News Exposure, Knowledge and Awareness of Waste Problems of People in Khaoroopchang, Songkhla province vis-à-vis Their Household Waste Management Behaviors

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Abstract

This research aimed to: 1) examine news exposure about waste problems and the knowledge and awareness of these waste problems, including studying household waste management behavior of the people in Khaoroopchang Municipality, Songkhla province; and 2) determine the relationship between news exposure and the knowledge, awareness, and waste management behavior of the people in Khaoroopchang Municipality, Songkhla province. The population of this research included heads of household or representatives whose house is located in Khaoroopchang Municipality. The sample size was calculated by using the Taro Yamanese formula. Systematic and proportional sampling was also used to determine the population. The sample of this research consisted of 401 heads of household or representatives. Percentage (%), mean ($\bar{x}$), standard deviation (S.D.), and Pearson's chi-square were applied to analyze the data.

The findings showed that most of the samples received news about waste problems from mass media. Overall, most of the samples have knowledge on waste problems at a very good level. Similarly, the awareness of waste problems was also at a high level. Considering each aspect, the study revealed that the awareness of the importance of waste problems was at a high level, while household waste management behavior was found at a good level. Moreover, it showed that the behavior in reducing the amount of waste, waste collection and sorting, and waste disposal behavior were all at a good level. In regard to the relationship between news exposure about waste problems from mass media and the knowledge on solid waste problems, a significant difference was found. However, there was no relationship between news exposure and the awareness of waste problems. As for the relationship between news exposure and household waste management behavior, there was a statistically significant difference when comparing mass media, personal media, and traditional media with household waste management behavior. In addition, the research found that knowledge on waste problems was statistically significant and correlated with the awareness of waste problems. Likewise,

there was a significant relationship between the awareness of waste problems and waste management behavior.
Keywords: News exposure, Knowledge, Awareness, Household waste management behavior, Songkhla province

Introduction

Songkhla is one of the southern provinces that is experiencing an increase in the amount of waste. In 2012, Songkhla province had the second highest amount of waste in Thailand. The amount of waste found in Songkhla was 1,013 tons/day (Southern Environmental Quality Management Plan 2013-2016) and later increased to 1,594 tons/day, divided into 1,058 tons/day of municipal waste and 563 tons/day of waste generated in the local administrative organization (Songkhla Waste Management Plan for the 5-year period 2015-2019). Due to the increase in the amount of waste, it was beyond the capacity of the local administrative organization to eliminate all the waste, thus, resulting in the accumulation of 2,471,840 tons of waste. As a result, Songkhla is becoming a dirty province and has been regarded as Number 1 for having the most tons of accumulated waste in the country (Songkhla Waste Management Plan for the 5-year period 2015-2019). Thus, the government has designated Songkhla province as an urgent target area (6 months) for the pilot model of waste management, specifically addressing hazardous waste from communities.

The sectors involved in waste management in Songkhla province have used the mentioned concepts as a guideline to solve the problem. In 2013, the Office of Environment Area 16 had implemented a project called "Reduce, Reuse, and Recycle (3R)" in 47 municipalities around Songkhla under the theme "Beautiful City without Pollution," publicizing the campaign through various media to educate the public about waste management. This included supporting the operations of the Songkhla Provincial Administrative Organization in promoting the campaign for people and agencies in all sectors in Songkhla province to educate them on separating hazardous waste from general waste and later delivering those waste to the local administrative organization in the area for proper disposal.

Although the government has already publicized the campaign to solve waste problems, it appears that the amount of waste in Songkhla has still not decreased but rather emerged as Number 1 in the country in terms of accumulated waste. Meanwhile, though some local organizations have launched the campaign on how to separate hazardous waste from general waste, it was found that most of the hazardous waste was still mixed with general waste (Songkhla Waste Management Plan for the 5-year period 2013-2016). Therefore, the research team raised questions on whether the public received the news or information from public relations; specifically about the ways the public was exposed to news on waste problems, whether they knew proper household waste management, their degree of awareness on waste problems, and their behavior in managing their household waste. Khaoroopchang Municipality was the focus area of this study because it is rapidly expanding into a city causing a large amount of waste each day, where the average amount of waste is 25-50 tons/day. The results from this research will be useful to the involved agencies, which can be applied to public relations planning in order to solve waste problems in the area.

Research objectives

1. To examine news exposure related to waste problems and the knowledge and awareness of these waste problems, including household waste management behavior of people living in Khaoroopchang Municipality, Songkhla province

2. To determine the relationship between news exposure and the knowledge, awareness, and waste management behavior of the people living in Khaoroopchang Municipality, Songkhla province

Research hypotheses

1. News exposure related to waste problems has a relationship with knowledge on household waste management for people in Khaoroopchang Municipality, Songkhla province.

2. News exposure related to waste problems has a relationship with the awareness of waste problems for people in Khaoroopchang Municipality, Songkhla province.

3. News exposure related to waste problems has a relationship with the household waste management behavior of the people in Khaoroopchang Municipality, Songkhla province.

4. Knowledge on waste problems is correlated with the awareness of waste problems for people in Khaoroopchang Municipality, Songkhla province.

5. Awareness of waste problems is correlated with the waste management behavior of people in Khaoroopchang Municipality, Songkhla province.

Research methodology

1. Research scope

1.1 The target group used in this research comprised of households located in Khaoroopchang Municipality, Songkhla province. Khaoroopchang Municipality is being transformed into an urban area with greater prosperity, causing more people to move and live there and subsequently increasing the amount of household waste as well. This survey research collected data from heads or representatives of households, both male and female, in order to obtain information about household waste management. The sample size was calculated by using the Taro Yamanese formula. Systematic and proportional sampling was also used to determine the total population (18,248 households) from all 10 villages. The calculated sample size was 391 people and increased to 401 people for this research.

1.2 The variables in this research are as follows:

- The independent variable is the news exposure for the people in Khaoroopchang Municipality, Songkhla province.

- The dependent variables consist of the knowledge on waste problems, awareness of waste problems, and waste management behavior of people in Khaoroopchang Municipality, Songkhla province.

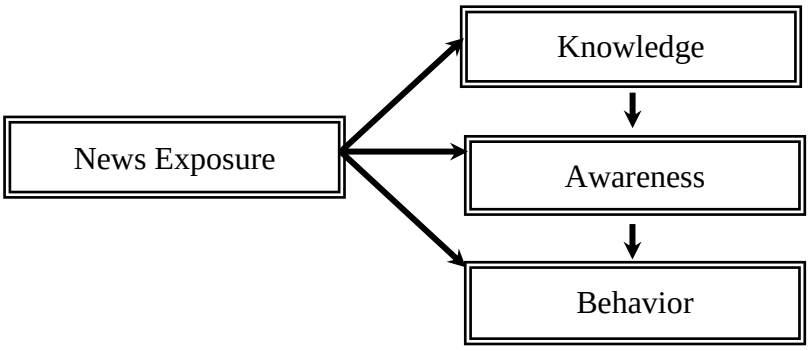

Figure 1 Conceptual framework

2. Procedure

To achieve the research objectives, the research team had created an instrument with the following steps:

2.1 Examine relevant documents and research, and visit the area in Khaoroopchang Municipality to study and seek for information to write the research proposal and create a questionnaire covering issues regarding the basic information of the respondents, news exposure about solid waste problems, knowledge on household solid waste management, awareness of waste problems, and household waste management behavior.

2.2 Create a questionnaire with the following details:

2.2.1 The questionnaire consisted of 6 parts which are as follows:

Part 1. Basic information (demographical data) of the respondents consisted of 13 items including gender, religion, age, education, career, income, and number of family member.

Part 2. News exposure about waste problems consisted of 5 items related to follow-up news from various media, receiving news about waste and waste problems from various media, and participating in the recycle waste donation activity or Sor Dah Kor activity. Respondents were asked to select from two answer choices (receive or not receive / watch or not watch / ever or never).

Part 3. Knowledge on waste problems consisted of 3 sections with a total of 30 items as shown in Table 1. This part was a closed-ended questionnaire with two answer choices (yes or no).

Table 1 Questionnaire on knowledge on waste problems in 3 sections

Section	Issues	Number of items
Section A	Knowledge on the definition and types of waste	12 items
Section B	Knowledge on the effects of waste problems	9 items
Section C	Knowledge on waste problem solving	9 items
	Total	30 items

Part 4 . Awareness of waste problems consisted of 10 positive statements and 10 negative statements to determine the awareness of the respondents on waste problems. A rating scale was used to rate their awareness of waste problems in 5 levels as follows: strongly agree (positive = 5, negative = 1), agree (positive = 4, negative = 2), unsure (3), disagree (positive = 2, negative = 4), and strongly disagree (positive = 1, negative = 5).

Part 5. Household waste management behavior consisted of positive statements and negative statements to examine the respondents' practice or behavior in household waste management. A rating scale was used to determine the level of the respondents' practice or behavior in household waste management, where the respondents were asked to select from 4 levels of practice as follows: "always" (positive = 3, negative = 0), "often" (positive = 2, negative = 1), "sometimes" (positive = 1, negative = 2), and "never" (positive = 0, negative = 3).

Part 6. Suggestions were solicited through an open-ended question.

2.2.2 Research Instrument Validity Testing

- Content validity testing of the questionnaire was examined by three experts and then analyzed with the Item-Objective Congruence Index (IOC). Only the items with an IOC value of 0.5 or more were selected (Tirakanant, 2008). The questionnaire was then piloted with 30 people in Songkhla Municipality and analyzed for question selection.

- The quality of the questions on knowledge on solid waste was analyzed by means of the technique 25% high, low. Then, the Index of Difficulty (P) and the Discrimination Power or (r) was determined, and the questions that possessed a P value between 0.2-0.8 and a r value of 0.2 or more were selected (Kitpridaborisut, 1988). The reliability of the knowledge test (questionnaire in Part 3) was tested by the KR-20 and had a reliability value score of 0.82.

- The quality of questions on awareness and household waste management behavior (designed as a rating scale questionnaire) was determined for reliability by using the Cronbach's Alpha coefficient. It was found that the reliability of the questions on awareness was at 0.86, while the reliability for household waste management behavior was at 0.75.

2.3 Launch the questionnaire at the selected area.

2.4 Analyze the data and compose the results, discussion, and conclusions in preparation of the full research paper.

3. Data collection

Sets of questionnaires were used to collect data from samples in 10 villages, where a sample consisted of 1 representative of each household from a total of 401 households.

4. Data analysis

Statistical software packages were run to analyze the data.

4.1 Descriptive statistics were presented as mean, standard deviation, frequency, and percentage.

4.1.1 Frequency and percentage were used to report the basic information of samples, news exposure, and information perception. Two types of statistical analysis were

employed to analyze the knowledge on waste problems. Frequency and percentage were used to analyze each item, while the scores of individual samples were divided according to the score range at four levels.

4.1.2 Average ($\bar{x}$) and standard deviation (S.D.) were used to analyze the awareness of waste problems, divided into five levels of positive statements and negative statements. The Likert scale was employed with three purposes: 1) to analyze the overall awareness (Rueangsuwan, 1990), 2) to group samples based on individual awareness scores divided into four levels, and 3) to analyze the household waste management behavior divided into four levels. For the positive and negative statements, the Likert scale was also used to analyze each statement and to group the samples based on the individual scores divided into four levels.

4.2 Analytical statistic was conducted with Chi-square at 0.05 level. The Chi-square test was performed to analyze the relationship between news exposure and a respondent's knowledge, awareness, and household solid waste management behavior.

Results

Research findings

The results are shown as follows:

Basic information of samples (Demographical data)

Table 2 Demographical data

Variable	Number	Percentage (%)
Gender		
Male	137	34.2
Female	264	65.8
Total	**401**	**100**
Religion		
Buddhist	357	89
Muslim	44	11
Total	**401**	**100**
Age		
Not over 20 years	17	4.2
21-30 years	62	15.5
31-40 years	62	15.5
41-51 years	105	26.2
51-60 years	83	20.7
Over 61 years	72	18
Total	**401**	**100**
Education		
Grade 6	56	14
Grade 9	49	12.2
Grade 12 / Vocational Certificate	72	18
Diploma / High Vocational Certificate	59	14.7

Variable	Number	Percentage (%)
Bachelor's Degree / Higher Education	115	28.7
Others	50	12.5
Total	**401**	**100**
Career		
Employee	67	16.7
Company employee	18	4.5
Merchant	120	29.9
Personal business	62	15.5
Agriculturist	7	1.7
Government enterprise / State enterprise	54	13.5
Fisherman	1	0.2
Housewife	42	10.5
Student	19	4.7
Others	11	2.7
Total	**401**	**100**
Income		
Less than 5,000 baht	103	25.9
5,001-10,000 baht	117	29.5
10,001-15,000 baht	74	18.6
15,001-20,000 baht	32	8.1
20,001-25,000 baht	21	5.3
More than 25,000 baht	50	12.6
Total	**397**	**100**
Family Members		
1-3 people	183	45.6
4-6 people	188	46.9
More than 6 people	30	7.5
Total	**401**	**100**
Duration of living in the community		
Not over 5 years	77	19.2
6-10 years	69	17.2
11-15 years	55	13.7
16-20 years	40	10
More than 20 years	160	39.9
Total	**401**	**100**

Table 2 shows that most of the respondents are females and Buddhists. Half of the respondents are between 41-60 years old, and mostly holding a bachelor's degree or higher education. Most of the respondents are merchants with an average income/month of 5,001-10,000 baht. Most households have 4-6 family members; however, households with 1-3 family members also had a similar proportion to households with 4-6 family members. The sample group was comprised mostly of people who have lived in the community for over 20 years.

Table 3 Sorting waste/disposing waste

Sorting Waste / Disposing Waste	Number	Percentage (%)
Sorting waste before disposal		
No	156	38.9
Yes	245	61.1
Total	**401**	**100**
Disposing waste		
At the provided point by the municipality	375	93.5
At waste landfills / open burning	11	2.7
At locations based on convenience	10	2.5
Others	5	1.2
Total	**401**	**100**
Support for sorting containers at the dumping point		
With support	89	22.2
Without support	312	77.8
Total	**401**	**100**

Table 3 shows that most of the respondents' households have sorted waste before disposal, and over 90% of the samples disposed of their waste within the provided point by the municipality. However, it was found that 80% of the respondents that live in the community did not separate containers for each type of waste.

1. News exposure about solid waste and knowledge, awareness, and household waste management behavior of people in Khaoroopchang Municipality, Songkhla province, in regard to solid waste problems

1.1 News exposure for people in Khaoroopchang Municipality, Songkhla province

Table 4 News exposure about waste problems

News Exposure about Waste	Number	Percentage (%)
Mass Media		
Radio	174	9.4
Television	325	17.6
Newspaper / magazine	171	9.2
Online Media		
Internet	190	10.3
Social media (Line / Facebook)	176	9.5
Community Media		
Village broadcast	149	8.1
Brochure / leaflet	106	5.7
Billboard	186	10.1
Personal Media		

News Exposure about Waste	Number	Percentage (%)
Personal media in community	198	10.7
Government officials	174	9.4
Total	**1,849**	**100**

Table 4 reveals that the most popular media used to follow daily news was the television (29.60%). Media was grouped into mass media, online media, community media, and personal media. It was shown that mass media still acted as the greatest source of news about waste problems to the sample group.

Table 5 Perception and participation in the Sor Dah Kor activity

Perception / Participation in activity	Number	Percentage (%)
Perception of recycle waste donation activity and Sor Dah Kor		
Don't know	181	45.1
Know	220	54.9
Total	**401**	**100**
Participation in recycle waste donation activity and Sor Dah Kor		
Have participated in activity	169	42.1
Have not participated in activity	232	57.9
Total	**401**	**100**

Table 5 reveals that most of the respondents (54.60%) have been informed that there are recycle waste donation activity and Sor Dah Kor, a traditional Muslim activity where people willingly donate money or unused items to others without coercion, which are held by the Khaoroopchang Municipality to solve waste problems in the area. Nonetheless, 57.90% of the respondents didn't participate in the aforementioned activities.

1.2 Knowledge on waste problems of people in Khaoroopchang Municipality, Songkhla province

The results of the knowledge on waste problems (knowledge on the meaning, types of waste, knowledge on the effects of solid waste, and knowledge on waste problem solving) were found as follows:

1.2.1 Knowledge on waste problems was classified by the following items:

- Knowledge on the definition and types of waste: The results showed that most of the respondents have an accurate knowledge and understanding of the definition and types of solid waste. The percentage of respondents who answered correctly ranged from 63.3% to 97.3%. The item that had the lowest percentage was for "wet and dry waste characteristics" (63.3%), whereas "the definition of recycling waste" garnered the highest score (97.30%).

- Knowledge on the impact of solid waste: The results showed that most of the respondents have correct knowledge and understanding about the effects of solid waste. The percentage of people who answered each question correctly ranged from 76.00% to 95.00%.

However, this research found that the greatest percentage of incorrect answers (53.60%) was in regard to hazardous waste disposal such as the disposal of dry battery and expired battery.

- Knowledge on waste problem solving: The results showed that most of the respondents have knowledge and understanding about how to solve waste problems. Over 90% of the questions (8 items out of 9) were answered correctly.

1.2.2 Individual knowledge on waste problems:

Table 6 Scores of individual knowledge on waste problems

Knowledge Range	Level	Number	Percentage (%)
23-30	Very good	324	81.2
16-22.5	Good	60	15
8-15	Fair	15	3.8
0-7.5	Low	0	0
	***Total**	**399**	**100**

Table 6 shows that the individual knowledge scores revealed that the majority of the respondents (81.20%) had a good level of knowledge on waste problems. There was nobody who had a low level of knowledge on waste problems among the samples.

1.3 Awareness of waste problems of people in Khaoroopchang Municipality, Songkhla province

The results on the awareness of waste problems (importance, effects, and role of households in solving waste problems) are shown below:

1.3.1 Awareness of waste problems was classified by the following items:

- Awareness of the importance of waste problems: The results showed that the respondents were aware of the importance of waste problems at a moderate to high level. The item which had the highest level was "awareness of creating a campaign with a relevant sector for people to jointly solve waste problems" ($\bar{x}$ = 4.56, S.D. = 0.72). Considering the overall awareness of the importance of waste problems, it was at a high level ($\bar{x}$ = 3.08, S.D. = 0.54).

- Awareness of the effects of waste problems: The results showed that the respondents were aware of the effects of waste problems at a moderate to high level. The highest mean score was "the awareness of waste problems can affect people's health if it is not urgently resolved" ($\bar{x}$ = 4.32 S.D. = 1.01). Considering the overall awareness of the effects of waste problems, it was at high level ($\bar{x}$ = 3.79, S.D. = 0.68).

- Awareness of the role of households in solving waste problems: The findings revealed that the respondents were aware of the role of households in solving waste problems at a moderate to high level. The item with the highest mean score was "the awareness of waste sorting before disposal is necessary for everyone" ($\bar{x}$ = 4.47, S.D. = 0.68). Considering the overall awareness of the role of households in solving waste problems, it was found at a high level ($\bar{x}$ = 4.01, S.D. = 0.61).

Table 7 Awareness of waste problems

Awareness	n	Mean ($\overline{X}$)	(S.D.)	Level
1. Awareness of the importance of waste problems	400	3.88	0.54	**High**
2. Awareness of the effects of waste problems	400	3.79	0.68	**High**
3. Awareness of the role of households in solving waste problems	400	4.01	0.61	**High**

1.3.2 Individual awareness of waste problems:

Table 8 Scores of individual awareness of waste problems

Awareness Range	Level	Number	Percentage (%)
81-100	Very high	164	41.5
61-80	High	200	50.6
41-60	Moderate	31	7.8
20-40	Low	0	0
	***Total**	**395**	**100**

Table 8 shows that the individual awareness scores consisting of four levels revealed that half of the respondents (50.60%) had a high level of awareness, and 41.50% had a very high level of awareness.

1.4 Household waste management behavior of people in Khaoroopchang Municipality, Songkhla province

The results of household waste management behavior (household waste reduction, waste collection and waste sorting, and waste disposal/disposal behavior) are shown below:

1.4.1 Household waste management behavior was classified by the following items (according to Table 9)

Table 9 Household waste management behavior

Household Waste Management Behavior	n	Mean ($\overline{X}$)	(S.D.)	Level
1. Household waste reduction	400	1.85	0.57	Good
2. Waste collection and sorting	400	1.76	0.53	Good
3. Waste disposal	400	2.15	0.53	Good

- Household waste reduction: The results showed that the respondents had waste reducing behavior at a moderate level to very good level. The item with the highest score (very good level) was "reducing the amount of waste by using refilled products" ($\bar{x}$ = 2.28, S.D. = 0.86), whereas "the behavior of reducing the amount of waste by using baskets or woven bags instead of plastic bags" was still at a fair level ($\bar{x}$ = 2.28, S.D. = 0.97). Considering the overall reduction behavior of household waste management, it was found at a good level ($\bar{x}$ = 1.85, S.D. = 0.57).

- Waste collection and sorting: The results revealed that the respondents collected and sorted their waste before disposal at a moderate level to good level, respectively. The item with the highest average value was "some types of waste have been separated for sale" ($\bar{x}$ = 2.16, S.D. = 0.93). "Disposing of foam, plastic bags, and noodles sachets along with other wastes" was at a moderate level. In general, the overall waste collection and sorting behavior was found at a good level ($\bar{x}$ = 1.76, S.D. = 0.53).

- Waste disposal behavior: It was found that the respondents' behavior on waste disposal was at a moderate level to very good level. The highest mean score was "the guidelines for proper waste disposal; no disposing of waste at the back of the house" ($\bar{x}$ = 2.55, S.D. = 0.88). However, this study found that not many respondents contributed food waste, including vegetable and fruit waste, for making fertilizer, which was at a moderate level ($\bar{x}$ = 1.17, S.D. = 1.14). In general, the overall waste disposal behavior was found at a good level ($\bar{x}$ = 2.15, S.D. = 0.53).

1.4.2 Individual household waste management behavior:

Table 10 Scores of individual household waste management behavior

Behavior Range	Level	Number	Percentage (%)
46-60	Very Good	65	16.3
31-45	Good	286	71.9
16-30	Fair	47	11.8
0-15	Poor	0	0
	***Total**	**398**	**100**

Table 10 shows that the individual scores on household waste management behavior revealed that almost 3/4 of the respondents (71.9%) had a good level of waste management behavior. None of the respondents had a poor level.

2. The relationship between news exposure and the knowledge, awareness, and waste management behavior of the people in Khaoroopchang Municipality, Songkhla province

2.1 The relationship between news exposure about waste problems and the knowledge on waste problems.

Table 11 Relationship between news exposure and knowledge on waste problems

News Exposure	Knowledge on Waste Problems			Chi Sq. (sig.)
	Fair	Good	Very Good	
Mass Media				
Receive (n = 337)	3.0 (10)	13.9 (47)	81.1 (280)	6.616
Not receive (n = 61)	8.2 (5)	21.3 (13)	70.5 (43)	(0.037)*
Online Media				
Receive (n = 204)	3.9 (8)	11.8 (24)	84.3 (172)	3.583
Not receive (n = 194)	3.6 (7)	18.6 (36)	77.8 (151)	-0.167
Community Media				
Receive (n = 247)	3.6 (9)	13.8 (34)	82.6 (204)	0.934
Not receive (n = 151)	4.0 (6)	17.2 (26)	78.8 (151)	-0.627
Personal Media				
Receive (n = 234)	3.0 (7)	17.5 (34)	79.5 (186)	3.359
Not receive (n = 164)	4.9 (8)	11.6 (19)	83.5 (137)	-0.186
Traditional Media				
Receive (n = 220)	4.5 (10)	17.7 (39)	77.7 (171)	3.895
Not receive (n = 179)	2.8 (5)	11.7 (21)	85.5 (153)	-0.143

Table 11 reveals that the relationship between news exposure about waste problems from the mass media and knowledge on waste problems by the respondents were statistically significant ($\chi^2 = 6.616$, $p = 0.037$). Considering news exposure from other media, it was found that there was no relationship with knowledge on waste problems among the sample group.

2.2 The relationship between news exposure and the awareness of waste problems

Table 12 Relationship between news exposure and the awareness of the waste problems

News Exposure	Awareness of Waste Problems			Chi Sq. *(sig.)
	Moderate	High	Very High	
Mass Media				
Receive (n = 333)	6.6 (22)	50.2 (167)	43.2 (144)	5.783
Not receive (n = 62)	14.5 (9)	53.2 (33)	32.3 (20)	-0.055
Online Media				
Receive (n = 201)	9.0 (18)	47.3 (95)	43.8 (88)	2.061
Not receive (n = 194)	6.7 (13)	54.1 (105)	39.2 (76)	-0.357
Community Media				
Receive (n = 245)	8.6 (21)	49.4 (121)	42.0 (103)	0.67
Not receive (n = 150)	6.7 (10)	52.7 (79)	40.7 (61)	-0.715
Personal Media				
Receive (n = 232)	8.6 (20)	50.4 (117)	40.9 (95)	0.476
Not receive (n = 163)	6.7 (11)	50.9 (83)	42.3 (69)	-0.788

News Exposure	Awareness of Waste Problems			Chi Sq. *(sig.)
	Moderate	High	Very High	
Traditional Media				
Receive (n = 217)	8.8 (19)	52.1 (113)	39.2 (85)	1.479
Not receive (n = 179)	6.7 (12)	48.6 (87)	44.7 (80)	-0.477

Table 12 reveals that there was no relationship between news exposure about waste problems and the awareness of waste problems among the sample group.

2.3 The relationship between news exposure and household waste management behavior.

Table 13 Relationship between news exposure and household waste management behavior

News Exposure	Household Waste Management Behavior			Chi Sq. *(sig.)
	Fair	Good	Very Good	
Mass Media				
Receive (n = 336)	9.2 (31)	72.9 (245)	17.9(60)	15.594
Not receive (n = 62)	25.8 (16)	66.1 (41)	8.1 (5)	(0.000)*
Online Media				
Receive (n = 204)	8.8 (18)	76.0 (155)	15.2 (31)	4.478
Not receive (n = 194)	14.9 (29)	67.5 (131)	17.5 (34)	-0.107
Community Media				
Receive (n = 248)	9.3 (23)	73.8 (183)	16.9 (42)	4.069
Not receive (n = 150)	16.0 (24)	68.7 (103)	15.3 (23)	-0.131
Personal Media				
Receive (n = 235)	7.7 (18)	74.0 (174)	18.3 (43)	10.105
Not receive (n = 163)	17.8 (29)	68.7 (112)	13.5 (22)	(0.006)*
Traditional Media				
Receive (n = 220)	9.5 (21)	53.7 (154)	20.5 (45)	7.551
Not receive (n = 179)	14.5 (26)	46.3 (133)	11.2 (20)	(0.023)*

Table 13 shows that there was a statistically significant difference between news exposure ($\chi^2 = 15.594$, $p = 0.000$), personal media ($\chi^2 = 10.105$, $p = 0.006$), and traditional media ($\chi^2 = 7.551$, $p = 0.023$) and household waste management behavior.

2.4 The relationship between knowledge and awareness of waste problems.

Table 14 Relationship between knowledge and awareness of waste problems

Awareness of Waste Problems	Knowledge on Waste Problems			Chi Sq.
	Fair (n = 15)	Good (n = 60)	Very Good (n = 320)	*(sig.)
Moderate	73.3 (11)	25.0 (15)	1.6 (5)	150.207
High	26.7 (4)	65.0 (39)	49.1 (157)	(0.000)*
Very High	0.0 (0)	10.0 (6)	49.4 (158)	

Table 1 4 shows that the relationship between knowledge and awareness of waste problems was statistically significant ($\chi^2 = 150.207$, $p = 0.000$).

2.5 The relationship between awareness and household waste management behavior

Table 15 Relationship between awareness and household waste management behavior

Household Waste Management Behavior	Awareness of Waste Problems			Chi Sq.
	Moderate (n = 31)	High (n = 200)	Very High (n = 164)	(sig.)
Fair	32.3 (10)	14.5 (29)	4.9 (8)	37.658
Good	64.5 (20)	75.5 (151)	68.9 (113)	(.000)*
Very Good	3.2 (1)	10.0 (20)	26.2 (43)	

Table 15 shows that the relationship between awareness and household waste management behavior was statistically significant ($\chi^2 = 37.658$, $p = 0.000$).

Discussion

Several interesting findings of this research were found as follows:

1. News exposure for people in Khaoroopchang Municipality, Songkhla province

The results of this research found that mass media, especially radio and television, was the media which served as the respondents' channels to follow the news. Mass media had more action in providing news about waste problems than any other media. This indicated that mass media still plays an important role in news to provide surveillance of the environment by gathering truth from various news sources based on the concept of Harold D. Lasswell (Trisakul, 2004). Moreover, it was found that the sample group in this study still received news from television similar to the research results of Prajongsangsri and Follet (2014), who studied the behavior of Thai people in their exposure to television as compiled by Nielsen Media Research. However, the research found that the behavior of Thai people in their exposure to

television had changed with less people watching television. A number of viewers over 50 years old, however, were prone to have a continuous increase of watching television by about 1-2%. This finding was in accordance with the present study in that most of the respondents who watched television are over 40 years old. In addition, the research results on news exposure for the sample group were in accordance with the study of Borirak (2006), which was titled, "Participation Model in Environmental Management in the Community: A Case Study of Solid Waste Management in the Community in Khaoroopchang Sub-district Administrative Organization, Muang District, Songkhla province." It was found that 62.79% of the residents in Khaoroopchang Municipality received news about waste problems from mass media. News exposure from television (20.27%) was slightly lower than from newspaper and radio (21.26%). This pointed out that television media is still the most accessible channel for people to receive news about waste problems.

Interestingly, Khaoroopchang Municipality has applied the Muslim tradition of "Sor Dah Kor" as a medium to gain participation from people in order to help solve waste problems. Most of the respondents had been informed that there was the Sor Dah Kor activity held in the area; however, they did not join the activity. This traditional media is consistent with the traditional culture of the community, which is an interesting issue that should be further investigated regarding traditional media and waste problem solving. This is because there was a statistically significant difference between traditional media and household solid waste management behavior.

2. Knowledge on waste problems

The results of the respondents' knowledge on waste problems showed that overall 81.2% of their knowledge was good. In relation to knowledge on "definition and types," "effects of waste problems," and "waste problem solving," it was found that 36.7% of the respondents did not know the definition of wet and dry waste and answered that question incorrectly.

As for knowledge on the effects of waste problems, it was found that "the proper way of hazardous waste disposal (e.g. dry battery and expired battery)" was answered incorrectly the most (56.3%), whereas "knowledge of waste problem solving" was answered correctly the most (90%). It indicated that the respondents had a very good level of knowledge on waste problem solving. However, 25.4% of the respondents answered incorrectly the question about using refilled products to reduce the amount of waste. Therefore, more information should be given about the "definition and types of wet and dry waste" in order to differentiate between these two types of waste.

This study found that the respondents had a very good level of knowledge on solid waste problems. It can be assumed that waste problems in the present is a nationally important issue in accordance with the Solid Waste Management Plan, Songkhla province (during the 5 years of 2015-2019), which showed that Songkhla province was Number 1 in the country for the highest accumulated waste. Therefore, they were alert to solving waste problems. Various sectors, therefore, have launched campaigns to provide knowledge and create understanding about waste problems through various media. The findings was in accordance with Kaewprayoon (2015), who studied about the knowledge, attitude, and household waste management behavior

of people in Khuanlang Municipality, Hat Yai District, Songkhla province, which found that people living in Khuanlang Municipality had knowledge on household solid waste management at a high level. The findings of the present study also corresponded with Kiddee, Kaewwong, and Puk-ngam (2007), who studied about the knowledge, attitude, and waste management behavior of people in Pa Phayom District, Phatthalung Province. The results revealed that the participants had knowledge about general principles of waste management at a high level at 82.5%, which was in accordance with the results of Khaositthiwong (2011) who did a study titled, "Correlated Factors of Public Participation in Solid Waste Recycling : A Case Study of Yannava and Bangkapi Districts." The research found that the sample group had a high level of knowledge on solid waste sorting. In contrast, Klinhom (2010), who did a study titled, "Knowledge, Attitude, and Waste Management Behavior of the People in the Municipality of Janjawa, Mae Chan District, Chiang Rai Province," found that the participants had an overall knowledge on solid waste management at a moderate level.

3. Awareness of waste problems

The results of this study showed that half of the respondents generally have a high level of awareness of waste problems. Considering each aspect of "Awareness of the importance of the waste problems," "Awareness of the effects of the waste problems," and "Awareness of the role of households in solving problems," it was found that the respondents had a high level of awareness because various organizations, both local and national, have given importance to this issue and created campaigns about waste problems to promote important government policy. Most Thai people, thus, are aware of waste problems.

However, although most of the respondents, in general, had a high level of awareness of waste problems, when each aspect was examined closely, it was found that many items (e.g. "the importance of waste problems") were at a moderate level. The respondents considered other problems to be more urgent than the need to solve waste problems. In relation to the effects of waste problems, the respondents viewed burning garbage as a way to reduce toxic gas or dispose of hazardous waste. For instance, 53.6% of the respondents provided an incorrect answer about burying dry battery as a good and convenient way to dispose of household waste. With regard to the awareness of households in solving waste problems, the results revealed that the respondents perceived solving waste problems as a duty of the government sectors. They also perceived that sorting household waste for sale or disposal was not worthwhile.

Therefore, a campaign to be held in Khaoroopchang Municipality to increase the awareness of waste problems would further imply that waste problems are just as important as any other problems. Every household should pay more attention and be aware of the effects of improper hazardous waste disposal. Government sectors should also create campaigns to build understanding and demonstrate the benefit of waste sorting for sale or disposal. In other words, this research found that knowledge on waste problems was correlated with awareness of waste problems.

4. Household waste management behavior of people in Khaoroopchang Municipality, Songkhla province

The results of the research showed that the overall household waste management behavior of the respondents was at a good level. This was probably because most of the respondents had a high level of awareness of waste problems, which resulted in a good level of household solid management behavior. The reason is because this research found that there was a statistically significant difference between awareness of waste problems and household waste management behavior. This was in accordance with the results of Klinhom (2010), who studied about the knowledge, attitude, and behavior of waste management of people in Janjawa Municipality, Mae Chan District, Chiang Rai Province; and with the results of Kaewprayoon (2015), who studied about the knowledge and perspectives and household waste management behavior of people in Khuanlang Municipality, Hat Yai District, Songkhla province. The findings revealed that there was a statistically significant relationship between knowledge and attitude towards household waste management and behavior of household waste management.

Recommendations

1. Research recommendations

1.1 The results of the research found that overall the sample group received news about waste problems from community and personal media. Hence, if Khaoroopchang Municipality utilizes mass media as a tool to enhance people's knowledge on waste problems, it will, to a certain extent, help reduce waste problems in Khaoroopchang Municipality.

1.2 The news content that is publicized to people in Khaoroopchang Municipality should include the definition of wet and dry waste, hazardous waste disposal, and the reduction of waste by using refilled products. Apart from this, government sectors should create a campaign to raise awareness for people in solving waste problems, which is not only the government's duty but an important duty of every household. Campaigns on waste sorting and using baskets or cloth bags instead of plastic bags should also be seriously promoted.

1.3 Government sectors should encourage the public to dispose certain types of waste, such as food scraps (e.g. vegetables and fruits), for composting since this research has found that waste disposal behavior was at a good to very good level. However, the behavior of using waste to make compost was still at a moderate level.

2. Recommendations for further research

2.1 Further research should study the factors or demographic characteristics in regard to news exposure about solid waste problems.

2.2 Further investigation should examine the role of traditional media in regard to recycling waste, holding donation activities, and solving waste and environmental problems.

2.3 The role of personal media in solving waste problems needs further research.

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