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VALIDATION OF A FOOD WASTE BEHAVIOUR QUESTIONNIARE AMONG HOUSEHOLDS: A MALAYSIAN CONTEXT

Sarah Ainina Mohd Nazi[1]*, Zuraini Mat Issa @ Zakaria[2], Saidatul Afzan Abdul Aziz[3]
*Corresponding author
[1]Faculty of Hotel and Tourism
Universiti Teknologi Mara (UiTM) Puncak Alam Campus, Puncak Alam, 42300, Selangor.
[2,3]Department of Foodservice Management,
Faculty of Hotel and Tourism Management, Universiti Teknologi Mara (UiTM) Puncak
Alam Campus, Puncak Alam 42300, Selangor.

*2019854942@student.uitm.edu.my
zurainim@uitm.edu.my
saida509@uitm.edu.my

Abstract

Food waste affects the food security status especially among the low-income groups. In addition, food wastage influences the financial development of the country where the economic cost of the industries will be at loss, equivalent to the waste of food that occurs during food production. In Malaysia, households have been identified as the main contributor to this food wastage amounting to approximately 16,650 tons of food is wasted daily. Hence, this preliminary study will validate the instrument used in examining factors influencing the household's food waste that contribute to the food waste behaviour. In addition, this study also will evaluate the reliability of the instrument used. A purposive sampling was applied to collect data via online survey among 50 households in Selangor. The data were subjected to SPSS version 26 for reliability analyses. The results showed that all dimensions are between the values of 0.6 to 0.9. According to the Alpha Coefficient Range, these values can be considered moderate, good and very good. Therefore, the instrument developed is valid and reliable and can be used for actual data collection involving households in Kuala Lumpur. The study will be extended to other parts of the country. The findings of this study can be used by the local authorities in providing new guidelines, and in educating and providing suitable intervention among Malaysian citizens related to food waste management. Besides, the outcomes of the study will help the researchers and relevant bodies to understand how people manage food to avoid wastage and ensure food security among family members.

Keywords: *Food Waste Management, Food-Related Routines, Income Levels, Households, Behavior.*

INTRODUCTION

Waste management is associated with economic and lifestyle of its population. Solid waste management can be divided into three general classes which are municipal waste, hazardous waste, and industrial waste (Abdul Hamid et al., 2012). Municipal solid waste (MSW) includes residential area, commercial, open area such as streets, parks, playground and also plant waste. MSW has many categories consists of food waste, plastic, paper, cardboard, textile, metals, diapers and others. Meanwhile, hazardous waste is a substantial danger immediately or over some time to human, plant or animal life. There are so me households' wastage that can be considered as hazardous waste which is unused medicines, solvents, paints,

batteries, and many more. Lastly, industrial wastes are wastes that came from industrial activities which is other than mining (Jaafar et al., 2018).

However, due to the rapid economic development and growth of population as well as insufficient infrastructure and lack of land shortage make the management of municipal solid waste become one of Malaysia's most critical environmental issues. According to U.S Environmental Protection Agency (EPA) 2016, municipal solid waste is usually known as trash or garbage consists of everyday items that were used and then been throwing away. Unfortunately, in 2005, Malaysia had generated 7.34 million tons of municipal solid waste and it will rise to approximately 11 million tons in 2020 (Abdul Hamid et al., 2012). According to Mohd Pauze Taha, the CEO of Solid Waste Corporation of Malaysia (SWCorp), out of the total amount of waste produced by the Malaysians, about 60% of the waste is food (Fong, 2019).

In Malaysia, food was wasted about 15,000 tons daily, which includes 3,000 tons of foods that are still in good quality to be eaten and has been dumped in landfills every day (The Star, 2016). Henceforth, the amount of food wasted by the Malaysians is higher than other countries in Southeast Asia for almost 33% (Yang et al., 2016). Gustavsson et. al. (2011) estimated that each year, nearly 1.3 billion tons of food is being wasted annually.

There are different factors or sources that add to food waste namely waste that comes from the household unit, hoteliers and restaurant outlets, food courts, schools, shopping malls, hypermarket, food and beverages industries, and institutions. Households represent more than 30% of the sum of food waste in Malaysia (Jereme et al., 2016). According to Azrina Sobian, a research fellow from the Institute of Islamic Understanding Malaysia (IKIM), households have been identified as the main contributor to this food wastage (The Sun Daily, 2019) amounting to approximately 16,650 tons of food is wasted daily. According to Chien Bong et al., (2016), a family in Malaysia discards around 0.5 – 0.8 kilogram of uneaten food every day, which is sufficient to feed those in needs (Gustavsson, et al. 2011). Although some attempts have been made to address this issue (Amirudin & Gim, 2019; Jereme et al., 2018), it persists. There is no standardized way of tackling this issue since there are many interrelated factors that may contribute to the outcomes. Hence, it is important to conduct a study to understand how people manage food to avoid wastage and ensure food security among the family members.

However, this preliminary study is focusing on the validation and reliability of an instrument use in the process of collecting data. It is important as validity of a research instrument assesses to the extent which the instrument measures what it is designed to measure (Robson, 2011). Meanwhile, reliability measures the consistency, precision, repeatability, and trustworthiness of an instrument in your study (Chakrabartty, 2013).

LITERATURE REVIEW
Food Waste

Food Agriculture Organization (2013) defined food waste as any good or eatable parts of food for human consumption is wasted, lost and degraded. Besides, food waste refers to food that even though the food is kept or not, past its expiry date or left to spoil. Graham-Rowe et. al. (2019) stated that a tremendous amount of food waste critically affects the sustainable development of the country, as it leads to the development of elevated level of harming substances outflows (greenhouse gases) and exhaustion of resources. Those gas emissions then affect such as climate change, land scarcity, and food security to the world.

Food waste not only happened at consumer level but also at all platform of food production network from farming, manufacturing and processing, retail as well as household utilization (Mirabella et al., 2014). At some point when food is wasted rather than being consume, the impact of food production and utilization towards the environment is even more prominent because of handling the waste (Scherhaufer et al., 2018). According to a government

organization in which managing the solid waste, SWCorp Malaysia, Malaysians has produced about 38,000 tons of waste for each day and about 15,000 tons of the waste comes from the food waste. Deputy CEO (Technical) SWCorp, Mohd Pauze Mohamed Taha, said that about 8,000 tons, which nearly to sixty per cent of the food waste that is being created, is avoidable for food waste. Avoidable food waste is the food that could have been consumed if it is managed better.

Food Waste Awareness

A high-level number of people is not aware of how much food they disposed of (Exodus, 2007). The size of food waste amounted from a family is practically endless given that consumable food waste may not exclusively be tossed inside the rubbish bin however served to pets, treated the soil in a container or may be dumped in a garden. Consequently, endeavours to quantify wasted food incline to underrate the real values. Malaysia government perceived the need to decrease food waste has sort help from the Ministry of Environment Japan (MOEP), and specialists from Institute for Global Environmental Strategic (IGES) for the national arrangement plan primarily focused on food waste management with an accentuation on the 3R (Reduce, Reuse and Recycle). However, the issue of households' wasted food which generates more waste than these macro sources set up together was not inside the image. It must be clarified that when households are made to know their unfeasible food utilization have both environmental and economic outcomes and influence the food security of other poor fellow citizens who are in food insecurity.

Food Waste at Household Level

Globally, about 1.3 billion tons of food is wasted per year. Food is wasted from the agricultural production and down to the final which is consumption by the household (FAO, 2013). Food waste can occur at various stage associated with the retail, food service, households as well as consumers within the country (Parfitt et al., 2010). Surprisingly, one of the largest contributors of food waste is from the domestic level which comes from households (Jereme et al., 2016). Food waste that created in households is not because of an individual's single behaviour yet rather a procedure that including consumer's food and kitchen practices, as well as their conduct and attitude on the problematic food items, and other factors associated such as the price of the food items, the size packaging of the food and how the products are being sold (Quested et al., 2013; Quested et al., 2011).

Besides, various household practices that related to manage food in the households, contribute to food waste (Quested et al., 2013; Mondejar-Jimenez et al., 2016; Graham-Rowe et al., 2014). Supported by many studies that household management routines influenced by the food waste levels (Stefan et al., 2013; Stancu et al., 2016; Visschers et al., 2015). Subsequently, SWCorp Federal Territory director Hazilah Gumri reported a study uncovered that a family of five spent an average of RM 900 a month on food and that a quarter of that food was wasted during cooking preparation, and usage (SWCorp, 2015). An individual people wasted about RM225.00 to the garbage every month which equal to an aggregate of RM2,700.00 in a year. The figure will exceptionally increase especially during festive seasons (The Star Online, 2016).

Factors That Contribute to Food Waste

The objective of this study, therefore, is to examine the factors influencing household food waste. From a theoretical perspective, this study extends the recent research by Stefan et. al. (2013); Stancu et. al. (2016) and Romani et. al. (2018); FAO, 2018 which clarifying food waste behaviours as well as psychosocial factors with the role of household food-related practices. Several reasons on why food waste is happening such as food-related routines,

intention not to waste, concern about food waste implications, socio-demographic and multiple behaviours lead to the waste of food.

Food-Related Routines

Food waste has been affected by food-related routines. Food-related routines are part of practices and daily activities that have been done among households. For examples; food storage, food purchase planning, food purchase behaviour in-store, food planning preparation, and leftover consumption. Therefore, this part will be elaborated further on every factors.

Food storage can be defined as storing and categorizing food products in systematic ways. Many cases explained that a properly stored food can extend the shelf life of the foods. For examples, using FIFO (First in First out) method which is organizing food products according to expire date or arrange products in newer and older foods. Furthermore, Farr-Wharton et. al. (2014); Waitt and Phillips, (2016) stated that it can be arranged according to the frequency of use when cooking so it can bring down food waste generated. This storage practices are associated with the consumers' capacities to appropriately store and protect food subsequent after bought it.

Apart from that, food purchasing management has started even before the food has entered the household. Planning also refers to when the food is in stock. It started when people begin to choose what they have to purchase. Food purchase planning behaviour such as planning of meal and utilizing a list of shopping that contains the items needed and amount required lead to food waste reduction (Jorissen et al., 2015; Stancu et al., 2016; Stefan et al., 2013). The previous research has demonstrated that correctly checking of food stocks, great arranging of food purchases, and make a shopping list on what to purchase can lead in reducing the food waste (WRAP, 2007).

While, food purchase behaviour in-store alludes to all actions or activities that occurred previously and throughout the food purchasing. When purchasing food products in-store, several behaviours can occur and increase the amount of food waste. Studies by Mattar et. al. (2018) and Di Talia et. al. (2019) demonstrated that when a list of shopping items is used, it could make food purchasing as an activity that was planned instead of buying impulsively, which in turn lessen the sum of food being wasted. Individual who makes spontaneous purchases that happen without much contemplation incline to waste more (Stefan et al., 2013).

In other hand, the preparation always associated with the process of cooking food products. Reports by several researchers stated that cooking too much food unintentionally can cause food waste (Quested et al., 2013; Van Geffen et al., 2017). Likewise, cooking practices might have difficulties in predicting portions due to the presence of children at home (Cappellini and Parsons 2012; Porpino et al., 2015). The planning preparation, such as meal planning or check the inventories, likewise can prompt to lower food waste (Stefan et al., 2013).

However, the consumption refers to a meal that is being consumed and the leftovers of food need to be handled properly. Eating the leftovers foods are behaviours that can reduce food waste (Stancu et al., 2013; Van Geffen et al., 2017). Leftovers food are typically identified as one among of the fundamental reasons for disposing food since their reuse to transform foods to a new meal requires high adaptability and versatility in arranging the menu (Quested and Johnson, 2009; Williams et al., 2012). Besides, consumers may abstain reusing the leftovers as it might contain harmful substances or already contaminated and it simply because they can bear to continuously purchase and eat food freshly (Porpino et al., 2015).

Concern about Food Waste Implications

Concerning about food waste might be identified with a person's values and mentalities along this line may impact behaviour, such as food waste behaviour. However, in general, individual concerns, for example, money-saving draw out a stronger motivation to save food

waste from environmental and social concern (Graham-Rowe et al., 2014; Neff et al., 2015; Stancu et al., 2016). Similarly, the concern about food waste plays a vital role in reducing waste (Mondejar-Jimenez et al., 2016; Stancu et al., 2016; Stefan et al., 2013). Furthermore, feeling guilt about food that has been thrown away is reflected by the majority of the households (Quested et al., 2013; Ganglbauer et al., 2013; Parizeau et al., 2015; Qi and Roe, 2016; Pearson et al., 2016).

On the other hand, knowledge regarding specific conduct and its consequences are influenced by the attitude and behaviour of a person (Ajzen, 1991). For instance, knowledge on the consequences of waste towards environmental has affected the intention not to waste food (Barr, 2007). Furthermore, mindfulness to the issues of food waste is identified with decrease the measure of food waste. Making a mindfulness and comprehension of food waste implications especially on the environmental concern is one of the powerful devices to maintain the food waste behaviour (Cox et al., 2010). People need to aware that household food waste will affect and damage the environment. Thus, food waste will produce harmful gases to the environment.

Intention Not to Waste Food

A few studies contend that food choices are impacted by various reasons, for example, feelings, value, appetite, and habits (Graham et al., 2014). This cause a high unpredictability level to recognize consumer's food choices (Setti et al., 2018). Consumers front on to numerous individual motivations or encouragement that following the expectation to diminish food waste. Consequently, food that has been wasted identified to inspiration or motivation that can cause an intention-behaviour gap (Graham et al., 2015). The gap is the overall finding that individuals' motivations do not correspond with their intention-behaviour (Sheeran, 2002).

Besides, Setti et. al. (2018) contended that the blank space between food decisions and anticipated result (food waste) is a conduct result gap and can additionally affect customers' basic decision. In outline, a few investigations contend that an intention to stay away from or lessen food waste is essentially identified with reducing food waste (Stefan et al., 2013; Graham et al., 2015). Furthermore, the intended behaviour is probably to be moderated by the person who controls the behaviour (Graham et al., 2013). Stancu et. al. (2016) detailed that intention not to waste food was controlled by mentalities and injunctive standards towards food waste, while perceived behavioural control and moral standards made no significant influence.

Household Income

Income level is one of the main factors of household food waste behaviour, as well as affects consumer's choices of food. Besides, inequalities of income lead to different degree of individual's decisions and complexity (Setti et al., 2017). Apart from that, when concentrating on financial status and the ways of life, many studies expressed that higher-pay family units' waste quite less than poorer households (Principato et al., 2015; Secondi et al., 2015). This is likely a result of the living states of the poor that may affect their capacity to save food.

Yu and Janenicke (2017) reported that household whose has poorly controlled budgets are likely does not have time to manage their food purchases, provision and allocations among members. It likely to believes that they appreciate their food less because they can afford wasting of food.

Validity and Reliability

The amount to which an instrument measures what it needs to measure is often how validity is defined (Blumberg et al., 2005). It takes a research instrument (questionnaire) to accurately quantify the concepts being studied (Pallant, 2011). It covers the complete experimental design process and addresses whether the outcomes comply with the guidelines

set forth by the scientific method. The degree to which the rules of the scientific research methodology were followed to while coming up with research findings is known as the validity of the study. It is a necessity for all academic programmes (Oliver, 2010). The questions on the instrument and the results of the questionnaire's scores, which represent all potential questions that may be asked, were used for content validity in this study. It was done to make sure the questionnaire had a sufficient and accurate set of items that were appropriate for the study. The stronger the content validity, the more accurately the scale items reflect the subject being measured (Shekaran & Bougie, 2010). The judgement of subject-matter experts typically determines the validity of the content. With the reviewers' guidance, the unclear and obscure questions may be clarified, and the useless and dysfunctional questions can be eliminated.

Reliability, however, refers to a measurement that yields constant results with identical values (Blumberg et al., 2005). It evaluates a research's consistency, relevance, accuracy, and equality (Chakrabartty, 2013). It reveals the degree to which it is bias-free (error-free), ensuring consistent measurement throughout time and across the many instruments' items (the observed scores). Reliability in quantitative research relates to the consistency, stability, and repeatability of results; thus, a researcher's findings are regarded as dependable if consistent results have been obtained in similar contexts under various conditions. Every time a single observer provides the data, there is cause for concern because there is no proven way to prevent the influence of that observer's subjectivity (Babbie, 2010). As a general rule, reliability values above 0.8 are regarded as high (Downing, 2004). The more accurately the data are produced, the greater the likelihood that a research decision will be accurate.

METHODOLOGY
Pilot Study

A pilot study has been conducted to check on the clarity, proper use of terms, the meaning and relevance of each statement in the instrument. It was undertook among 50 households in Selangor at three different locations which represent the income levels; Damansara (represents T20), Shah Alam (represents M40) and Sungai Buloh (B40).

Research Instrument

The questionnaire using dual languages, which are English and Bahasa Melayu. Dual language is using to ensure all respondent understand the question before answering it. The respondents answered the questionnaire through online platform on Google form as it might be difficult to face the respondents physically during this pandemic period. Identification of the respondents will be identified through social media platforms such as Facebook and Instagram and through communication channels such as Whatsapp and Telegram.

The instrumentation was developed based on a framework by Janssens et al., (2019). The items for the self-completed questionnaire was adapted from a few researchers namely; Stefan et al. (2013), Stancu, et al. (2016), Mondejar-Jimenez, et al. (2016), Romani, et al. (2018), Secondi, et al. (2015) and Brook (2017). The questionnaire consists of five sections; (1) socio-demographic characteristics of the participants, (2) food-related behaviour, (3) households concern about food waste, (4) households' intention not to waste food and (5) households' food waste behaviour. The 5-point Likert scale will be utilized to interpret items in the questionnaire.

Data Analysis

The data were subjected to the SPSS version 26 software for Cronbach's alpha values. According to Bachir (2017), below 0.6 is an unacceptable, while, between 0.65 and 0.70 are minimally acceptable. Upper than that, are very respectable and very good. However, Konting,

et al. (2009) indicated that a general accepted rule of 0.6 - 0.7 point out an acceptable level of reliability, and 0.8 or greater a very good level.

RESULTS

A total of 52 respondents have participated in this study, consisting of 21 (40.4%) men and 31 (59.6%) women. Majority of the respondents (40.4%) are belonged to B40 group, followed by M40 (38.5%) and finally the T20 group (21.2%). As for the reliability analysis, the alpha coefficient for concern about food waste implications is 0.719, and household food waste behavior is 0.878. It suggesting that the items have relatively high internal consistency. While, for food-related routines is 0.640 and intention not to waste food variable recorded only 0.691 which indicates such a moderate strength of association. Moreover, Sekaran and Bougie (2003) indicated that alpha coefficients value less than 0.6 is considered weak while those in the range 0,7 are to be accepted and range for over than 0.8 are believed to be good.

The mean score (SD) for food-related routines, concern about food waste implications, intention not to waste food and household food waste behavior are 93.13 (14.86), 19.4 (3.01), 19.5 (2.91) and 16.03 (6.84) respectively. These preliminary data showed that there is a positive relationship between food-related routines, concern about food waste implications, and intention not to waste food towards household income as the value is greater than zero. In other hand, only concern about food waste and intention not to waste food have a positive relationship towards food waste behavior. In addition, the results from ANOVA, there is significant different between household income towards the food waste behavior as the sig. value is 0.124 (p>0.05).

DISCUSSION

The main aim of this preliminary study was to test the credibility of the questionnaire. Pre-testing is the right way to protect the questionnaire from major and minor errors. The pilot test is required to assemble data to assess the respondent's comprehension of the meaning of every item in the questionnaire. Even though the questions in this study were adapted and validated thoroughly by the other researchers in the field such as Stefan et. al. (2013), Stancu et. al. (2016), Romani et. al. (2018) and Secondi et. al. (2015), a pilot study will be conducted to check on the clarity, proper use of terms, the meaning and relevance of each statement.

Researcher increases external validity by select the respondents using purposive random sampling as to measure a right concept according to the criteria from the study (Shekaran & Bougie, 2010). Besides, content validity from the judgement of experts in the field to ensure any unclear and uncertain questions in the instrument can be modify, and those not applicable questions should be discarded.

In theoretical way, food wastes contribute to many sociological and social practice theory on the issue of food waste. As shown in this study that involves a small percentage of respondents, in which 52 respondents have participated in this study, consisting of 21 (40.4%) men and 31 (59.6%) women. Majority of the respondents (40.4%) are belonged to B40 group, followed by M40 (38.5%) and finally the T20 group (21.2%). It is therefore, important to conduct a study involving larger scale of respondents in Malaysia. Apart from that, a theory of planned behaviour by Ajzen (1991) predominantly applied for food waste behaviour by many studies. This study can also generate more research and studies regarding on reducing the amount of food waste. Furthermore, this study somehow will help the future researcher to widen the scope of their study.

From a practical perspective, this study is important not only to households but also to future researcher, manufacturer, governments, producer, retailer and marketer as it would help in increase of personal concern and identified the barriers in reducing food waste. Other than that, to educate the household to understand the proper behaviour of handling the food waste.

Besides, this study also can educate governments to conduct more campaigns to educate people on reducing food waste. Likewise, it also gives a benefit for the governments such as Ministry of Housing and Local Government and also Solid Waste Corporation (SWCorp) to make new policies regarding on reducing food waste, conducting intervention in coping with food waste issues.

CONCLUSION

The purpose of this research is to discuss the validity and reliability of measurement instruments that are used in research. Validity concerns what an instrument measure, and how well it does so. Regarding the degree to which any measuring instrument controls for random error, reliability refers to the level of credibility that may be placed in the result obtained via the use of an instrument. When conducting research, validity and reliability are crucial factors to take into account. Validity and reliability tests must be conducted with great attention in order to provide quality research. In the study, we found that although a reliable tool is not always valid, a valid tool must be reliable. We have also taken into account the risk that good research can present to validity and reliability.

As a conclusion, a study conducted at a larger scale is needed. The findings will be more meaningful that can be used by the local authorities in providing new guidelines, and in educating and providing suitable intervention among Malaysian citizens related to food waste management also understand how people manage food to avoid wastage and ensure food security among family members.

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Universiti Teknologi MARA
Cawangan Perak
Kampus Seri Iskandar
32610 Bandar Baru Seri Iskandar,
Perak Darul Ridzuan, MALAYSIA
Tel: (+605) 374 2093/2453 Faks: (+605) 374 2299

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