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Correlation between Knowledge of Disaster, Leadership of Regional Leader and Disaster Awareness Behavior - A Correlation Study of Households in East Jakarta

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Abstract: ***Objectives of this research are to know a correlation between knowledge of disasters, leadership of principal with Behavior of disaster awareness. Survey method conducted in the Village District Kramatjati Cililitanin East Jakartain 2015with a sample of100people based on Multistage Proportional Random Sampling. Results of this study give conclusions: i) no significant correlation between knowledge of disaster and disaster awareness behavior with correlation coefficient(r_{y1}) of 0,643, determination coefficient (r^2_{y1}) of 0.413 and regression equation of $\hat{Y}=53.832+2.579X_1$; ii) significant positive correlation between leadership of regional leader and disaster awareness behavior with correlation coefficient(r_{y2}) of 0.950, determination coefficient (r_{y2}) of 0.902 and regression equation of $\hat{Y}=9.390+0.952X_2$; andiii) significant positive correlation between knowledge of disasters and leadership of regional leader as simultaneously toward disaster awareness behavior with correlation coefficient(r) of 0.950, determination coefficient (r^2) of 0.903 and regression equation of $\hat{Y}=8,475+0,086X1 + 0,938X2$ .The conclusion of this studyisthat the disaster awareness behavior can be enhanced significantly particularly through improvement of leadership of regional leader in flooding management.***

Keywords: disaster awareness behavior; knowledge of disaster; leadership of regional leader

1. Introduction

Geographically Indonesia is located in tropical climate region with two seasons that are summer season and rainy season possessing characteristics of extreme weather change, temperature and wind direction. Such climate condition combined with heterogeneous topography of surface and rock both physically and chemically yielding fertile land condition. On the other hand, that condition may generate several hazards to human such as hydrometeorology disaster, for instance flood, land slide, forest fire and drought.

Data of disasters in Indonesia (BNPB 2014) for recent years (2010 – 2014) reported that number of disasters has increased as follows: 691 disasters (2010), 814 disasters in 2011, 888 disasters in 2012, 1306 disasters in 2013 and 1954 disasters in 2014. In addition, there is an increase on human victim disaster, destruction and loss values in several elements. The data (3) shows an elevation of disaster graph in Indonesia year to year.

The outlook of international disaster management has already changed from fatalistic responsive with emergency disaster management oriented as response to disaster event, to proactive preparedness, which the disaster management has been conducted since very earlier time through awareness until social recovery stage. The developing next outlook is the concept of building, which several efforts in disaster management have been taken more to the direction of integrated disaster management effort and programs involved with building, economic strengthening, technology implementation, poverty reduction, etc. This outlook is on the basis of efforts on reduction of social vulnerability. The latest outlook is the directive of risk reduction. This approach is an integration of technical and scientific viewpoint with respect to social, economic and political factors in disaster reduction planning. The objective of disaster management in the concept of disaster risk reduction is to improve social capability in management and to stress risk reduction due to disaster. This approach is based on a perspective that society is viewed as a subject and not as an object in disaster management and building process.

This change yields an impact on the development of disaster management in Indonesia. A positive response was generated through the Law of Disaster Management No.24/2007 about disaster management stressing on social active participation in disaster management.

One of proper tasks in order to reduce disaster risk is to take mitigation, both structural and non structural mitigations. Disaster mitigation is a serial of efforts to reduce disaster risk, both through physical building and capability enhancement toward disaster threat (3).

The above cases show the importance of disaster awareness behavior in community particularly in disaster prone regions. That behavior is related to factors in effective disaster management, which implicates all social elements with their respective duties in corporation with disaster management. In order to build defense towards disaster, a comprehensive disaster management is needed particularly in pre-disaster task as a form of awareness enhancement. This task is practically taken to minimize the occurrence of big number victims in disaster prone regions.

The perspective of disaster awareness is taken in the study of social awareness assessment planning, which is more stressing on capability preparedness in order to conduct emergency task force promptly and properly. The

emergency task force implicates steps of action promptly before disaster.

Theoretically, the disaster is occurred due to interaction between hazard and vulnerability and also its catalyst. The hazard is a natural or man-made phenomenon potentially threatening human life, material loss and environmental damage. The vulnerability is a condition where a community or society acts towards or generates capability in facing disaster threat.

The disaster will happen when there is "jeopardy" and occurred in vulnerable condition as described by Awotona (1997) that "…… *Natural disasters are the interaction between natural hazards and vulnerable condition"*.

In the meantime disaster risk is the interaction between level of regional vulnerability and the existence of disaster threat. The disaster threat particularly the natural disaster is generally constant due to part of dynamical process undergone formation or breakage of earth surface both due to internal and external forces. Meanwhile the level of regional vulnerability can be minimized and therefore, the capability in facing disaster threat will increase (3).

There are factors concerned with disaster awareness behavior, one of those factors is the knowledge of disaster. In the context of knowledge of disaster, Piaget in Wina Sanjaya described that knowledge of disaster is a continuous interaction between individual and environmental. The knowledge of disaster is described on the basis of type of knowledge in experience and learning individual commonly called as scheme term about disaster in community.

According to Anderson the dimension of knowledge is consisted of (i) Factual knowledge is related to basic elements used by experts for communication in academic discipline, understanding, and description of the dimension of knowledge systematically. This elements is usually used by scientists working in certain discipline required changes from one application to other application, (ii) Conceptual knowledge is related to categorical knowledge and classification and also correlation between them in more complex relationship in the form of systematical knowledge, (iii) Procedural knowledge is the knowledge of methodology to conduct something, and (iv) Metakognitive is the awareness of something recognizable and not recognizable. The strategy of metakognitive is referred to a method of awareness enhancement of current thinking and learning process.

The other factor that is closely related to a factor of principal leadership is an effective leader or a performance coach, that is a person or a coach for his or her people. It means that the person has capability to inspire, encourage, and make members be able to arrange planning (including planning of action, target or direction, resources need, etc), to conduct daily activity (monitoring and supervision), and to evaluate working assessment of members.

Leadership is a person capability to influence member behavior in order to change their behavior to achieve the target desirable (3). This definition implicates two fundamental understanding of leadership, that is to influence other people behavior. This leader navigates his people to follow his commands and to gain the proposed target as his will.

Other perspective of leadership (George, 2006) is that a leadership is a relationship where one person as a leader is capable to influence other party to cooperate voluntarily in doing work in order to achieve target proposed by the leader (3).

Ordway Tead (1935) defined about leadership *"Leadership is the activity of influencing people to cooperate toward same goal which come to find desirable"* (3),while Gary Yulk (…) *"Leadership is the process of influencing others to understand and agree about what needs to be done and how it can be done effectively, and the process of facilitating individual and collective to accomplish the shared objectives"* (3).

A leader with respect to regional authority (particularly in Jakarta region) is a leader and coordinator to manage government in regional area, which conducts tasks getting mandate from city mayor to handle part of local authority and to manage common tasks of government.

As a regional leader with a lot of roles in government displays roles as accelerator, facilitator, problem solver, communicator, and to build spirit of employees to work with regard to self respect, appropriate place, opportunity to go forward and comfortable working facility.

On the basis of materials as described above, the problem statement of this research can be summarized as follows:

1) Is there any correlation between knowledge of disaster and disaster awareness behavior?
2) Is there any correlation between leadership of regional leader and disaster awareness behavior with regard to flood management?
3) Is there any correlation between knowledge of disaster and leadership of regional reader as simultaneously toward disaster awareness behavior?

2. Methodology

This research applies survey methodology with correlation approach (3) to determine the correlation between knowledge of disaster and leadership of regional leader as independent variables and disaster awareness behavior in flooding management as dependent variable. In this investigation, the correlation between those variables is determined without any variable treatment.

The population in this investigation is household representatives possessing intermediate school as the lowest education staying in Cililitan Kramatjati, East Jakarta. The location is selected on the basis of sampling considerations regarding flooding area and therefore, the location is appropriate for selected population. The data from BNPB as reported shows that this location is flooding prone area.

The sampling method in this investigation is referred to Multistage Proportional Random Sampling. The first stage

was pertained to determination of Heads of Community (HC), i.e. HC 05, 06, 07, 16 as samples, and the second stage was pertained to Heads of Household (HH) taken as random sampling. As a result of sampling, the HH 06 and 13 are representatives for HC 05; the HH 01, 03 and 09 are representatives for HC 06; the HH 01, 06 and 13 are representatives for HC 07; and HH 08 is representative for HC 16. At the third stage, a proportional random sampling was done to household representatives of nine HHs possessing intermediate school minimum education. Totally, the number of samples from random sampling with qualification of intermediate school minimum education is to be 100 household representatives.

In this investigation, the procedure of data collectivity used three instruments, i.e. i) disaster awareness behavior regarding flood prone region, ii) knowledge of disaster, and iii) leadership of regional leader in flood management.

The data analysis used regression and correlation technique implicate with variable of disaster awareness behavior (Y), variable of knowledge of disaster (X_1) and variable of leadership of regional leader in flood management (X_2). Those variables were used to determine regression equation, correlation coefficient and significance of correlation.

3. Results and Discussion

1. Correlation between knowledge of disaster (X_1) and disaster awareness behavior regarding flood prone region (Y_1).

The statistics analysis using SPSS 20 (*Statistic Program for Social Science*) was applied to determine regression equation $\hat{Y}1 = a + bX_1$ between variable of knowledge of disaster (X_1) and variable of disaster awareness behavior regarding flood prone region (Y_1) as presented in Fig.1.

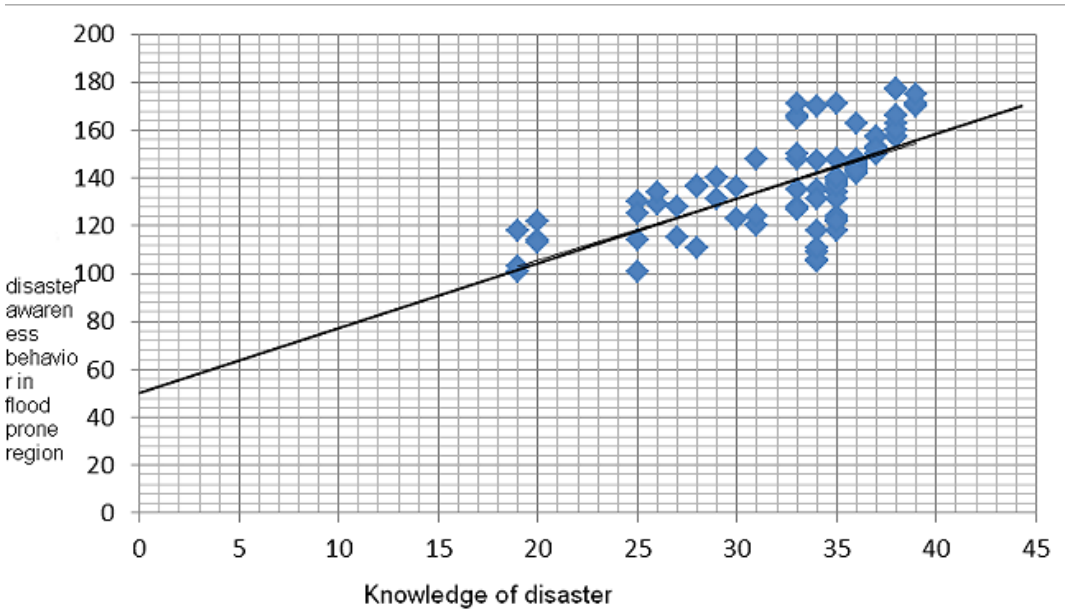

Figure 1: Regression equation of knowledge of disaster (X_1) and disaster awareness behavior in flood prone region (Y_1).

From Fig.1, the regression equation of knowledge of disaster and disaster awareness behavior in flood prone region is found to be $\hat{Y}1 = 53.832 + 2.579X_1$ with constants a = 53.832 and b = 2.579.

In order to determine the test of significance and significance of regression slope, this investigation used F-distribution in Analysis of Variance (ANOVA) as listed in Table-1.

Table 1: ANOVA for simple linear regression of knowledge of disaster and disaster awareness behavior in flood prone region

Source	DF	SS	MS	F_{stat}	F_{table} 0.05	F_{table} 0.01
Regression (a)	1	39157.310	39157.310			
Regression (b/a)	1	16171.877	16171.877	68.950**	3.938	6.901
Residue (R)	98	22985.433	234.545			
Compatibility	44	790.303	17.961	1.522^{ns}	1.600	1.949
Error	54	637.117	11.798			

Note
DF : Degree of Freedom
SS : Sum of Square
MS : Mean Sum of Square
** : strongly significant regression ($F_{stat} > F_{table}$)
ns : linear regression ($F_{stat} < F_{table}$)

On the basis of test of significance and test of linearity obtained from Table-1, it can be deduced that the regression equation $\hat{Y}1=53.832+2.579X_1$ is very significant and linear as performed by the values of F_{stat} 68.950 and 1.522 at α = 0.01.

With regard to the regression equation in Fig. 1, it implies that each conversion of one unit of knowledge of disaster may yield a change of disaster awareness behavior in flood prone region as large as 2.579 at a constant of 53.832.

The result of correlation coefficient between variable knowledge of disaster (X_1) and variable disaster awareness behavior in flood prone region (Y_1) is presented in Pearson Correlation Table (not shown here), that is to be 0.643,

which shows moderately strong correlation between variable knowledge of disaster (X_1) and variable disaster awareness behavior in flood prone region (Y_1). The contribution value can be derived from the determination coefficient (r^2) found in this investigation, i.e. 0.413, which implies a contribution of knowledge of disaster towards disaster awareness behavior in flood region is equal to 41.3% , meanwhile the rest of 58.7% is the contribution from other factor.

2. Correlation between leadership of regional leader in flooding management (X_2) and disaster awareness behavior in flood prone region (Y_2).

The SPSS results with regression equation $\hat{Y}_2 = a + bX_2$ is presented in Fig.2 and Table-2, respectively.

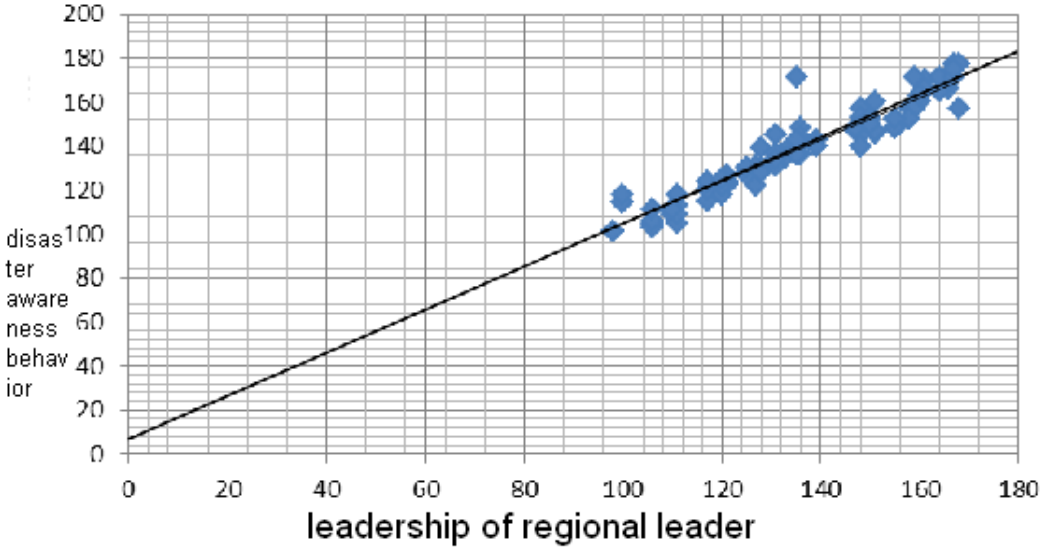

Figure 2: Regression equation of leadership of regional leader (X_2) and disaster awareness behavior in flood prone region (Y_2).

The regression equation of disaster awareness behavior in flood prone region (Y_2) dependency on variable leadership of regional leader in flood management (X_2) is found to be $\hat{Y}_2 = 9.390 + 0.952X_2$ with the constant values of a = 9.390 and b = 0.952.

The test of linearity for regression equation is justified on the basis of $F_{stat} < F_{table}$, which is known from ANOVA table (Table-2).

Table 2: ANOVA for simple linear regression of leadership of regional leader in flood management and disaster awareness behavior in flood prone region

Source	DF	SS	MS	F_{stat}	F_{table}	
					0.05	0.01
Regression (a)	1	38982	38982			
Regression (b/a)	1	35174.66	35174.66	905.387**	3.938	6.901
Residue(R)	98	3807.34	38.85			
Compatibility	44	2078.723	47.244	1.476^{ns}	1.601	1.949
Error	54	1728.617	32.011			

Note
DF : Degree of Freedom
SS : Sum of Square
MS : Mean Sum of Square
** : strongly significant regression ($F_{stat} > F_{table}$)
ns : linear regression ($F_{stat} < F_{table}$)

On the basis of test of significance and test of linearity on data of ANOVA table (Table-2), it can be deduced that the regression equation $\hat{Y}_2 = 9.390 + 0.952X_2$ is strongly significant and linear as shown by F-values in Table-2, with respective F_{stat} = 905.387 and F_{table} = 1.476 (99% level of confidence)

The correlation coefficient (99% level of confidence) between variable leadership of regional leader in flood management and disaster awareness behavior in flood prone region is determined from Pearson Correlation Table (not shown here), i.e. ry_2 = 0,950. The significance value (95% level of confidence) is found to be 0.000, which it implies very strong correlation. The determination coefficient can be used to determine the contribution of independent variable to dependent variable, in this case, the determination coefficient (r^2) is found to be 0.902. It implies that the contribution of leadership of regional leader towards disaster awareness behavior in flood prone region is as high as 90.2%, meanwhile the rest of 9.8% is the contribution from other factor.

3. Correlation between knowledge of disaster (X_1) and leadership of regional leader in flooding management (X_2) simultaneously toward disaster awareness behavior in flood prone region (Y).

Finally, this investigation found out positive correlation between knowledge of disaster (X_1) and leadership of regional leader in flood management (X_2) as simultaneously toward disaster awareness behavior in flood prone region (Y). The double regression analysis gave results as follows: a = 8.745; b = 0.086; and c = 0.938. Therefore, the regression equation is found to be $\hat{Y}_{12} = 8{,}745 + 0{,}086X_1 + 0{,}938X_2$. The ANOVA results using F-assay (Table-3) show that the regression equation is very significant as justified by the F_{stat} (449.397) and F_{table} (4.831) at 99% level of confidence.

Table 3: ANOVA of knowledge of disaster (X1) and leadership of regional leader in flood management (X2) as simultaneously toward disaster awareness behavior in flood prone region (Y)

Source	DF	SS	MS	F_{stat}	F_{table} 0.05	F_{table} 0.01
Regression (a)	1	39157.31	39157.31			
Regression (b/a)	2	35343.007	17671.504			
Residue (R)	97	3814.303	39.323	449.397**	3.09	4.831

** very significant regression

The double correlation analysis in this investigation gave a result of r^2 of 0.950, it means that the knowledge of disaster and leadership of regional leader in flood management as simultaneously toward the disaster awareness behavior in flood prone region have positive correlation

In this investigation, it is found that the determination coefficient is to be 0.903. The determination coefficient is used to determine the contribution value of independent variables, in this case, the knowledge of disaster and the leadership of regional leader in flood management, toward the dependent variable or the disaster awareness behavior in flood prone region. Furthermore, the value of r^2 (0.903) indicates the knowledge of disaster and leadership of regional leader in flood management as simultaneously give a contribution of 90.3% toward the disaster awareness behavior in flood prone region. The rest of 9.7% is a contribution from other elements to the disaster awareness behavior in flood prone region.

This investigation also used partial correlation test, the results are shown in Table-4 and Table-5. There are two independent variables in this investigation and in partial correlation test one of the two independent variables is set as a control.

Table-4 is a table of partial correlation where the variable leadership of regional leader in flood management is set as a control.

Table 4: Partial correlation coefficients of knowledge of disaster (X_1) towards disaster awareness behavior in flood prone region (Y) where the leadership of regional leader in flood management (X_2) is set as control

Control Variable			Disaster knowledge	Disaster awareness behavior
Leadership of regional leader	Disaster knowledge	Correlation	1	0.052
		Significance (2-tailed)	.	0.612
		DF	0	97
	Disaster awareness behavior	Correlation	0.052	1
		Significance (2-tailed)	0.612	.
		DF	97	0

Table-4 shows that the value of coefficient correlation (0.052) is relatively low, it implies that the influence of knowledge of disaster on disaster awareness behavior is low. Moreover, this case is strengthened by the fact that the significance value in Table-4 (0.612) is very much larger than the critical value (0.05).
At the same time, the influence of leadership of regional leader in flood management toward the disaster awareness behavior in flood prone region where the variable knowledge of disaster set as a control was investigated. The result is shown in Table-5.

Table 5: Partial correlation coefficients of leadership of regional leader in flood management (X_2) towards disaster awareness behavior in flood prone region (Y) where knowledge of disaster (X_1) is set as control.

Control Variable			Leadership	Awareness behavior
Knowledge of disaster	Leadership of regional leader	Correlation	1	0.913
		Significance (2-tailed)	.	0
		DF	0	97
	Disaster awareness behavior	Correlation	0.913	1
		Significance (2-tailed)	0	.
		DF	97	0

The correlation coefficient of leadership of regional leader in flood management and the disaster awareness behavior in flood region where the variable knowledge of disaster set as control is high (0.913) as shown in Table-5. Moreover, the significance value is very remarkable (Table-5) due to very much lower (practically zero) than the critical value (p =0.05) indicating that the influence of leadership in flood management towards disaster awareness behavior is highly significant. The Pearson correlation shows that correlation between leadership in flood management and disaster awareness behavior is very strong as performed by its correlation coefficient (0.950).

The partial correlation analysis shows substantial information in relation to the very strong influence of leadership in flood management towards disaster awareness behavior justified by its correlation coefficient (0.950) and its significance value (0.000), however, on the other hand, the partial correlation analysis shows no significant influence of knowledge of disaster towards disaster awareness behavior justified by its very low correlation coefficient (0.052) and its significance value (0.612). The low influence of knowledge of disaster towards disaster awareness behavior is probably due to most respondents graduated from intermediate school as the lowest education. On the other hand, the role of leadership in flood management towards disaster awareness behavior is much more substantial in relation to eastern culture that a leader is viewed as a respectful teacher.

Moreover, a slightly increased is found in the contribution from regional leadership in flood management alone towards disaster awareness behavior from the statistical viewpoint. The determination coefficient of regional leadership in flood management alone towards disaster awareness behavior is found to be 0.902, however, its determination coefficient is slightly increased to 0.903 by 0.1% if the knowledge of

disaster and the regional leadership in flood management give effect simultaneously toward disaster awareness behavior. The implementation to the real condition is not yet clear.

4. Conclusion

This investigation gives some conclusion as follows:

1) Although positive correlation is found in the relationship between knowledge of disaster and disaster awareness behavior in flood region as shown by its correlation coefficient (0.643), however, the correlation is not statistically significant.
2) Strong positive correlation is found between leadership of regional leader in flood management and disaster awareness behavior justified by its high correlation coefficient (0.950). Strong contribution from regional leader in flood management (90.2%) towards disaster awareness behavior is shown in this investigation.

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