



## The Relationship of Clean Water Facilities and Fecal Discharge to Incidence of Diarrhea in The Tidal Floods Area and Not Tidal Flood in Pekalongan

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### Abstract

Diarrhea is a major health problem in Indonesia. The incidence of diarrhea in Pekalongan increased from 622 patients in 2015 to 1,507 in 2016 and a 10% increase existing 2017. The purpose of the study to analyze the relationship of clean water facilities and fecal discharge to incidence of diarrhea in the tidal floods area and not tidal flood in Pekalongan. The study was conducted with a retrospective approach. The population in this study 2,186 homes were tidal flood. The sample amounted to respectively 96 people in the area tidal flood and 96 in the area do not tidal flood, with purposive sampling techniques. Retrieving data obtained by giving questionnaires and in-depth interviews in the respondents. Bivariate data analysis research shows the incidence of diarrhea by 74% tidal flood region while not tidal flood the incidence of diarrhea by 45.8%. Tidal flood can cause a seedy neighborhood and become a breeding ground for bacteria. Water supply contaminated by tidal flooding can cause diarrhea. Tidal flood damage excreta disposal facilities, due to the septic tank is covered with water, so a lot of bacteria that can cause diarrhea. There is a relationship clean water facilities and fecal discharge to incidence of diarrhea in the tidal floods area and not tidal flood. Suggestions community is expected to understand the importance of maintaining healthy clean environment to avoid diarrhea. so many bacteria that can cause diarrhea. There is a relationship relationship of clean water facilities and fecal discharge to incidence of diarrhea in the tidal floods area and not tidal flood. Suggestions community is expected to understand the importance of maintaining healthy clean environment to avoid diarrhea. so many bacteria that can cause diarrhea. There is a relationship diarrhea with clean water facilities and fecal discharge to incidence of diarrhea in the tidal floods area and not tidal flood. Suggestions community is expected to understand the importance of maintaining healthy clean environment to avoid diarrhea.

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## INTRODUCTION

Diarrhea is the excess liquid that occurs one or more times out of the water to form a dilute or liquid stool (Suriadi, 2010). Diarrhea with a frequency of more than 3 times a day (Zein, 2004). Diarrhea is tracking defecation (BAB) is characterized by BAB more than 3 times a day with blood and or mucus (Aini, 2016).

Diarrheal disease is endemic in Indonesia and is also a potential disease outbreaks (Unusual) that often occurs kematian. Selain as the cause of death, morbidity of diarrhea is still high in Indonesia (Indonesia Health Profile 2011). Numbers of cases of diarrhea in the province of Central Java Pekalongan showed the highest incidence of diarrhea after a 144.4% amounting to 221.6 percent Tegal (Central Java Health Office, 2016). Based on information obtained from Pekalongan City Health Office in 2016 the number increased incidence of disease increased in PHC Kusuma Bangsa from 622 patients in 2015 to 1,057 people in 2016. This is due to the impacts of climate change affecting the tidal flood / tide (Pekalongan City Health Office, 2016).

Tidal flood is a natural disaster that has a long history of human life on earth, have broad impact and long-term (Agustiana, 2013). Tidal flood occurred in the city - the city of Java coast of Sumatra (Ikhsyan, 2017). Based on preliminary data collected by the Post's National Agency for Disaster Management (BNPB) report Disaster Management Agency (BPBD), there are 24 districts / cities in Indonesia are experiencing tidal flooding and tidal waves (Erdianto, 2016). The coastal area in the north of the island of Java experience more severe impacts from tidal floods one of them is the town of Pekalongan (Erdianto, 2016).

At this time, the flood tide (tidal flood) continued to expand and the higher in Pekalongan city, submerging three districts namely North Pekalongan, Pekalongan West and East, or 25% of the city area. Height of the

tidal flood continues to rise from the previous 50cm below has now reached 1 metre (Pranggono, 2017). This leads to a lack of clean water and pollution at the point of disposal of excreta. Water can also be a nest and spread of diseases that are harmful to human. Water dirty is ideally suited and comfortable for disease-causing microorganisms. Diseases that breed spread through the intermediary of water one of them is microbial diarrhea (Wandasari, 2013).

Residents in the area of the health center Pekalongan Kusuma Bangsa utilize water for everyday use wells and taps. The well is located in the region has been polluted stagnant water tidal region of the township. Tidal flood contamination by human waste leading to increased risk of infectious diseases such as intestinal infectious risk disease is typhoid, diarrhea, dysentery and so forth (Indonesian Ministry of Health, 2011). Therefore need to do research on water supply and disposal of excreta on the incidence of diarrheal disease in Puskesmas Kusuma Pekalongan.

This study aimed to analyze the the relationship of clean water facilities and fecal discharge to incidence of diarrhea in the tidal floods area and not tidal flood.

## METHOD

The study was conducted by using a case-control design with a retrospective approach. The variables in this study included independent variables consisting of clean water and excreta disposal facilities as well as the dependent variable is the incidence of diarrheal disease. This research was conducted in the region in the area of tidal water floods Kusuma Bangsa health center and the area did not flood tidal water in Puskesmas Krapyak Pekalongan. The samples in this study using purposive sampling technique. The number of samples to be used in this study was calculated using the formula Slovin with a standard error of 10% in order to obtain a sample of 96 people in the area tidal flood and 96 in the area do not tidal

flood. The study was conducted in March 2018 until May 2018 in Pekalongan.

The research instrument used for data collection include questionnaires and in-depth interview to the respondent. Analysis of the research data was performed using bivariate data analysis with chi square test.

**RESULTS AND DISCUSSION**

Data from a study of 192 respondents consisting of 96 respondents affected by tidal flooding and 96 respondents are not affected by tidal flooding, are listed in Table 1 as follows.

**Table 1.** Distribution of frequencies cause of diarrhea in the tidal flood area and not tidal flood

Genesis Diarrhea	Tidal area f	flood (%)	The area is not the tidal flood f	(%)
Diarrhea	71	74	44	45.8
not Diarrhea	25	26	52	54.2
Total	96	100	96	100

The results of the study Table 1 shows that the frequency distribution of respondents who experienced diarrhea colored tidal flood of 74%, higher than that of respondents who eat diarrhea not tidal flood area 45.8%. Results showed what causes diarrhea, which can safe water and excreta disposal facilities were unhygienic.

The bivariate analysis between water supply and discharge stool disposal container, using Chi-Square test, presented in Table 2.

**Table 2.** The Relationship of diarrhea with clean water in the tidal flood area and not tidal flood area

Clean water facilities	Tidal area		flood not Diarrhea		The area does not tidal flood		Diarr not Diarr		Total	
	F	%	f	%	f	%	f	%	f	%
Bad	80	43	32	17	12	6	11	4	38	20
Well	62	33	18	9	32	17	27	14	59	31
Total	142	76	50	26	44	23	38	18	97	51

Table 2 It is estimated that most people with clean water facilities badly in the tidal flood-related diarrhea 80 respondents (43%), higher than that of clean water bad in the area is not tidal flood was largely improve diarea 12 respondents (6, 5%) , Communities with good clean water facilities in the area of tidal flood diarrhea in no small part, namely 18 respondents (17.6%). Communities that provide clean water in the tidal flood area no small part better that 32 respondents (17.2%). There is a relationship between the water systems in the incidence of diarrhea.

Based on the findings in the field, the tidal flood regions result, the majority of respondents Source community water polluted tidal flood, closed net air, cloudy and lifted. Spot clean water that is closed but it caused flooding can cause diarrhea-causing germs remain and cause diarrhea. Areas not covered tidal flood clean water, use wells and taps for clean water clean so, spend a little will improve diarrhea.

In line with the research Fauziah (2016), differences in cause of diarrhea in urban and coastal areas are clean water faktorpenyediaan Coastal and urban areas. In reality the difference between the provision of clean water

in the coastal region and perkotaan. Masyarakat affordable clean water oleh penyediaannya mempunyai risiko smaller waste disposal, compared to people who do not have clean water (Latitude, 2016).

In line with the research Cita (2013), the tidal flood area of 31.4%, which means decent community water diarrhea. This is because the water needed for drinking, first prepared for boiling, and the air needs to be kept in a sealed container. So less likely to be contaminated with bacteria that cause diarrhea.

A total of 32 respondents (29.4%) of its water supply facilities eligible but cause diarrhea. This is because the majority of respondents hold water for drinking and cooking in open containers, as well as the distance of latrines with water sources less than 10 meters, making it likely to be contaminated with bacteria that cause diarrhea. In line with the results of the Sky (2016) shows that there is a relationship between the condition of clean water supply facilities with the incidence of diarrhea in infants in Puskesmas Rembang.

Clean water sources have a role in seed dispersal of infectious diseases, one of which is diarrhea. Diarrhea is transmitted through bacteria *E.coli*. These bacteria are linked to diarrheal disease, because these bacteria are easy to breed and spread fast and can move the hand to the mouth or through food and beverages (Heaven, 2016). These bacteria usually enter the water in a way when it rains, the water carries the waste from animal manure or man then seep into the soil through the pores of the soil surface or flowing water sources. The food was washed water contaminated with pathogens can be a cause of diarrhea. Too, the food was not completely closed can be exposed to flies that were previously perch in animal and human feces So as a result of hoarding contaminated waste that is not covered meeting (Aini, 2016).

Diarrhea can be transmitted through fluids or materials yang tercemar with feces such as drinking water, hands or fingers, the

food is placed in a pot that require polluted air. Condition of water facilities can be easily reached by pencemaran yang can occur in water (Latitude, 2016).

Based on Table 3 shows, most people with bad fecal diversion in the flood area tidal flood divide diarrhea that is 80 respondents (43%), compared to the transport of fecal bad in the area did not tidal flood mostly diarrhea that is 15 respondents (15.7%). but in communities with good fecal carriage in the tidal flood area small part to diarrhea in 18 respondents (17.6%), while in the public transport of fecal well in the area did not tidal flood diarrhea largely improve as much as 34 respondents (18.3%) , There is a relationship between the incidence of diarrhea excreta disposal.

**Table 3.** The Relationship of diarrhea with feces disposal tidal flood area and not tidal flood

exc reta dis pos al	Tidal area		flood not Diarr hea		The area does not tidal flood				Total	
	Diarr hea		Diarr hea		Diarr hea	Diarr hea	Diarr hea	Diarr hea		
	f	%	f	%	f	%	f	%	f	%
Bad	8	4	3	3	1	5	1	1	1	4
	0	3	2	1.	0	4	5	4.	3	7.
			4				7	7	6	
We	6	3	1	1	3	1	3	3	1	5
Il	2	3.	8	7.	4	8.	7	6.	5	2.
		3	6		3		3		1	4
Tot	1	7	5	5	4	2	5	4	2	1
al	4	6.	0	1	4	3.	2	9	8	0
	2	3				7			8	0

Based on results on the ground in tidal flood regions result, respondents still have to defecate (BAB) was not in the pit, they defecate in public toilet and the river is tidal air puddle. Although people have latrines but, within toilet with source of clean water <10 meter. Pada area does not tidal flood people have latrines, clean water sources > 10 meters with septitank. Communities that have latrines and clean water sources toilet with distance > 10 meters where

latrines are dirty and need to be invited flies and germs that cause diarrhea. can be nested therein. The disease can cause a variety of diarrheal diseases.

The factors associated with the incidence of diarrhea is one of which is the release of stool, because there is a relationship between affinity toilet with diarrhea (Meliyanti, 2016). Based on the results Lubis (2017) concerning improper disposal of feces in children under five that can cause diarrhea.

Research conducted by wulandari (2009), in addition to sources of drinking water, type of latrine is also a means of sanitation-related diarrhea. Type improper storage will shorten the chain of transmission of diarrheal disease. In line with the research Lubis (2017) there is a relationship between the type of latrine on the incidence of diarrhea in balita. Jenis latrines that meet the requirements will need someone from the attacks of various diarrheal diseases.

Results of interviews with respondents, people who do not have latrines, regular toilet toilet water neighbors, public toilets and places associated disembarang tidal flood. Chapter communities in any place causing the sludge is exposed to flies, then flies alighted on food and drink and ultimately cause diarrhea. Communities that do not have it, if the evening would like BAB usually uses water tidal inundation to defecate because people are lazy to go to the public toilet.

## CONCLUSION

There is a relationship diarrhea with clean water and excreta disposal facilities in tidal flooded areas and not tidal flood. Diarrhea with clean water facilities in areas of the tidal flood amounting to 58.3% and that is not the tidal flood amounting to 28.1%. Diarrhea with feces disposal in tidal areas by 58.3% and that is not the tidal flood of 26%.

## REFERENCES

- Aini N., Mursid R., Budiyono. 2016. Hubungan Kualitas Air Minum Dengan Kejadian Diare Pada Balita Di Wilayah Kerja Puskesmas Banyuasin Kecamatan Loano Kabupaten Purworejo. *Jurnal Kesehatan Masyarakat Undip.* (4) 1.
- Agustiana E, S. 2013. Tingkat Depresi Pada Masyarakat Semarang Utara Yang Mengalami Banjir Rob. *Jurnal Universitas Islam Sultan Agung Semarang*
- Cita R, S. 2013. Hubungan Sarana Sanitasi Air Bersih Dan Perilaku Ibu Terhadap Kejadian Diare Pada Balita Umur 10-59 Bulan Di Wilayah Puskesmas Keranggan Kecamatan Setu Kota Tangerang Selatan Tahun 2013. *Jurnal Kesehatan Masyarakat Universitas Islam Negeri Syarif Hidayatullah Jakarta*
- Depkes RI. 2011. Buku Pedoman Pelaksanaan Program P2 Diare. Jakarta: Departemen Kesehatan Republik Indonesia
- Dinas Kesehatan Kota Pekalongan. 2016. Pekalongan
- Erdianto K. 2016. Banjir Rob dan Gelombang Pasang landa 24 Kota di Jawa, Ratusan Bangunan Rusak. *Kompas*
- Fauziah A., La Ode Ali I, A., Lymbran T. 2016. Studi Komparatif Determinan Kejadian Diare di Wilayah Pesisir dan Perkotaan.
- Ikhsyan N., Chatarina M., Peduk R. 2017. Analisis Sebaran, Dampak Dan Adaptasi Masyarakat Terhadap Banjir Rob Di Kecamatan Semarang Timur Dan Kecamatan Gayamsari Kota Semarang. *Jurnal GeoEco.* 3 (2)
- Kementrian Kesehatan RI. 2011. Buku pedoman pengendalian penyakit diare. Direktorat jendral pengendalian penyakit & penyehatan lingkungan. Kementrian kesehatan Republik Indonesia. Jakarta
- Kemenkes RI. 2011. Pengendalian Diare Di Indonesia. *Bulletin Jendela Data dan*

- Informasi Kesehatan. Vol. 2 No. 2 hal 19-25
- KosekM., Berry C And Guerrant, R.L.2003. The Global Burden Of Diarrheal Disease, As Estimated From Studies Published Betwen 1992 And 2000. Bulletin of the World Health Organization. 81 : 197-2004
- Langit L, S. 2016. Hubungan Kondisi Sanitasi Dasar Rumah Dengan Kejadian Diare Pada Balita Di Wilayah Kerja Puskesmas Rembang. Jurnal Kesehatan Masyarakat UNDIP. Vol. 4(2)
- Lubis A. 2017. Hubungan Faktor Lingkungan Dengan Kejadian Diare Pada Keluarga Yang Mempunyai Balita Di Dusun Bandar Setia Kec.Percut Sei Tuan Kab.Deli Serdang. Jurnal Ilmiah Kohesi Vol.1(2)
- Meliyanti F. 2016. Faktor-Faktor Yang Berhubungan Dengan Kejadian Diare Pada Balita.Jurnal Ilmu Kesehatan Aisyah. 1( 2)
- Monika K, T, G. 2012. Hubungan Personal Hygiene Ibu dan Sarana Sanitasi Lingkungan Dengan Kejadian Diare Pada Anak Balita Di Desa Raja Kecamatan Boawae Kabupaten Nagekeo. Jurnal Kesehatan Masyarakat Vol. 7(1)
- Suriadi Skp, MSN., Yuliani Rita Skp. M.Psi. 2010. Asuhan Keperawatan Pada Anak. Jakarta : CV Sagung Seto
- Wandasari A, P. 2013. Kualitas Sumber Air Minum Dan Pemanfaatan Jamban Keluarga Dengan Kejadian Diare.Jurnal Kesmas UNNES Vol. 9 (1) Hal. 24 – 29 ISSN 1858-1196
- Wulandari A, P. 2009. Hubungan Antara Faktor Lingkungan dan Faktor Sosiodemografi dengan Kejadian Diare Pada Balita di Desa Blimbing Kecamatan Sambirejo Kabupaten Sragen Tahun 2009. Surakarta: Universitas Muhamadiyah
- Zein U. 2004. Diare Akut Infeksius Pada Dewasa. Sumatera Utara: Jurnal Fakultas Kedokteran Universitas Sumatera Utara