentage 64.7% aware that the garbage dumpsite in their area were in good condition and orderly while 35.3% respondents didn't think the same way. However, most of the respondents (91.4%) were aware about the existence of solid waste in river or lake in their neighbourhood and could affect the water quality. Only 8.6% of all respondents stated that they didn't aware about the existence of solid waste in river or lake. Luckily, the result shown that most of the time majority respondents were aware about the solid waste problems and impacts as well as their existence in the neighbourhood.

Table 5. Respondent's awareness on the impact of unsustainable solid waste disposal

Statements	Mean (SD)	Yes f (%)	No f (%)
The community needs to segregate the waste according to their categories to reduce their quantity at landfill.	0.92 (0.268)	214 (92.2)	18 (7.8)
Do you think the current solid waste management practice is a problem in your area?	0.79 (0.409)	183 (78.9)	49 (21.1)
Do you aware that the waste open burning method will cause the global warming?	0.98 (0.146)	227 (97.8)	5 (2.2)
Do you aware that the stagnant rainwater in solid waste will be a breeding ground to mosquitoes?	0.97 (0.159)	226 (97.4)	6 (2.6)
Are the garbage dumpsite in your area in good condition and orderly?	0.35 (0.479)	150 (64.7)	82 (35.3)
Do you aware about the existence of solid waste in river or lake in your neighbourhood could affect its quality?	0.91 (0.281)	212 (91.4)	20 (8.6)

3.4. Solid waste disposal practices.

Table 6 illustrates the practices of respondents regarding solid waste disposal. Majority of respondents with the percentage 77.2% stated that they borrowed and rented equipment that are needed occasionally while the other 22.8% didn't practice the same behaviour. Other than that, more than half respondents with percentage 73.3% out of all stated that they only buy amount of food that they need to prevent the leftover while the remaining 26.7% respondents showed the result inversely as they didn't buy the food needed contribute to food waste. In term of plastic packaging, 64.2% respondents choose to pack their food in a reusable lunch box so that they can avoid plastic packaging while other 35.8% prefer a simple way to go with plastic packaging. More than half of respondents with total percentage 56% prefer to bring their own drinking bottle to avoid one-used plastic bottles while 44% respondents didn't practice the same habit. Luckily, there were 90.1% respondents who cautious and responsible for every waste they generated.

Moreover, majority of respondents show a positive behaviour as 82.3% out of all respondents didn't throw and left their garbage anywhere. 66.4% respondents choose to burn their waste materials for the purpose of disposal while remaining 33.6% didn't agreed with it as they may dispose their wastes in other methods. Apart from that, there were 67.2% respondents who dispose their biodegradable wastes like kitchen and garden waste into common dustbin while other 32.8% didn't practice the same disposal method. In term of expired medicine, majority of the respondents with total percentage 65.5% dispose their expired medicine in any garbage together with other waste materials. There were 34.5% respondents who dispose their expired medicine in other way instead of mixing them in any common dustbin. Majority of total respondents (52.2%) chose to bury their waste that generated from home

Table 6. Respondent's practices in solid waste disposal

Statement	Mean (SD)	Yes f (%)	No f (%)
I separate recyclable waste (paper, cardboard, plastic bottles) and non-recyclable waste (food wastes).	0.85 (0.359)	197 (84.9)	35 (15.1)
I segregate biodegradable waste (newspaper) and non-biodegradable waste (glass).	0.56 (0.497)	131 (56.5)	101 (43.5)
I separate non-harmful wastes (plastic packaging) from toxic and hazardous wastes such as batteries.	0.61 (0.489)	141 (60.8)	91 (39.2)
I segregate wastes according to their categories before it collected by municipalities.	0.56 (0.498)	129 (55.6)	103 (44.4)
I mix all types of waste in one garbage container.	0.31 (0.462)	161 (69.4)	71 (30.6)
I throw and leave my garbage anywhere.	0.82 (0.382)	41 (17.7)	191 (82.3)
I burn the waste materials for the purpose of disposal.	0.34 (0.473)	154 (66.4)	78 (33.6)
I dispose biodegradable wastes like kitchen and garden waste into common dustbin.	0.33 (0.470)	156 (67.2)	76 (32.8)
I dispose expired medicine in any garbage together with other waste materials.	0.34 (0.476)	152 (65.5)	80 (34.5)
I buried the solid wastes generated.	0.52 (0.501)	111 (47.8)	121 (52.2)

3.5. Sociodemographic factors influence the solid waste disposal practices in Kg Batu Uban.
A Mann-Whitney U test indicated that the level of knowledge towards practices of solid waste management of the male respondents (Mean Rank = 129.75, n = 163) were higher than those of the female respondents (Mean Rank = 85.21, n = 69), U = 3464.50, z = –4.86 (corrected for ties), p = .000. For the level of awareness of proper solid waste, the Mann-Whitney U test also indicated that the male respondents (Mean Rank = 128.72, n = 163) were higher than those of the female respondents (Mean Rank = 87.63, n = 69), U = 3631.50, z = -4.43 (corrected for ties), p = .000. Based on this result, it's shows that, there was a statistically significant different between gender on level of knowledge and awareness of solid waste management practices. Therefore, there have significant evidence to reject the null hypothesis that the distribution of knowledge and awareness is the same in this two groups male and female. The results indicate that male tend to have higher knowledge and awareness on solid waste management practices than female, a difference that is statistically significant. Besides that, a previous study stated that they found female respondents tend to have higher knowledge and proper behaviour on waste minimisation specifically for the waste separation [16]. The results might be

slightly different to this study as the respondents are majority from the male category as it is focusing on the gender of the household.

In the table, a kruskal-wallis H test indicated that there was a statistically significant differences in knowledge on solid waste management practices between the age of the respondents for the age < 29 years old (Mean Rank = 95.27), 30 - 39 years old (Mean Rank = 137.71), 40 – 49 years old (Mean Rank = 159.23), 50 years old and above (Mean Rank = 121.96), (H (4) = 83.562, p = .000). Since the p-value is less than 0.05, there have significant evidence to reject the null hypothesis that the distribution of knowledge is the same in those groups of age and not all the groups of age are equal. In term of awareness, a kruskal-wallis H test also indicated that there was a statistically significant differences in awareness on solid waste management practices between the age of the respondents assigned to < 29 years old (Mean Rank = 105.32), 30 - 39 years old (Mean Rank = 148.01), 40 – 49 years old (Mean Rank = 132.87), 50 years old and above (Mean Rank = 92.52), (H (3) = 26.327, p = .000). Since the p-value is less than 0.05, there have significant evidence to reject the null hypothesis that the distribution of awareness is the same in those groups of age and not all the groups of age are equal. The knowledge of respondents between age is different and the results indicates that respondents among 40 – 49 years old were more knowledgeable than others. In contrast by the previous study by Wang et al. [1] as they stated that people among 20 – 30 years old were more knowledgeable compared to the older as most of them are from college or university students. From this research, it can be concluded that the younger might have more knowledge in term of good practices, but they didn't contribute and involved in solid waste disposal practices at home compared to the older.

In the table, a kruskal-wallis H test indicated that there was a statistically significant differences in knowledge on solid waste management practices between the household income of the respondents assigned to B1 income group (Mean Rank = 93.89), B2 income group (Mean Rank = 103.45), B3 income group (Mean Rank = 168.34), B4 income group (Mean Rank = 175.15), M1 income group (Mean Rank = 138.29), M2 income group (Mean Rank = 120.60), M3 income group (Mean Rank = 118.00), M4 income group (Mean Rank = 83.64), T20 income group (Mean Rank = 122.33), (H (8) = 51.379, p = .000). Since the p-value is less than 0.05, there have significant evidence to reject the null hypothesis that the distribution of knowledge is the same in those groups of household income of respondents and not all the groups of household income are equal. In term of awareness, a kruskal-wallis H test also indicated that there was a statistically significant differences in awareness on solid waste management practices between the income of the respondents assigned to B1 income group (Mean Rank = 100.74), B2 income group (Mean Rank = 120.66), B3 income group (Mean Rank = 162.29), B4 income group (Mean Rank = 150.95), M1 income group (Mean Rank = 65.93), M2 income group (Mean Rank = 94.30), M3 income group (Mean Rank = 45.25), M4 income group (Mean Rank = 74.14), T20 income group (Mean Rank = 90.42), (H (8) = 36.867, p = .000). Since the p-value is less than 0.05, there have significant evidence to reject the null hypothesis that the distribution of awareness is the same in those groups of household income and not all the groups of household income are equal. The result indicates that the respondents categorized in B40 level of household income were more knowledgeable and had better awareness compared to the others. This result was contradicted by previous study in China as they stated that the higher income of respondents was more knowledgeable as they were usually with higher educational attainment [1]. This awareness result was also contradicted with the previous study by Brotosusilo et al. [17], as they stated that respondents' awareness are rises along with their financial situation. Most of the rich people tend to make more significant contributions and they estimated that wealthy zones are much cleaner compared to weak areas [18]. These results might be slightly different as respondents with lower household income might have the better informal education that led them to a good practice and better sensation towards solid waste disposal practice.

In Table 7, a kruskal-wallis H test indicated that there was a statistically significant differences in knowledge on solid waste management practices between the household size of the respondents assigned to < 2 members (Mean Rank = 82.67), 3-4 members (Mean Rank = 130.08), 5-6 members

(Mean Rank = 118.60), > 7 members (Mean Rank = 118.40), (H (3) = 17.242, p = .001). Since the p-value is less than 0.05, there have significant evidence to reject the null hypothesis that the distribution of knowledge is the same in those groups of household size of respondents and not all the groups of household size are equal. In this study, the results indicate that 3 – 4 members of family size interpret a higher result for knowledge on SWM. The result was slightly different from the previous study by Adzawla et al. [19], as they stated that household size has a negative significant effect on knowledge and awareness which lead them to the open burning, burying and open dump waste disposal. This is because the larger households may generate huge quantities of solid wastes and therefore, they preferred the simple way like burning or burying to dispose their waste. However, the result might be slightly different in both of this research study areas due to the differences of family members' attributes which may lead to better practice on solid waste disposal. In term of awareness, a kruskal-wallis H test indicated that there were no statistically significant differences in awareness on solid waste management practices between the household size of the respondents assigned to < 2 members (Mean Rank = 113.39), 3-4 members (Mean Rank = 128.48), 5-6 members (Mean Rank = 110.31), > 7 members (Mean Rank = 94.15), (H (3) = 7.744, p = .052). Since the p-value is more than 0.05, there is no significant evidence to reject the null hypothesis that the distribution of awareness is the same in those groups of household size and not all the groups of household income are equal.

Table 7. Mann-whitney U and Kriskal-wallis test

Sociodemographic	Test	Knowledge	Awareness
Gender of Head Household	Mann-Whitney U	3464.500	3631.500
	p-value	.000	.000
		Significant	Significant
Age of Head Household	Kruskal-Wallis H	83.562	26.327
	p-value	.000	.000
		Significant	Significant
Income of Head Household	Kruskal-Wallis H	51.379	36.867
	p-value	.000	.000
		Significant	Significant
Household Size	Kruskal-Wallis H	17.242	7.744
	p-value	.001	.052
		Significant	Not Significant

4. Conclusion

The findings of this study show the knowledge and awareness of rural community in Kg Tok Uban, Pasir Mas, Kelantan about solid waste disposal is good. However, the solid waste disposal practices is not convincing which could cause negative impact to the environment. More environmental activities or programmes need to be done to ensure a better awareness of managing the waste properly. There are recommendations to improve solid waste disposal practices in the rural area. Firstly, it would be better if an awareness programme or activity related to solid waste management is done together with a demonstration session on how to have a proper practice such as the recycling methods according to the products label. This initiative is crucial because practising proper solid waste disposal will give them a better understanding of the good practices.

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