WASTE MANAGEMENT PRACTICES AND GOVERNMENT-LED INITIATIVES: ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) LEVEL IN A NON-URBAN AREA

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ABSTRACT

Malaysians are generally knowledgeable and aware of waste but have not transformed this into favorable attitudes and behaviors toward sustainable waste management practices. Regulations, economic incentives and education are just a few of the tools available to policymakers to influence behavior, particularly in non-urban areas. An assessment of the knowledge, attitude and practice (KAP) were conducted in Penampang, Sabah. A total of 401 individuals from several villages participated and responded to the KAP questionnaire. The KAP variables were assigned with scores to determine the level (weak, low, moderate and high). Pearson's correlation coefficient was employed to determine the association between knowledge, attitude and practice. Most respondents were found to have high knowledge and attitude levels but lack in practice. Knowledge and attitude were found to be significantly correlated (r = .406, p = .000). Significant negative correlation was found between knowledge and practice (r = -.139, p = .005) and attitude and practice (r = -.284, p = 000). Appropriate intervention initiatives must be enforced soon to teach environmentally friendly behaviors' so that Malaysians can keep up with the challenges of a developed country.

Keywords: government initiatives, KAP, non-urban, waste management

1. Introduction

For years, the Malaysian government has improved waste management conditions in cities, towns and rural areas. However, owing to inadequate implementation and weak public engagement, most programs were unsuccessful. This problem was forecasted to deteriorate further as the waste generation scenario will continue to increase from 36,138 tons per day by 2020 to 49,670 tons per day by 2030. Unfortunately, as there are no official statistics on real waste creation in Malaysia, these figures are just estimations (Theng, 2020). The rate and characteristics of waste generation vary by country. They are strongly linked to socioeconomic status, public opinion, cultural habits, energy resources, geographic location, regional service features, year season, and regulation (Srivastava et al., 2020). Currently, waste mismanagement, such as illegal open dumping and open burning, are still practised openly, especially in remote areas, causing pollution and other safety and health hazards (Iacovidou and Kok, 2020). According to Wang et al. (2018), less attention was given to waste management in non-urban areas in developing countries such as China, India, and Malaysia. Waste generation in Malaysia's non-urban population is increasing at the rate of 2 per cent annually. Therefore, this study was implemented to assess the household's understanding of the national policy on waste management and their involvement in managing waste at their homes in Penampang, Sabah. The knowledge, attitude, and practice (KAP) method were particularly useful because it collects data on the difference between intentions and practice; also, beneficial to design cost effective interventions to encourage sustainable consumption choices and activities (UNEP, 2017).

2. Literature Review

The National Solid Waste Management Department and the Solid Waste and Public Cleansing Management Corporation (SWCorp) are in charge of Malaysia's waste management policy and enforcement. These two agencies are under the governance of the Ministry of Housing and Local Government, and both are observing the Solid Waste and Public Cleansing Management Act 2007 (Act 672) (Iacovidou and Kok, 2020). Act 672, however, is only implemented in six states (Kedah, Perlis, Johor, Pahang, Negeri Sembilan, and Melaka) and two federal territories (Kuala Lumpur and Putrajaya). The Act does not apply to the remaining seven states (Selangor, Penang, Kelantan, Perak, Terengganu, Sarawak, and Sabah), and one federal territory (Labuan). However, this unusual, decentralised governance and inadequate funding have resulted in poor waste management across the country (Iacovidou and Kok, 2020).

In Sabah, waste management is overseen by several state laws such as the Environment Protection Enactment 2002, Town and Country Planning Ordinance 1950/Town and Country Planning (Amendment) Enactment 2002, Public Health Ordinance 1960 and the Uniform (Anti-Litter) By-Laws 2010 (Chemsain Konsultant, 2007b). In 2017, the Sabah State Policy on the Environment was introduced. Several strategies were outlined, among others: waste separation and shared responsibility between government, producers, importers, merchants and consumers (Environmental Protection Department, n.d.). In Malaysia, waste management related expenditures are not considered a priority as compared to health and education. This is common in developing countries, where the main priority was executing initiatives and policies with greater social and political urgency that left lower budgets for waste management issues. Most landfills are nearing their maximum capacity due to the rapidly growing population and lavish consumption habits (Chen et al., 2021). The Malaysian government spends more than RM2 billion annually on waste management that will escalate annually. Additionally, waste management expenditures account for 20 to 80 per cent of local government revenue and is a serious financial burden for smaller local governments (Theng, 2020). Therefore, stakeholders must immediately resolve by establishing smart partnerships with private sectors and initiating proactive measures to generate their revenue towards sustainable waste management (Chen et al., 2021).

Theng (2020) also identified significant waste management issues in Malaysia, including attitude problems, low priority in decision-making, and low willingness to pay. Changes such as persistent awareness initiatives, mainstreaming waste management, emphasising shared responsibilities, and enforcing legislative instruments such as extended producer responsibility (EPR) rules, packaging law, and fees should be done immediately (Theng, 2020). Attempts to change human behaviours can have limited or unexpected outcomes, whether individual, household, or societal. Regulations, economic incentives and education are just a few of the tools available to policymakers to influence behaviour. While all these approaches are necessary for changing customer behaviour, a thorough understanding of behaviour is essential (UNEP, 2017). The study of knowledge, attitude and practice (KAP) was engaged to study general human behaviour by assessing a community's cognitive, affective, and behavioural aspects and acts as an educational diagnosis (Kaliyaperumal, 2004). In the 1950s, the KAP survey was historically used to research family planning and population. The KAP surveys were then widely utilised in the 1960s and 1970s to better understand and analyse health behaviour and gather additional information on health-seeking activities, including sustainable environmental practices (Kaliyaperumal, 2004)

Most government policies, including waste management initiatives, have traditionally taken a top-down approach, which limits public participation in the policymaking process. As a result, individuals rely significantly on their local governments to handle waste issues. It was also assumed that the government is obligated to provide waste management services and

infrastructure (Moh and Abd Manaf, 2017). Generally, Malaysians have poor comprehension of knowledge, awareness, and perceptions of overall waste management systems. In order to improve existing policy initiatives while meeting public demands, a sense of shared responsibility in managing waste among Malaysians at all levels, including the government, businesses, and individuals, must be strengthened (Theng, 2020).

3. Method and Study Area

The study was conducted in Penampang, Sabah, 9 kilometres away from the Kota Kinabalu city centre. It had a total area of 463,47 square kilometres and a population of 152,900 in 2010 (Department of Statistics, Malaysia, 2020). Previously, Penampang was a rural area. However, the rapid shift in land use from rural and rice paddy farming to heavy urban development creates many social and environmental problems (Mariappan et al., 2019). There are 55 gazetted villages in Penampang, but only 10 were selected for sampling purposes to comply with the government's movement control order (MCO) due to the coronavirus outbreak at the time of writing.

A cross-sectional study design is employed to obtain an educational analysis of a specific group for a KAP survey (Kaliyaperumal, 2004). Cluster sampling was employed, and a total of 401 individuals was selected using the Krejcie and Morgan (1970) formula. An outlier was discovered and eliminated following a z-score test, bringing the total number of responders to 400. Dual languages (English and Malay) structured questionnaires were used and divided into five sections: the sociodemographic profile, communication channel preference, knowledge, attitude and practice. Items for the questionnaire were mainly adapted and modified from Ahamad and Ariffin (2018), Asmuni et al. (2012), and Ahmad et al. (2010). Data obtained from the survey were analysed using descriptive and inferential statistics in the IBM SPSS Statistics (Version 22). Individual scores were allocated to items in knowledge, attitude, and practice and the total scores were classified into four levels using modified Bloom's cut-off points (Nasarudin et al., 2014) (Hassan et al., 2009). Relationship between knowledge, attitude and practice were examined using Pearson correlations with P-values significant at <0.01 and <0.05.

4. Results and Discussion

4.1. *Demographic characteristics*

From a total of 400 respondents, 58 percent (n = 232) of them were female and 42 percent (n = 168) were male. The respondents' age range was segmented into three categories, namely young age (0 to 14 years old), working-age (18 to 64 years old) and old age (65 years old and above) (Department of Statistics, Malaysia, 2020). Their income level was categorised into three levels, with B40 as the lowest income level, M40 as the middle-income level and T20 as the top income level (Department of Statistics, Malaysia, 2020). The educational attainment of the respondents was also surveyed. Table 1 summarises the respondents' sociodemographic factor.

Table 1**:** Sociodemographic profile of the respondents

Sociodemographic Profile	n	Percentage (%)
Gender:		
Male	168	42
Female	232	58
Age:		
0 To 14 Years Old	2	0.5
15 To 64 Years Old	388	97
65 Years Old and Above	10	2.5

Income Level:			
B40: RM2,500 to RM4,849		277	69.25
M40: RM4,850 to RM10,959		115	28.75
T20: RM10,961 and above		8	2
Educational Attainment:			
No Formal Education		2	0.5
Primary Education		2	0.5
Lower Secondary		20	5
SPM/SPMV		78	19.5
STPM/STAM		25	6.3
Certificate		36	9
Diploma		79	19.8
Bachelor's Degree		117	29.3
Master's Degree		37	9.3
PhD		4	1
TOTAL		**400**	**100**

Table 1 (Continued)

4.2. *Respondents' knowledge level*

The knowledge section consisted of 12 items that explored the respondents' knowledge of waste management practices and government-led initiatives and programs. Knowledge is defined as an awareness of a community in many categories, such as facts, information, and capacities that can be acquired through experience or education (Knickmeyer, 2020). The respondents were asked to indicate their agreement with a 'Yes' or 'No' to statements corresponding to issues of waste management in general and the government's efforts and effectiveness. Each correct response was given a score of 1, while incorrect answers received a score of 0. There are 12 items, and so the maximum score was 12, and the minimum was 0. The lowest score recorded was 3 (n=2, 0.5%), while the highest was 12 (n=62, 15.5%). The total mean score for knowledge was 77.35, and the standard deviation was 0.165. The total of respondents' scores were then categorised to determine their knowledge level:

Table 2: Respondents' knowledge level (n=400)

Scores (%)	Knowledge level	n	Percentage (%)
Below 25	Weak	2	0.5
26 – 50	Low	30	7.5
51 – 75	Moderate	178	44.5
76 - 100	High	190	47.5
	TOTAL	400	100

In Table 2, it is evident that the majority of them have a high level of knowledge (n=190, 47.5%), 178 respondents (44.5%) have moderate knowledge level, 30 of them (7.5%) have poor knowledge level, and the remaining 2 (0.5%) individuals has weak knowledge level. 99.5 percent of the respondents have attended formal education, which could contribute to their high and moderate knowledge level. According to Jafer (2020), formal education is a key factor in imparting knowledge and awareness of growing environmental concerns, which is a great

opportunity for widespread promotion of the campaign and eventually improving sustainable waste management practices (Agamuthu and Fauziah, 2019). A clear example is respondents in Kota Kinabalu were found to be aware of the waste separation legislation and willing to participate even though it is yet to be implemented in Sabah at the time of writing (Yap et al., 2020). Nevertheless, knowledge and awareness do not always translate into good practices. For example, almost 30 to 37 per cent of the respondents agreed that plastic bags are convenient and harmless to the environment. This is unsurprising as the average Malaysian produces 34 kg of post-consumer plastic waste annually and is bound to increase. In addition, *tapau* or take-away food, food delivery and climate conditions necessitate more plastic packaging to prevent perishables from possible contamination, deteriorating or pest-infected (WWF-Malaysia, 2020).

Respondents were also asked to choose their primary sources of acquiring information and knowledge on waste management. Table 3 shows the communication tools as preferred by the respondents. As selected by 359 (89.75%) of the respondents, social media was the most preferred communication channel. It was also corroborated in Mallick and Bajpai (2019) that social media was the most effective medium to raise environmental awareness, disseminate messages on waste recycling (Ramzan et al., 2019), encourage recycling and waste reduction practices behaviour (Sujata et al., 2019).

Table 3: Respondents' preferred communication tool (n=400)

Communication Tools	Preference	
	n	%
Social media	359	89.75
Family members and friends	343	85.75
Online news portal	335	83.75
Traditional media	323	80.75
Government official sources	317	79.25
Banners, brochures and billboards	316	79
Carnivals, seminars, lectures and roadshows	305	76.25

4.3 Respondents' attitude level

Attitudes are learned traits of people characterised as a stable structure of thoughts, feelings, or beliefs centred on an object, subject, or concept that influences individuals to respond in a particular way (Knickmeyer 2020). A Likert scale ranging from strongly agree, agree, not sure, disagree, to strongly disagree was employed to identify the respondents' feelings about waste management practices and government-led initiatives and programs. This was suggested by Kaliyaperumal (2004) and Lovelace and Brickman (2013) to evaluate attitude.

The attitude items were assigned with a score from 1 to 5, with the total score ranging from 1 to a maximum of 45. The lowest score is 18 (n=5, 1.3%) and the highest is 45 (n=32, 8%). The mean for attitude is 4.03, and the standard deviation is 0.698. The respondents' scores for attitude were categorized as follow

Table 4: Respondents' attitude level

Scores (%)	Attitude Level	n	Percentage (%)
Below 25	Weak	0	0
26 – 50	Low	27	6.75
51 – 75	Moderate	96	24
76 - 100	High	277	69.25
	TOTAL	400	100

After the summation of overall individual scores, most of the respondents (n=277, 69.25%) has high attitude levels, while 96 (24%) of them has moderate and the remaining 27 (6.75%) respondents have low attitude levels, respectively. Essentially, environmental knowledge is required to promote ecological attitudes, and the two are inextricably linked (Paco and Lavrador, 2017). The findings of this study show that high levels of knowledge are frequently followed with favourable attitudes (high and moderate) than low and weak levels of expertise. Similar findings were also found in Ahamad and Arifin (2018) studies and Barloa et al. (2016). This was also corroborated by Chen et al. (2021), who stated that knowledge and values of health consciousness or sustainable consumption significantly affect attitudes towards eco-friendly goods. Respondents were also observed to have a positive attitude on waste separation, indicating their readiness to enforce it in Sabah. According to Alhassan et al. (2020), attitude is a critical factor of their willingness to engage in pro-environmental action such as waste separation. Compared to 20 years ago, Malaysia's solid waste management has significantly improved, notably in waste collection. Since waste collection is the most common service, this may contribute to respondents' positive opinions of the government's performance (Theng, 2020).

4.4 Respondents' practice level

Practices are the acts of a community that are influenced by knowledge and attitude (Knickmeyer, 2020). A frequency scale was employed to measure the items ranging from always, sometimes, seldom, and never to evaluate the respondents' practices. First, the practice level was assessed using frequency scale items ranging from always, sometimes, seldom and never. Individual scores were then assigned to each item from 1 to 4, which yields a maximum score of 48 and a minimum score of 0. The lowest individual score recorded was 12 (n=5, 1.3%), while the highest was 48 (n=16, 4%). The mean for practice is 2.28, and the standard deviation is 0.735. Total respondents' practice score was then classified as follows:

Table 5: Respondents' practice level

Scores (%)	Practice Level	n	Percentage (%)
Below 25	Weak	5	1.25
26 – 50	Low	172	43
51 – 75	Moderate	162	40.5
76 – 100	High	61	15.25
	TOTAL	400	100

Table 5 indicates the respondents' level of waste management practice at the household level. Generally, the respondents' practice is at a low level. Mutang et al. (2015) found out that situational barriers such as the inadequacy of recycling facilities, inaccessible drop-off centres, irregular visits from the recycling collectors were among the top reasons for residents in Kota Kinabalu not to recycle. Other causes include lack of awareness and an attitude problem. According to Moh and Manaf (2017), Malaysia has an engagement and commitment problem regarding waste separation. Environmental education is vital in closing the knowledge gap in waste management and sustainability. The low participation in environmental education may be improved via technological adoption to enhance information delivery (Debrah et al., 2021)

4.4.1. *Association between Knowledge, Attitude and Practice*

Pearson's correlation coefficient was employed to determine the association between the respondents' knowledge, attitude, and practice, as shown in Table 6. A positive correlation between knowledge and attitude ($r = .406$, $p = .000$) was found. Studies have established that the increment of knowledge will generally increase the attitude score (Al-Rabaani and Al-Shuili, 2020). This study has found that most respondents have high knowledge and attitude level. The positive relationship between knowledge and attitude was mostly contributed by factors such as formal education (Janmaimool and Khajohnmanee, 2019) and the role of teachers (Debrah et al., 2021).

The correlation between knowledge and practice is significantly negative ($r = -.139$, $p = .005$), suggesting that good knowledge of waste management does not guarantee that it will be translated into actual behaviour (Fisher and Fisher, 1992). Recent studies also supported this conception and revealed that a substantial amount of behavioural inconsistency supports the indication that knowledge is partially disregarded by complicating factors such as normative effects, old behaviour patterns (Klöckner, 2013) and situational constraints (Geiger et al., 2018).

The relationship between attitude and practice in this study was also significantly negative ($r = -.284$, $p = 000$). This is consistent with the notion brought by the Campbell Paradigm. The apparent discrepancy between verbal evaluations and behavioural performances stems from ignorance of the difficulties or costs of actions (Kaiser et al., 2010). People are presented with a plethora of behavioural alternatives when pursuing a certain goal. While implementing their environmental attitude, people usually have diverse options. It is reasonable to believe that everyone will favour the more convenient and socially acceptable actions over the more challenging, socially prohibited, or otherwise costly and difficult behaviours (Kaiser et al., 2010).

Table 6: Pearson's correlation coefficient between Knowledge, Attitude and Practice

		Knowledge	Attitude	Practice
Knowledge	Pearson Correlation	1	.406**	-.139**
	Sig. (2-tailed)		.000	.005
Attitude	Pearson Correlation	.406**	1	-.284**

	Sig. (2-tailed)	.000		.000
Practice	Pearson Correlation	-.139**	-.284**	1
	Sig. (2-tailed)	.005	.000	

**p-values significant at <0.01 and <0.05.

5. Conclusion

Respondents were found to have high knowledge and attitude levels towards waste management practices and government-led initiatives and programs. However, as the practice level was low, appropriate intervention initiatives must be enforced soon towards combating unsustainable consumption patterns and waste management. Shared responsibility and mainstreaming of waste management must also become one of the national agendas. Conclusively, Malaysia must keep up with the upcoming challenges of being a developed country, not just in terms of physical infrastructure and revenue but also in cultivating a quality mindset.

6. Limitations

The findings of this study were gathered from a group of people who shared similar values and beliefs, which could limit its representativeness and generalisability. Therefore, Future research should develop a more systematic and inclusive sampling technique.

Acknowledgement

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