



The Analysis of Katajaga (Village of Qualified Family Latrine) Program Effect to The Contamination of Fecal Coliform , Diarrhea and Typhoid Occurrence in Semarang

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Abstract

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The most common contagious diseases in developing countries are diseases of the respiratory and digestive tract. Gastrointestinal tract infection disease can be caused by virus, bacteria and protozoa. Diseases that can occur include diarrhea and typhoid. Factors that may increase the risk of diarrhea and typhoid include fecal contaminated water and improper defecating. The lack of owning healthy latrines causes most of people defecate in any places which induce environmental pollution so that sanitation is needed to break the germ link from the infectious source. The purpose of this study is to analyze the effect of Katajaga program (Village Of Qualified Family Latrine) against contamination of fecal coliform, the occurrence of diarrhea and typhoid. This research is a type of quantitative research with cased control study approach. The population in this study was 30 people who were given Katajaga Program in Gunungpati Sub-district and 30 people who were not given Katajaga Program in Mijen Sub-district. Sampling was done by simple random sampling technique. The results showed that there was a significant difference of fecal coliform contamination rate between case and control group with p value 0.047 ($p < 0.05$), there was a significant difference of diarrhea occurrence rate between case and control group with p value 0.034 ($p < 0.05$) and there was significant difference of typhoid occurrence rate between case and control group with p value 0.009 ($p < 0.05$). The conclusion is giving the Katajaga program effects on the contamination of fecal coliform, the occurrence of diarrhea and typhoid. This research is useful to encourage people to improve sanitation development and prevent disease transmission caused by poor sanitary conditions.

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INTRODUCTION

The most common contagious diseases in developing countries are diseases of the respiratory and digestive tract. Gastrointestinal tract infection disease can be caused by virus, bacteria and protozoa. Diseases that can occur include diarrhea and typhoid. Diarrhea is caused by bacteria infiltration in the colon which causes colon function is not in maximal condition i.e. cannot absorb water properly (Anorita & Andayasari, 2011), while typhoid fever is critical infectious disease in human digestive system (especially small intestinal) which caused by *salmonella typhi bacteria* (Lestari *et al.*, 2017).

Factors that are able to increase the risk of diarrhea and typhoid are lack of clean water for personal hygiene and household hygiene, inappropriate food preparation and storage, fecal contaminated water and improper defecation (Mafazah, 2013).

Qualified clean water should be free from pollution, while drinking water must fulfill physical, chemical and biological requirements. The need for drinking water including for cooking need must be free from pathogenic bacteria and contamination that capable of causing gastrointestinal diseases (Boekoesoe, 2010).

The lack of owning and using healthy latrine causes most of people defecate in any places which induce pollution of waterways, soil, irrigation, rivers and water sources by *coliform bacteria* indicates the relation between human feces and the water sources (Saleh & Rachim, 2014).

Sanitation is needed to break the germ link from its infectious source and as an environmental control to realize a healthy society. Repairing of sanitation in this case requires real work. One of them is making efforts to accelerate sanitation developing by doing some actions to build family latrine thoroughly, as of the Katajaga Program (Village of Qualified Family Latrine) was born. Katajaga Program is a concept where all families in a region must own and use only family latrines for defecating. This is done to reduce the incidence of infectious diseases and environmental pollution from the scarcity of owning family latrine. Efforts are made by giving stimulants to people who do not have latrine so by giving the stimulant the community has been able to create a healthy latrine, but if people want to make better family latrine, the community must use self-supporting independently (Laksono, 2015).

This study aims to analyze the effect of Katajaga Program (Village of Qualified Family Latrines) to *Fecal Coliform* Contamination, Diarrhea and Typhoid Occurrence in Gunungpati and Mijen Sub-districts of Semarang.

This research is useful to encourage people in improving sanitation development and prevent disease transmission caused by poor sanitary conditions.

METHODS

The method used was quantitative comparative of case control design with retrospective time approach. The population in this research was the whole society who was given the Katajaga program in Gunungpati Sub-district and the society who was not given the Katajaga program in Mijen sub-district, while the sample in this research used the minimum sample 30 people in the case group who had the digging well and got the Katajaga program and 30 people in the control group had the digging well and did not get the Katajaga program.

Sampling was done by simple random sampling technique. The research instrument used check list of digging well state, questionnaire of respondent's knowledge and attitude, examination of water quality test using digging well water samples by MPN (Most Probable Number) method of enumerating organism through laboratory test and diarrhea and typhoid occurrence data was obtained from data base of Health Department of Semarang and Community Health Center in Gunungpati and Mijen Sub-districts for three years from 2014 to 2016.

The time of the study was on September 2017 to October 2017. The data was collected based on the results. Data analysis was done by using *Shapiro-Wilk* and *Mann Whitney* statistic test using SPSS 16.

RESULTS AND DISCUSSIONS

This study aims to analyze the influence of Katajaga Program (Village of Qualified Family Latrine) to *Fecal Coliform* Contamination, Diarrhea and Typhoid Occurrence in Gunungpati and Mijen Sub-districts of Semarang. The results are described as follows :

The Analysis Result of *Fecal Coliform* Contamination Differentiation Test in Katajaga Group and Non Katajaga Group

Table 1. The Analysis Result of *Fecal Coliform* Contamination Differentiation Test in Katajaga Group and Non Katajaga Group

<i>Fecal Coliform</i> Contamination				
Group	N	mean	±	P-Value
		s.d		
Katajaga	30	103.66	±	0.047
		97.41		
Non Katajaga	30	140.40	±	
		77.09		

Based on table 1 it can be seen that the average rate of *fecal coliform* contamination in katajaga group (case) of 103.66 ± 97.41 is lower than non katajaga group (control) of 140.40 ± 77.09 . Based on Mann Whitney test results obtained p-value of 0.047 ($p < 0.05$) which means there was a significant difference of *fecal coliform* contamination rate between case and control groups.

The results showed that there were significant differences in *fecal coliform* contamination rates between case and control groups. *Fecal coliform* contamination rates in the case group were lower than in the control group. The case group was given the Katajaga program, the water source was light contaminated while the control group was not given the Katajaga program, the water source was medium contaminated. It showed the number of *fecal coliform* bacteria in the case group is lower (< 100 colonies / 100 ml) than in the control group (100-240 colonies / 100 ml).

This was in line with research conducted by Dewi & Haribowo (2015) in Subangjaya Village of Subang obtained the average value of *e. coli* which was in precise $> 240 / 100\text{ml}$ while the limit issued by the Minister of Health No. 416 / MEN.KES / PER / IX / 1990 is 0 MPN / 100ml so this might increase cases of disease caused by water such as infectious diseases caused by *e. coli* bacteria.

The presence of *escherechia coli* in water or food sources is a definite indication contamination of human feces. The presence of *escherechia coli* shows a sign of poor sanitation practices against water, food and milk products (Trihora & Siwiendrayanti, 2015).

Owning healthy latrine can reduce the number of water source contamination. The Katajaga program is a comprehensive program, it does not only focus on providing latrine stimulant to the community by building latrines based on health requirements but also providing

an understanding to the public about the importance of maintaining sanitation and having healthy latrine. Meanwhile, according to Hartini & Munandar (2016), the requirements of a healthy latrine i.e. feces did not contaminate the water, keep the waste did not cause odor and allow animals/insects to enter the cesspool, safe latrine closet for users, equipped by protective walls and roof and also available water and sanitizer.

It is according to Mohammed & Zungu (2016) who stated that owning latrine/latrine facilities were used significantly was associated with diarrhea, it meant that households with better latrine facilities had a lower prevalence of diarrhea than those that not used and repaired latrine.

Mlenga (2016) who researched about sanitation repairing program had used Water, Sanitation and Hygiene (WASH) method which was done in Swaziland from 2012-2015. It measured the effectiveness of aid approach for clean water supply, sanitation and hygiene practices. It also measured community knowledge, attitude and practice before and after receiving WASH assistance. The WASH program results showed the increasing of target population percentage to access safe water sources, the increasing of water use coverage in liters per person and the repairing of sanitation and hygiene practices to the society.

The level of public knowledge about environmental health is very important, because it will affect the behavior of the next community in terms of procurement family latrines or facilities in terms of utilization to maintenance family latrines (Kurniawati & Windaswara, 2017).

The Analysis Result of Diarrhea Occurrence Differentiation Test in Katajaga Group and Non Katajaga Group

Table 2. The Analysis Result of Diarrhea Occurrence Differentiation Test in Katajaga Group and Non Katajaga Group

Diarrhea Occurrence				
Group	N	mean	±	P-Value
		s.d		
Katajaga	36	90.33	±	0.034
		27.42		
Non Katajaga	36	106.52	±	
		32.25		

Based on table 2 it can be seen that the average rate of diarrhea occurrence in one month in katajaga group (case) of 90.33 ± 27.42 is lower than non katajaga group (control) of 106.52 ± 32.25 . Based on Mann Whitney test

results obtained p-value of 0.034 ($p < 0.05$) which meant there was a significant difference in diarrhea occurrence rate between case and control group.

The results showed that there was a significant difference of occurrence rate between case and control group. The number of diarrhea occurrence in the case group was lower than in the control group. The case group was given the Katajaga program, the number of occurrence is about 90 cases per month while the control group was not given the Katajaga program, it is about 107 cases per month.

Diarrhea can be prevented by taking preventative steps i.e. increasing knowledge and understanding about washing hands using soap before and after having meal, after using latrine, before preparing food, maintaining nail hygiene, boiling drinking water and maintaining latrine hygiene (Rohmah & Syahrul 2017).

Hand washing using soap after defecation or before having meal significantly reduces reduction of diarrhea risk about 48%. The infection of diarrhea depends on the *faecal-oral* route through microbial agents such as virus and bacteria, most of the study respondents use to have meal using their hands directly so hand hygiene is essential to prevent the risk of diarrhea (Jung et al., 2017).

The majority of respondents in the case group had good knowledge and attitude while the majority of respondents in the control group had enough knowledge and attitude. If the respondents had good knowledge and attitude, they would be able to decide the appropriate activity to improve the healthy living standard and would increase awareness in healthy behavior so as would be able to improve the physical, mental and social health rate.

It is according to Mohammed & Zungu (2016) who stated that the knowledge of respondents was significantly related to the occurrence of diarrhea, less knowledge of respondents about the cause of diarrhea would risk 3.09 times than respondents who had good knowledge because knowledge was one of significant protective factors for diarrhea.

Environment and personal hygiene factors are important contributors to diarrhea (Solikah *et al.*, 2017). Diarrhea was a major killer in adults and 9.2% of total childhood deaths in rural areas was due to people still lacking clean water. Integrated approaches, including hand washing and sanitation repairing were emphasized, but the importance of clean water supply was also a particular concern. Reducing the diarrhea occurrence rate by changing community behavior without improving the water source was not a good solution. Improving adequate clean water

supply will reduce the occurrence of diarrhea to the children under 5 years about 11% (Seungman et al., 2015).

The Analysis Result of Typhoid Occurrence Differentiation Test in Katajaga Group and Non Katajaga Group

Table 3. The Analysis Result of Typhoid Occurrence Differentiation Test in Katajaga Group and Non Katajaga Group

Group	Typhoid Occurrence			P-Value
	N	mean	± s.d	
Katajaga	36	19.97	± 6.62	0.009
Non Katajaga	36	28.52	± 13.85	

Based on table 3 it can be seen that the average rage of typhoid occurrence in one month in katajaga group (case) of 19.97 ± 6.62 is lower than non katajaga group (control) of 28.52 ± 13.85 . Based on Mann Whitney test results obtained p-value of 0.009 ($p < 0.05$) which meant there was a significant difference of typhoid occurrence rate between case and control group.

The results showed that there was a significant difference of occurrence rate between case and control group. The number of typhoid occurrence in the case group was lower than in the control group. The case group was given the Katajaga program, the typhoid occurrence was about 20 cases per month whereas the control group was not given the Katajaga program, the typhoid occurrence was about 29 cases per month.

Typhoid can be prevented by washing hands using clean water to stop bacterial infection, avoiding eat raw fruits and vegetables, not drinking contaminated water, cleaning eating and cooking utensils by using clean water, keeping food hygiene by covering food to avoid flies, boiling the drinking water, paying attention to the consumed food and beverages quality and doing vaccination or immunization (Azhar et al., 2014).

This is in line with Augsburg & Lemes (2015), who stated that the available ways to reduce the infection of germ and pathogen which might cause diarrhea, typhoid and other infectious diseases were by managing and handling water in household safely and adequately, managing clean water in household, defecating used latrine, and washing hands before and after having meal and defecating.

Households that had the availability of handwashing facilities and the right

handwashing habits were 0.40 times less likely to have typhoid compared to households that did not do so. Washing fruits and vegetables as well as kitchen utensils using clean water was an action that had a lower typhoid prevalence. All such practices were protective against typhoid and reduce the risk of typhoid compared to household that did not do it. (Mohammed & Zungu, 2016).

Alba *et al* (2016) stated that there was a connection between typhoid and the availability and accessibility of water and soap. Handwashing practice was also influenced by the level of water availability in the household. Repairing access to the sanitation was done through the promotion of hygiene (to induce behavioral change), promotion of sanitation (to create demand for sanitation needs) and adding clean water infrastructure so that people might change their behavior to be better and healthier.

The majority of respondents In the case group had good knowledge and attitude while the majority of respondents in the control group had enough knowledge and attitude. It was according to (Alba *et al.*, 2016) who stated that good knowledge about risk factors of typhoid was very necessary, so it was important to make efforts for developing health education materials including prevention efforts, infection ways and typhoid handling and individual behavior factors that were able to affect the risk of typhoid disease infection.

CONCLUSION AND SUGGESTION

Based on the results of research and discussion can be concluded that there is significant influence of *fecal coliform* contamination, *diarrhea* and *typhoid* occurrence between case and control groups.

Suggestions to improve individual hygiene behavior are using healthy latrines and making efforts to prevent infectious diseases by conducting a clean and healthy life behavior.

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