An Analysis of Factors Influencing Mask Waste Management in the Chon Buri Community

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Abstract
This research aims to study (1) the current problems in mask waste management, (2) the relationship between variables and influencing factors for the participation in mask waste management in the Chon Buri community. The research applies a mixed-method approach. The data is analyzed through calculation of mean and standard deviation values, Pearson correlation coefficient, multiple regression, and content analysis. The result shows that (1) waste management knowledge level of respondents is moderate (49.25%); (2) attitude towards waste management level is moderate (66.5%); (3) behavior in waste management level is high (53.75%), and (4) participation in waste management activities level is moderate (66.50%). The core root problem in mask waste management is the lack of general knowledge and a good understanding of individuals (37.50%). The forecast variables influencing the participation in mask waste management in the Chon Buri community are the behavior of waste separation, collection, transportation, information perception from community media, and attitude towards solid waste disposal. Moreover, significant relationships between factors have influenced with participation, (R) = 0.312, (R2) = 9.7% and (SEest) = 0.578. Problems of local organizations are categorized as the source, midway, and destination. The main obstacles are the shortage of proper garbage collection bins, the inadequacy of mask waste collection point separating from other types of waste, as well as the lack of proper mask waste collection and disposal management.
Keywords: Community Participation, Local Organizations, Mask Waste, Waste Management

Introduction
Since the outbreak and the detection of coronavirus disease, 2019 (COVID-19) was an infectious disease caused by the SARS-CoV-2 virus in China. It was declared a global pandemic by World Health Organization. It has a lasting impact on almost every area of life in society and has also raised concerns about the contamination risks associated with waste management (Penteado & Castro, 2021). The usage of face masks has been an essential safety measure to protect the public and health workers from viral infection. (Smith & Freedman, 2020; Lin, 2020; Chintalapudi et al., 2020). Moreover, wearing a hygienic protective face mask slows the rate of COVID-19 transmission from person to person (World Health Organization,

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2020: 2; Wu et al., 2020; Zhai, 2020). The disposable or single-use face mask was made from polymers such as polypropylene, polyurethane, polyacrylonitrile, polystyrene, polycarbonate, polyethylene, or polyester. It consisted of three layers, an inner layer (soft fiber), a middle layer (melted filter), and an outer layer (nonwoven fiber which was waterproof and often colored). The fusible filter was the main filter layer of the mask produced by microfabrication and conventional nanofibers where the molten polymer was pressed through a small nozzle by high-speed blowing gas (Dutton, 2008). Both physical and chemical characteristics of community waste have been changed during the pandemic (Kahlert & Bening, 2020). However, the same protective materials become polluted when inappropriately disposed of in the environment, causing exacerbating social and environmental problems such as pollution in water supplies from plastics (Sousa, 2020; Das et al., 2021). Land and marine environment were threatened with massive amounts of plastic waste due to improper disposal worldwide, especially in developing countries. Contaminated used protective materials have reached the oceans, where they will inevitably produce plastic particles alongside other pathogenic diseases (Haque et al., 2021). In addition, the waste of the face masks with plastic components also affects the environment, ecosystems, soil, water resources, seawater and may also harm aquatic life in the form of microplastics (Botetzagias & Malesios, 2021; Fadare & Okoffo, 2020; Xu & Ren, 2021).

The increase in the number of patients has affected solid waste production from medical treatment. Therefore, it is necessary to increase the management capacity of medical waste, if improper handling of the mask waste can cause the spread of the virus. Because the used masks can be classified as infectious waste. In part, the waste of used masks for general people is not sick and healthy, it is considered general waste but must be properly disposed of in order not to affect public health and the environment (Department of Health, 2020). The number of used masks was likely to increase in 2020. There were 41.98 tons of used masks or 0.115 tons per day, and during January-April 2021. There were 16.8 tons of used masks and an increase of 0.14 tons/day. The number of masks used in 2020 and during January-April 2021 in the amount of 58.78 tons found to be disposed of in the incinerator 44.56 tons of infectious waste and 14.14 tons to landfill (Pollution Control Department, 2021). A local government organization is an agency that has authority and responsibility for solid waste, infectious waste, and mask waste management. Therefore, it is necessary to separate used masks from general solid waste and transport them to an infectious waste disposal facility with a high-temperature incinerator following the guidelines outlined in the ministerial regulation on the management of infectious waste in 2002 (Ministry of Public Health Regulations on Disposal of Infectious Waste, 2002). The framework for managing infectious waste and face masks during the COVID-19 outbreak should be assigned by the government and local government agencies and coordinate the area and community levels (Sangkham, 2020). Besides, various strategies of government agencies had determined for effective management of various types of community solid waste and focused on various waste processing technologies during the COVID-19 crisis (Ganguly & Chakraborty, 2021). Three policy implications were proposed to tackle the growing problem were raising awareness, regulation, and provision of bins designed for used face masks in strategic places and supporting innovations and research for eco-friendly face masks (Tesfaldet et al., 2022). The researcher took Chon Buri Province as a research site for several reasons. First of all, solid waste and infectious waste management strategies are among Chon Buri's top policy priorities. Secondly, there is a high rate of private sector's involvement in Chon Buri's waste management. Apart from being one of the three provinces covered by the Eastern Economic Corridor (EEC) industrial megaproject, the COVID-19 pandemic since 2020 has generated more infectious waste throughout the 11 districts in Chon Buri Province, which hosts an official population of 1,566,991 people (Chon Buri Provincial Office, 2022) Lastly, Chon Buri is a special case of public administration in 11 districts that accommodate a wide range of

small and large municipality offices include Pattaya City, “a city within a city”. Pattaya, located within Bang Lamung District, is a self-governing area and has its own local government office (Chon Buri Provincial Office, 2022). Besides, the infection rate is the highest in the top 10 in the country with a total of 15,375 cases (July 18, 2021). At the time of the study, the outbreak is in the 3rd wave and the trend continues to increase. Not all outbreaks originate from intra-provincial outbreaks. Most of them are from visitors during the Songkran festival and are taking back patients from various areas across the country. As a result, the amount of solid waste and infectious waste increases as well. (Chon buri Provincial Public Health Office, 2021).

Therefore, the researcher would like to study and develop a model to measure the participation rate in mask waste management within the community. The research method includes surveying problems and obstacles, as well as studying the relationships and influencing factors in waste management participation. This method aims to develop more efficient waste management operations. This study hopes to establish waste management guidelines on preventing and controlling the spread of disease for the sake of people's health, as well as reduce the negative impact on environmental quality.

Research Questions

1) What are the current problems in mask waste management in the Chon Buri community?

2) What is the relationship between variables in mask waste management in the Chon Buri community?

3) What are the influencing factors for participation in mask waste management in the Chon Buri community?

Research Objectives

This research aims to study (1) the current problems in mask waste management, (2) the relationship between variables and influencing factors for the participation in mask waste management in the Chon Buri community.

Research Methodology

This research uses a mixed-method approach. Data was collected through surveys, in-depth interviews, and questionnaires. The survey questionnaire consists of 6 parts. Part 1; general personal data of the individual respondent, Part 2; Knowledge test of the mask waste management procedures (12 questions, with 4 choices on each question), Part 3; Attitude towards the mask waste management (10 questions, with a 5-point scale on each question), Part 4; behavior of the mask waste management (10 questions, with a 5-point scale on each question), Part 5; participation of the mask waste management (15 questions, with a 5-point scale on each question), and Part 6; recommendations on the improvement of mask waste management. The official total population of Chon Buri Province is 1,566,991 people (Chon Buri Provincial Office, 2022). Therefore, the researcher drew a sample of 400 people from 16 different local organizations in 2 districts. The number came from Yamane’s calculation model (Yamane, 1973: 727-728) through stratified random sampling and sample random sampling.

In line with the classification of 5 solid waste management areas by the Ministry of Interior in 2015 and Chon Buri Metropolitan Authority's grouping of solid waste management clusters in 2017, the researcher chose the specific area group 2 (Chon Buri 2) as a research site. The group consists of 16 local administrative offices in Bang Lamung District and Sattahip District. Pattaya City is the main responsible for waste collection, transport, and disposal of this group. The target group of in-depth interviews included executives, heads of government agencies, and officers who were engaged in solid waste management at 16 local organizations. The group consisted of 1 interviewee from Pattaya City, 2 interviewees from Chon Buri Muang municipality, 10 interviewees from sub-district municipality, and 3 interviewees from subdistrict administrative organizations. The in-depth interview questions consist of 2 parts: Part 1; closed-ended questions about the conditions and problems of the mask waste

management of their responsible area, and Part 2; open-ended questions about additional recommendations on improving the mask waste management of their responsible area. The characteristics of the selected groups were in accordance with the study objectives. The snowball randomization was used to select the key informants continuously. (Tracy, 2012; Suri, 2011; Sutheewasinnon & Pasunon, 2016).

Data analysis: The data were analyzed by frequency, percentage, mean, standard deviation, Pearson correlation coefficient, and multiple regression. Data analysis involves a regression analysis with the stepwise method to test the relationship between the 16 variables. The quality of the instrument was improved and rechecked by the researcher's advisor and 5 other professors. Determination of the accuracy (validity) of the tool was taken in this research. The content congruence was taken from Rovinelli and Hambleton's IOC: Index of Item-Objective Congruence (Rovinelli & Hambleton, 1977; Tuntavanitch & Jindasri, 2018). The IOC of the questionnaire and interview form was 0.96 and 0.95. Rayong Municipality was the try-out area with 35 samples. Cronbach's Alpha Coefficient of confidence was used to analyze the survey questionnaires. The reliability of questionnaires tested with Kuder-Richardson Formula (KR20) of 12 knowledge questions was 0.8116. Reliability of 10 attitude questions, 10 behavior questions, 15 participation questions, and total questionnaire were 0.905, 0.745, 0.903, and 0.911, respectively. The scope of this study is the condition in mask management problem. The issue lies in the source, mid-way, and destination management of waste sorting, separation, collection, transportation, and disposal. This results in the five-step procedure of participation as follows: 1) finding the root cause of management problem 2) management planning, 3) management implementation, 4) monitoring and evaluation, and 5) receiving benefits. The duration of the research study is 4 months (October 2021-January 2022).

Research Results

The Current Problems in Mask Waste Management in the Chon Buri Community

While analyzing general data and personal characteristics of 400 respondents, it was found that the majority of respondents were female (64.00%) who were less than 30 years old (29.75%). The majority of respondents' position in the community/village was residents (88.25%) who were employees (34.25%), had completed primary school (26.00%), earn less than 10,000 baths per month (63.75%), and had been living in the studied community between 5 to 15 years (44.75%). They knew from mass media that to prevent the spread of COVID-19, one must wear a face mask, and know the pre-disposal procedure, which included the acknowledgment of garbage collection points and the correct way to dispose used masks. The results showed that the most influential information exchange channel was the peer-to-peer information exchange in the community media. Key figures involved in the community media include village headmen or community leaders, neighbors, colleagues, civil servants in the respective areas, health volunteers, as well as government officials from municipalities and/or subdistrict administrative organizations (61.75%), followed by online social media via mobile applications such as LINE messaging app chat groups, Facebook, Instagram, YouTube, etc., 52.50%. The least influential media was the sound truck (11.00%).

Table 1 The number, percentage, mean, and standard deviation values of knowledge level

Level	Interval of scores	Number (persons)	Percentage (%)
High	10-12	121	30.25
Moderate	7-9	197	49.25
Low	0-6	82	20.50
Total		**400**	**100.00**
$\bar{x}$ = 8.19 points, S.D. = 1.93 points			

The result of knowledge level analysis in mask waste management in the community with the participation of Chon Buri Province details as in Table 1, shows that knowledge score from a full score of 12 and level of knowledge was at the moderate, mean ($\bar{x}$ = 8.19), standard deviation (S.D. = 1.93), with the majority of the sample group, had a moderate level of knowledge (49.25%), followed by a high level of knowledge (30.25%), and a low level of knowledge (20.50%), respectively.

Table 2 The mean and standard deviation values of attitude level, overall and item-by-item

Item	Attitude on specific action	$\bar{x}$	S.D.	Level
1	Separating the mask waste in the community	4.37	0.68	moderate
2	Collecting and transporting of the mask waste in the community	4.29	0.51	moderate
3	Solid waste disposal	3.95	0.69	moderate
Overall		**4.26**	**0.46**	**moderate**

The result of attitude level analysis in mask waste management in the community with the participation of Chon Buri Province in Table 2 shows that the overall level of attitudes was at the moderate level, ($\bar{x}$ = 4.26, S.D = 0.46). Considering each aspect was found that the highest average was the separating the mask waste in the community ($\bar{x}$ = 4.37, S.D. = 0.68), followed by collecting and transporting of the masks waste in the community ($\bar{x}$ = 4.29, S.D. = 0.51) and solid waste disposal ($\bar{x}$ = 3.95, S.D. = 0.69), respectively. The number of samples was distributed according to the level of attitude at the most; the moderate level at 66.50%, the highest at 28.25%, and the low level at 5.25%, respectively.

Table 3 The mean and standard deviation values of the practice behavior level, overall and item-by-item

Item	Practice behavior	$\bar{x}$	S.D.	Level
1	Separating the mask waste in the community	3.52	0.58	high
2	Collecting and transporting the mask waste in the community	3.59	0.73	high
3	Solid waste disposal	3.55	0.77	high
Overall		**3.55**	**0.43**	**high**

Regarding the behavior level analysis on the practice behavior in mask waste management in the community with participative action of Chon Buri Province, Table 3 shows that the overall level of behavior analysis was at a high level, ($\bar{x}$ = 3.55, S.D. = 0.43). Considering each aspect was found that the highest mean was the collecting and transporting of the mask waste in the community and was at the high level ($\bar{x}$ = 3.59, S.D. = 0.73), followed by the high level of solid waste disposal ($\bar{x}$ = 3.55, S.D. = 0.77) and the high level of separating the mask waste in the community ($\bar{x}$ = 3.52, S.D. = 0.58), respectively. The number of samples was distributed according to the level of hygiene practices in the community at the most: the high level at 53.75%, the moderate level at 44.50%, the low level at 1.00%, and the highest level 0.75%, respectively.

Table 4 The mean and standard deviation values, and classification of the participation process level, overall and item-by-item

Item	Five-step Participation Procedure	$\bar{x}$	S.D.	Level
1	Finding the root cause of management problems	2.95	0.61	moderate
2	Management plan	2.79	0.78	moderate
3	Management implementation	2.92	0.74	moderate
4	Monitoring and evaluation	2.80	0.77	moderate
5	Receiving benefits	3.01	0.75	moderate
Overall		**2.91**	**0.61**	**moderate**

The result of participation process level analysis in mask waste management in the Chon Buri community is shown in Table 4. It reports that the overall level of participation was at a moderate level, 66.50%, ($\bar{x}$ = 2.91, S.D. = 0.61). Considering each aspect was found that the highest mean was the receiving benefits ($\bar{x}$ = 3.01, S.D. = 0.75), followed by finding the root cause of management problems ($\bar{x}$ = 2.95, S.D. = 0.61), the management implementation ($\bar{x}$ = 2.92, S.D. = 0.74), the monitoring and evaluation ($\bar{x}$ = 2.80, S.D. = 0.77) and the management plan ($\bar{x}$ = 2.79, S.D. = 0.78), respectively. The number of samples was distributed according to the level of participation, the highest level, 0.50%, the high level, 13.50%, the moderate level, 66.50%, the low level, 16.75%, and the least level, 2.75, respectively. In addition, the problem of participative management of the mask waste in the community was the knowledge and understanding in mask waste management, the most was at 37.50%, followed the procedures of solid waste disposal (36.25%), the correct way to separate used masks from other types of waste (33.00%), the right way to collect and transport used masks to the appropriate collection points (29.25%), and transporting the mask waste in the community (29.00%), respectively.

The Direction of the Relationship Between Variables in Mask Waste Management in the Chon Buri Community

A study at this stage aims at determining and analyzing the direction of the relationship between the 16 variables related to the level of participation in mask waste management in the Chon Buri community. Details in Table 5 show that all variables had a low correlation with the level of participation. The variables classified with negative values are 1) television media and daily news; 2) brochures, advertising flyers; 3) community radio broadcasting; 4) attitudes of separating the mask waste in the community; 5) attitudes of solid waste disposal and 6) behavior of solid waste disposal. After the analysis of the factor relationship between the 16 variables, it shows that the community media variable (X_1), the behavior of separating the mask waste in the community (X_{14}), and the behavior of collecting and transporting the mask waste in the community (X_{15}) had a positive correlation with participation at the significance level of 0.05, the other variables were found not to be statistically significant.

Table 5 Correlation values among variables related to the level of participation

Variable (communication channel)	Correlation coefficient (r)	Correlation values	p
1) Peer-to-peer information exchange in the community media with village headmen or community leaders, neighbors, colleagues, civil servants, health volunteers, government officials/municipalities/subdistrict administrative organizations (X_1)	0.152*	Low	0.002
2) Meeting with staff from government agencies/municipalities/subdistrict administrative organizations (X_2)	0.016	Low	0.744
3) Family members, relatives, acquaintances (X_3)	0.008	Low	0.878
4) Online media, social media via mobile phones such as Line group, Facebook, Instagram, YouTube, etc. (X_4)	0.023	Low	0.641
5) Television and daily news (X_5)	-0.019	Low	0.700
6) Offline media, such as news banners and posters of government agencies/municipalities/subdistrict administrative organizations (X_6)	0.024	Low	0.636
7) Brochures, advertising flyers (X_7)	-0.041	Low	0.411
8) Community radio broadcasting (X_8)	-0.036	Low	0.471
9) Sound trucks (X_9)	0.015	Low	0.765
10) Knowledge about mask waste management in the community (X_{10})	0.011	Low	0.827
11) Attitude towards separating the mask waste in the community (X_{11})	-0.027	Low	0.59
12) Attitude towards collecting and transporting the mask waste in the community (X_{12})	0.006	Low	0.912
13) Attitude towards solid waste disposal (X_{13})	-0.056	Low	0.268
14) Behavior of separating the mask waste in the community (X_{14})	0.229*	Low	0.00
15) Behavior of collecting and transporting the mask waste in the community (X_{15})	0.205*	Low	0.00
16) Behavior of solid waste disposal (X_{16})	-0.137**	Low	0.006

* $p < 0.05$

Factors influencing participation in mask waste management in the Chon Buri community

The result of multiplicative regression analysis came out after using a participatory community-based mask waste management as a criteria variable. Due to multiple regression analysis (MRA), a preliminary agreement stands that the independent variables must not be correlated with each other. If there is a correlation, it must not exceed the Burn & Grove criteria (1993: 102 cited in Kaiwan, 2013: 141). That criteria defined that

if the independent variables are related to each other more than 0.65, it is considered a problem of multicollinearity. In addition, the criteria of Stevens (1992: 26 cited in Kaiwan, 2013: 141) determines that if the correlation values (r) are over 0.80, there indicates a problem of multicollinearity. However, in this analysis, the researcher relies on the Variance Inflation Factor (VIF). VIF is the value that reflects the mutual influence of predictors in the linear model. Concordance of variables in a linear line is multicollinearity that explains how the predictors contained in the model are related. VIF is a measure that shows that if the predictor variables are related, the variance of the coefficients of the regression model will increase. If all VIF values of Y on independent variables are over 10, it is important to be aware of the high correlation between the independent variables or problems of multicollinearity and another value to be presented. The reciprocal of VIF is tolerance. The tolerance value is the variance of an independent variable that cannot be explained by other independent variables. Formular of tolerance is defined as tolerance = 1 - R_i^2. That value must not be less than 0.10. If it is lower than 0.10, it indicates a problem of multicollinearity (Tirakanan, 2021: 73). From criteria of multicollinearity, the researcher, therefore, examined the relationship between the factors of variables such as receiving media and information, knowledge, attitude, the behaviors of the practices in mask waste management in the community with 16 variables. Tolerance and VIF values were calculated to determine involved in the decision-making of selecting the appropriate factors to be predictive variables participation in mask waste management in the Chon Buri community. The tolerance values of 16 variables were 0.505-0.852, and an inflated variance component weight (VIF) was 1.173-1.936. It means that these factors are not very high because the tolerance value is higher than 0.01.VIF value is less than 10, it is not a problem of multicollinearity so that all 16 factors can be used as predictive variables for multiple regression analysis. The results of the multiple regression analysis of all 16 independent variables as criteria are shown in Table 6-7.

Table 6 Analysis of variance of independent and dependent variables

Source of variance	**SS**	**df**	**MS**	**F**	**p**
regression	14.259	4	3.565		
error	132.110	395	0.334	10.658*	0.000
Total	**146.369**	**399**			

* $p < 0.05$

Table 6 finds that is at least one independent variable that affects the participation variables with statistically significant at the 0.05 level. It was known that there was at least one independent variable influencing the participation variables. Thus, the authors analyzed to find such variables with the multiple regression analysis are shown in Table 7.

Table 7 The multiple regression analysis for the forecast variables influencing the participation variables with stepwise method

Forecast variable	**R**	**R^2**	**R^2_{change}**	**F_{change}**	**P**
X_{14}	0.229	0.053	0.053	22.072*	0.000
X_{14}, X_1	0.266	0.071	0.018	7.782	0.006
X_{14}, X_1, X_{13}	0.297	0.088	0.017	7.490	0.006
X_{14}, X_1, X_{13}, X_{15}	0.312	0.097	0.009	4.118	0.043

Table 7 shows that the forecast variables have affected the participation variables in mask waste management in the Chon Buri community with statistical significance at the 0.05 level, there are four variables: 1) behavior of separating the mask waste in the community (X_{14}), 2) community media perception via village headmen, community leaders, neighbors, colleagues,

civil servants, health volunteer, government officials/municipalities/subdistrict administrative organizations (X_1), 3) attitude towards solid waste disposal (X_{13}), and 4) behavior of collecting and transporting the mask waste in the community (X_{15}). The four influencing variables can explain the variance of participation (R^2) in mask waste management in the Chon Buri community, 9.7%.

Table 8 Testing for the significance of multiple regression coefficients

Forecast variable	**Coefficient multiple regression**		**t**	**P**
	b	***β***		
Constant value	2.257	-	10.039*	0.000
The behavior of separating the mask waste in the community (X_{14})	0.186	0.178	2.959*	0.003
Peer-to-peer information exchange in the community media with village headmen or community leaders, neighbors, colleagues, civil servants, health volunteers, government officials/municipalities/subdistrict administrative organizations (X_1)	0.198	0.159	3.286*	0.001
Attitude towards solid waste disposal (X_{13})	-0.123	-0.140	-2.812*	0.005
The behavior of collecting and transporting the mask waste in the community (X_{15})	0.100	0.120	2.029*	0.043
$R = 0.312$, $R^2 = 0.097$, $SE_{est} = 0.578$				

* $p < 0.05$

Table 8 shows the result of testing for the significance of multiple regression coefficients of the behavior of separating the mask waste in the community (X_{14}), community media (X_1), attitude towards solid waste disposal (X_{13}), and the behavior of collecting and transporting the mask waste in the community (X_{15}), it was at (β = 0.178), (β = 0.159), (β = -0.140), and (β = 0.120), respectively. As a result, the four affected variables had an influence on participation with a statistically significant at the 0.05 level. Multiple correlation coefficient (R) equals 0.312. The 4 forecast variables were able to explain the variance in participation, (R^2) was 9.7% and the standard error for prediction (SE_{est}) was 0.578. Therefore, the equation could be written to predict mask waste management in the community with the participation of Chon Buri Province as follows:

Forecast equations in raw score form

$\hat{Y} = 2.257 + 0.186\ X_{14} + 0.198\ X_1 - 0.123X_{13} + 0.100\ X_{15}$

Forecast equations in standard score form

$\hat{z} = 0.178Z_{X14} + 0.159Z_{X1} - 0.140Z_{X13} + 0.120\ Z_{X15}$

From the equation Z, it can be explained that the variables which influenced the positive participation in mask waste management in the community were the behavior of separating the mask waste in the community, engagement with community media players such as village headmen, community leaders, neighbors, colleagues, civil servants, health volunteer, government officials/municipalities/subdistrict administrative organizations, attitude towards solid waste management, and behavior of collecting and transporting the mask waste in the community.

The results of the in-depth interview with 16 interviewees show the 3 main problems in mask waste management as the source, midway, and destination. It shows that officials in local organizations still fail to provide enough appropriate garbage points for used face masks. Collection and transportation of waste are regarded as the midway in mask waste management.

Some local organizations do not have a specific collection of face mask waste. Moreover, used face masks were collected and stored with other infectious waste. It was collected once a day at the subdistrict public health agencies and community isolation center. Waste in other places such as government offices or community garbage collection points will be collected on average once a week. Regarding the destination, it is the issue with infectious waste management. Most of the local organizations stored them at the subdistrict public health agencies or the community hospital with other infectious waste. Only Pattaya City Municipality hired a professional private waste management company to collect and manage infectious waste at the waste incineration plant in Rayong Province. Likewise, the Nong Prue Municipality commissioned a professional private waste management company to conduct a similar task at the infectious waste incineration plant in Nonthaburi Province. The unsorted used face mask wastes that were in general garbage bins will be transferred to the local government's solid waste landfill.

From the interviews, the researcher classified the opinions on the problem of used mask pollution as follows; The first three categories (in order of severity) were 1) no proper waste sorting strategy, 2) used mask make the garbage collection obnoxious, and 3) insufficient storage bins. In the view of policy-makers and officials, the top problems are that residents did not sort waste, nor try to reduce waste. Most of the interviewees were interested in implementing the household/community mask waste management promotion projects/ activities within their responsible area per the guidelines of the Ministry of Interior. The researcher proposes that the prospective projects/activities to promote better mask waste management should include 1) correct way to sort household waste 2) how to fold, roll, store and dispose of used masks properly 3) right method to dispose of plastic bags before they go to trash bins. Moreover, the red trash bins shall be installed in the community specifically for used face masks.

Conclusion and Discussion

The main problem in mask waste management was a lack of good understanding and general knowledge in residents. The results showed that 1) the knowledge level was moderate (49.25%), the attitude towards waste management was moderate (66.50%), the behavior in waste management was high (53.75%), and 4) participation in waste management activities level was moderate (66.50%). Local organizations face a few main in mask waste management, including insufficient garbage bins and lack of proper infectious waste disposal premises. Moreover, they shall do more to promote a better understanding of mask waste management in the community. There were disease prevention campaigns to use disposable face masks in 15 places (78.26%). This is in line with the study of Sawanya Thamapiphon et al on the knowledge and behavior in the infectious waste management, specifically in used face masks, in Ban Klang-Phai Khad community in Nakhon Pathom Province during the COVID-19 crisis, which shows that the community residents' knowledge level was high (79.73%). This may have resulted from the active information provision on proper waste management through different media channels. The majority of the respondents knew the waste sorting, storage, and disposal procedure. For example, used face masks shall be folded before being disposed to proper garbage bins to prevent the spread of germs. (Thammaapipon et al., 2021). Regarding the case of the Bangkok Metropolitan Authority, there was a clear public health preventative guideline on how to properly handle used masks and dispose of them in the right place, as well as the budget was granted to increase more garbage bins, especially for used masks (Ginwong, 2020). From the problems of local organizations that existed the 3 main problems, were the management at source, midway, and destination consistent with the study of Poritosh Roy and team suggested that although various initiatives are underway to manage growing volumes of municipal solid waste and solid medical waste while controlling the spreading of infectious

diseases, the movable grate incineration technology coupled with an adequate disinfection process presents a potential solution in managing the COVID-19 waste challenges. The proper disinfection method and technological choices can mitigate the risk of spreading infections and can improve the waste management system's sustainability, especially the contaminated waste (Roy et al., 2021).

The attitude towards solid waste disposal, as well as the behavior of waste separation, collection, and transportation in the community can be reflected in both positive and negative participation in the interested field. Moreover, the attitude towards solid waste disposal and information perception from community media play a key role in shaping the action towards mask waste management. This goes in line with the cognitive skill concept of Bloom's taxonomy (Bloom, 1956) and Good (1973). The concept of knowledge level shows that good comprehension and realization follow a solid level of knowledge. Therefore, to influence a new behavior in their daily life, or in this case, to convince people to handle used masks properly, they need to receive a good ground of mask waste management first. Intelligence, attitude, emotions, and personal beliefs are parts of information perception and individual learning, which contribute to behavioral expressions. Each individual's behavior is a result of knowledge and understanding. Therefore, encouraging people to participate more in mask waste management in the community at various stages, including giving correct information, is important. This study found out of the 5-step procedures, especially benefits receipt, are appreciated and regarded the highest. This can be explained by the concept of people's participation, collective responsibility, and group process by Cohen and Uphoff (1980). According to this concept, participation is an open communication process, which includes decision-making, operations, implementation, benefits receipt, evaluation, and development. The benefits are the result of operations, and the benefits are determined to be evaluated **(**Cohen & Uphoff, 1977, 1980). Similarly, Mejjad et al. provide a similar approach to measure the used mask disposal behavior and evaluate the potential environmental impact during the COVID-19 pandemic in Morocco. This links the real impact of the COVID-19 on human behavior and the environment, as it suggests the need for new didactic management of used face masks and gloves to prevent and control the pandemic (Mejjad et al., 2021). This article can also be of great implication and policy in mask waste management for creation of a specific strategy towards preventing and controlling any potential pandemic of similar kind in the near future.

This research hopes to help set better policies and guidelines on mask waste management. Furthermore, related agencies should encourage more people to actively engage in the community's masks waste management.

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