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Models of Community Behavior Changes in Septic System and Management in Banjarmasin City, South Kalimantan

Juanda[1], Suyadi[2], Sri Andarini[3], Kliwon Hidayat[4]

[1]*Graduate School for Environmental Science, Brawijaya University, Malang and Department of Environmental Health - Health Politechniques Banjarmasin, South Kalimantan, Indonesia.*

[2]*Animal Husbandry Faculty, Brawijaya University, Malang, Indonesia*

[3]*Medical Faculty, Brawijaya University, Malang, Indonesia.*

4Faculty o Agriculture, Brawijaya University, Malang, Indonesia

Abstract :- Human fecal and sewage management is important aspect in urban environment. In Banjarmasin city, South Kalimantan, problems related to fecal disposal and sewage management has been reported become crucial issues in urban community health. The aims of the research was to describes the relationship between knowledge, attitude and behavior of city dwellers in Banjarmasin City. This research found that knowledge, attitude and action are important aspect for fecal and sewage management in Banjarmasin city. Knowledge about fecal and sewage management are able to changes positive individual to human fecal and sewage management. Action is important determinant in community sewage and fecal disposal management improvement. The strategic management for fecal and sewage management in Banjarmasin city need to be improved systematically.

Keywords - *Urban management, urban sewage, pollution management, community health.*

I. INTRODUCTION

Septic system is important in urban environment. The management of septic system widely discussed as one of the crucial issues in community health and urban ecosystem health. Septic systems is especially important in human fecal and waste management. A *septic tank* is especially important in sewage treatment among individual building and house in urban environments. Most society in the world is concerned with the need to establish proper septic systems which are benefits to urban ecosystem. The septic system management is crucial for health society in urban environment. The attention for septic systems reflects the community attention of sewage as sources of pollutant and diseases in urban environment [1] [2] [3].

Scholars point out that septic system in urban environment should be take into account in urban planning. Scholar point out that proper sewage management and septic systems are essential to public health, especially in developing countries. Septic systems are an integral part of the communal infrastructure of settlement which, besides the physical building of septic system, include sanitation systems. Urban development strategies must therefore be focused on the establishing sanitation system to ensure community health, especially in densely populated area in urban ecosystem. This strategy and development approach was consistent with the recommendations of global health strategy for urban development [3] [4].

Human behavior has been identified contributes significantly in numerous pollutant in urban environment, including human fecal and sewage. Scholars point out that there are significant relationship between level of education, culture and human behavior in urban pollutions. Well educated people often show good appreciation to the environmental health, including sewage and human fecal disposal and management issues. Through the education, the knowledge of waste and sewage management was introduced systematically. The negative impact of poor waste and sewage management to the community health status has been introduced widely among community. Poor understanding on sanitation was reported as one of the main factor for numerous diseases related to the poor quality of environment. The behavior of city dweller therefore becomes important issues [5].

The city of Banjarmasin in South Kalimantan is facing serious problems in septic system which are crucial in community health status. In Banjarmasin city, septic system show great variation both physical structure and works systems [6] [7]. One aspect of sewage management and septic system in urban environment which should never be underestimates is the community perspectives and behaviors. As far, there are no study

available in such area. The success of sewage management is especially determined by a number of factors, such as urban community perception and behavior. The aim of the research was to describes the relationship between knowledge, attitude and behavior of city dwellers in Banjarmasin City.

II. METHODS

The research was initiated by established models to evaluate and measure the relationship among variables which area contribute to the fecal and sewage management in among city dweller Banjarmasin city (Fig.1). The conceptual frameworks was analyzed through Structural Equation Modeling (SEM) using AMOS 18 (Analysis of Moment Structural). The approach of the study was quantitative through field survey which is conducted at Banjarmasin City, South Kalimantan. Primary data were collected through questioners. The questionnaire was distributed to the 185 respondents. Responded was selected from five sub-regency in Banjarmasin city with number of responders was given in Table 1. The validity and reliability test with degree of freedom $\alpha = 5$ %.

Table. Number of responders from each sub-regency in Banjarmasin city

No	Sub Regency	Number of family	Sample
1	Central Banjarmasin	27.115	38
2	East Banjarmasin	32.371	36
3	West Banjarmasin	39.806	44
4	North Banjarmasin	28.685	27
5	South Banjarmasin	37.875	40
Total		165.752	185

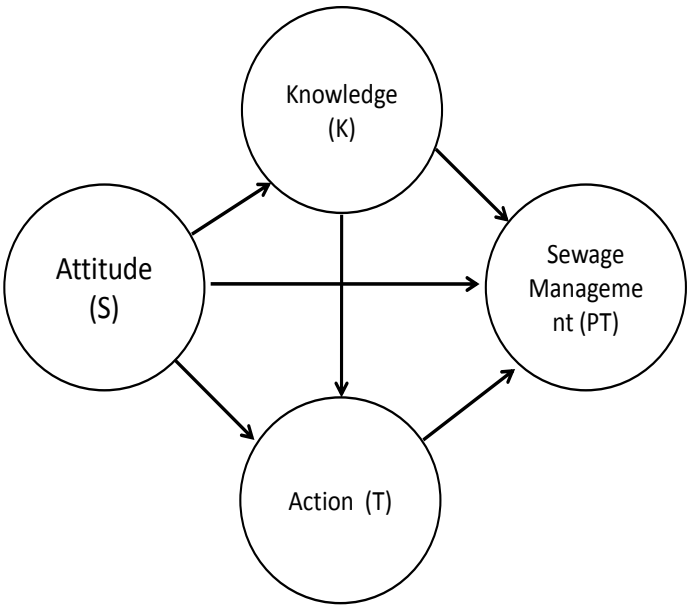

Fig. 1. Conceptual models for the relationship between knowledge, attitude and action to the human fecal and sewage management in Banjarmasin City.

The specific models which was used in this research were includes linear models, quadratic, cubic, inverse, logarithmic, power, compound, growth and exponential. All of the attributes produce significant linear models with statistical value *sig model linier*< 0.05, and therefore it is conclude that the linearity assumption of models was accepted.

III. RESULT AND DISCUSSION

Questionnaires were distributed to the respondent and the responds was calculated descriptively. The validity and reliability of research instrument was given in Table 1.

Table 1. Validity and Reliability value of research instrument

Variable	Item	Validity (P-Value)		Reliability	
Knowledge (P)	P1	0.933 (0.000)	Valid	0.874	Reliable
	P2	0.562 (0.000)	Valid		
	P3	0.663 (0.000)	Valid		
	P4	0.910 (0.000)	Valid		
	P5	0.836 (0.000)	Valid		
	P6	0.820 (0.000)	Valid		
Attitude (S)	S1	0.991 (0.000)	Valid	0.990	Reliable
	S2	0.983 (0.000)	Valid		
	S3	0.979 (0.000)	Valid		
	S4	0.987 (0.000)	Valid		
Actions (T)	T1	0.989 (0.000)	Valid	0.986	Reliable
	T2	0.990 (0.000)	Valid		
	T3	0.981 (0.000)	Valid		
Sewage management (PT)	PT1	0.980 (0.000)	Valid	0.992	Reliable
	PT2	0.984 (0.000)	Valid		
	PT3	0.989 (0.000)	Valid		
	PT4	0.981 (0.000)	Valid		
	PT5	0.989 (0.000)	Valid		

Based on the pilot test of research design, the validity test shows all of the correlation value was above 0.3 and p-value < 0.05. The similar value was found for reliability test, in which the value of reliability test was about 0.6. Therefore it could be said that all of the items, including knowledge, attitude, action and sewage management were in category reliable.

In order to verify the significant of modes to describe the relationship between knowledge, attitude, action and sewage management, some statistical test was performed. The result for structural model test was given in Table 2. From tested criteria, it is clear that Chi Quadrate, p-value, CMIM/DF, GFI, TLI, CFI and RMSE criteria provides good model

Table 2.Result of the structural models test

Criteria	*Cut-of value*	Models value	Notes
Chi Quadrate	Kecil	140.908	Good
p-value	≥ 0.01	0.011	
CMIN/DF	≤ 2.00	1.342	Good
GFI	≥ 0.90	0.915	Good
AGFI	≥ 0.90	0.862	Marginal
TLI	≥ 0.95	0.993	Good
CFI	≥ 0.95	0.995	Good
RMSEA	≤ 0.08	0.044	Good

This means, five criteria has informed that five criteria has meet *cut off* value. Therefore, SEM model in this research can be used as models to interpret the relationship between attitude, action and knowledge of the local community in Banjarmasin city to the sewage management. The result of linearity assumption test of the models was given in Table 3.

Table 3.The result of linearity assumption test

Relationship between variable	Test result	notes
Attitude (S) → Action (T)	Sig model linier 0.000 < 0.05	Linier
Attitude (S) → Sewage management (PT)	Sig model linier 0.000 < 0.05	Linier
Knowledge (P)→ Attitude (S)	Sig model linier 0.000 < 0.05	Linier
Knowledge (P)→ Actions (T)	Sig model linier 0.000 < 0.05	Linier
Knowledge (P)→ sewage management (PT)	Sig model linier 0.000 < 0.05	Linier
Action (T)→ Sewage management (PT)	Sig model linier 0.000 < 0.05	Linier

Based on the Table 3, it is clear that the linearity test of all measurable relationship was linier. Based on the evaluation of the direct impact and relationship among aspect in community septic system in Banjarmasin regency, it is clear that all of the modeled relationship has significant relationship (Table 4). Knowledge has relationship with attitude, action and sewage management. Attitude has been evaluated has significant value to action and sewage management. There is also significant relationship among action to human fecal disposal and sewage management. Changes of communal attitudes will creates a powerful social norm about behavior, especially in sanitation and environmental health. While Attitudes do not always predict behavior, the attitude is important aspect in community changes and behavior. Scholars point out that knowledge is important in human behavior [8] [9] [10].

Table 4. The direct impact and relationship among aspect in septic system

No.	Relationship	Standardized Coefficients	p-value	notes
1	Knowledge (P) → Attitude (S)	0.905	0.000	Significant
2	Knowledge (P)→ Action (T)	0.144	0.003	Significant
3	Knowledge (P)→ Sewage management (PT)	0.265	0.000	Significant
4	Attitude (S) → Action (T)	0.844	0.000	Significant
5	Attitude (S) → Sewage management (PT)	0.434	0.000	Significant
6	Action (T)→ Sewage management (PT)	0.305	0.000	Significant

This study relates three variables to the sewage management in Banjarmasin city, namely knowledge, attitude and action. Through the models analysis, the relationship was given in Fig.2. There are relationship between variable of knowledge and attitude, but no relationship between attitude and action. This situation may occur and can be explained by postulate of independent variation concept. Attempt in community changes, including changes in social system lead to the social changes. Based on the field observation, there is process for new behavior adoption, especially in sewage management from river to septic tank. However, changes of the behaviors not followed by proper methods of sewage management. This phenomenon can be classified as deficit behavior. Basically, people have negative behavior and it can be classified into three types, namely excessive behavior, deficit behavior and anomaly behavior. In case of community in Banjarmasin city, the management practices of domestic sewage management and practices can be classified into deficit behavior. There are, however, some little changes in human fecal disposal from rivers to water seal latrine. However, many

household develop simple septic system with septic tank without sanitary. Therefore, education to introduce the proper human fecal disposal was needed [11] [12] [13].

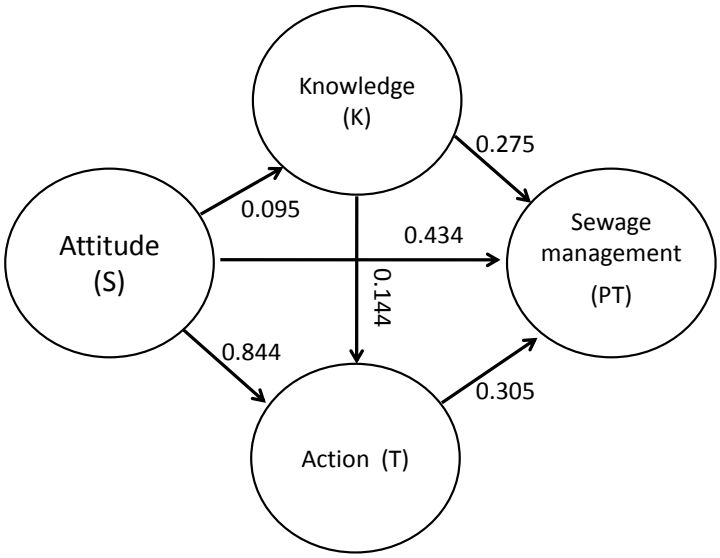

Fig.2. The relationship between knowledge, attitude and action to the human fecal and sewage management in Banjarmasin City

The deficit behavior can be explained by the theory of health belief model, in which human fecal disposal and sewage management using minimal standard of septic tank was believed not significantly affect human health, and it is no important to provides septic tank with standard quality. Moreover, the perceived benefits and barriers among local dweller was poor understood and unclear. This factors become internal factors in behavioral changes, and it is also caused and influenced by other internal factors such as cues action such as campaign in mass media about the danger of poor management of fecal and sewage [14] [15].

Knowledge about fecal and sewage management able to changes positive individual to human fecal and sewage management. The individual with knowledge about health and best practices of human fecal and sewage management was observed has positive attitude in term of human fecal and sewage management techniques. Conversely, individual wit poor knowledge about fecal and sewage management has negative attitude towards fecal and sewage management. As far, some program related to the sanitation has been implemented, but there are need some improvement in order to increase positive human behavior changes in sanitation health. New strategy may lead to alteration of the behavior. More emphasis may be given to poor urban dwellers with low knowledge and education levels, especially in environmental health issues. This suggest the need for a changes of urban development strategy [16] [17] .

Test to the direct impact of knowledge (P) and action (T) shows standardized coefficient about 0.144 with p-value 0.003. Since p-value<0.05, this means there are direct significant relationship between knowledge and action. Positive marking indicates the positive relationship, implies that increase of knowledge will contributes to the increase of action in sewage management. Knowledge is important to changes behavior. It is determined by a set of knowledge which are important to changes behavior which has direct relationship to individual actions [15]. This research shows that impact of the poor knowledge of human fecal management contributes to the poor action of community. Urban dwellers argues that using traditional septic tank with iron wood (*kayu ulin*) was enough. Establishing simple disposal facility using wood is cheap and as far there are no problems related to the environment. Household member usually observe and follow the neighbor techniques to build simple human fecal facility. The proper septic tank design as far was limited to access, lead to the poor understanding of the septic tank construction. Poor design of septic system has been recognized as one of the contributor for urban environment pollution [18].

In Banjarmasin city, especially in densely urban area, the pollution caused by poor sanitation is a complicated problems. Attitude of urban dwellers to the fecal and sewage system and management consist of several aspect, namely rules, institution/organization, operational techniques, funding and community involvement. Positive impact is often triggering active participation of community in sewage management, including human fecal disposal. It was stated that community participation is the important keys for development. The main reason for this aspect was the realization of community participation in sanitation program could at least contribute in environmental health programs [19].

IV. CONCLUSION

Poor of knowledge contributes significantly in poor management of human fecal and sewage system. Attitude to respond technology of fecal management and septic system was poor, lead to the health problems caused by sewage. There is also poor action to accept technology. The strategic management for fecal and sewage management in Banjarmasin city need to be improved systematically. It is includes knowledge, attitude and action aspects. This suggest the need for a changes of urban development strategy

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