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FROM LIVING WELL
TO AGING WELL:
A MULTIDISCIPLINARY APPROACH

Purwokerto, 4-5 November 2017



UNIVERSITY OF JENDERAL SOEDIRMAN
INDONESIA
2018

*Proceedings of the 2nd International Conference in Health Sciences (ICHS)
Purwokerto, Indonesia, November 4-5, 2017*

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**Penerbit
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PURWOKERTO
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Water Pollution in Bedadung Watersheds Area and Diseases in Elderly People

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Abstract

Water pollution involves the pollution of surface waters and/or groundwater. Water pollutants are moving slowly into the watersheds, carrying bad affect for large areas. Accumulation of water pollutant in the body, especially in elderly, could have serious health impacts, which may cause a series of diseases. The diseases caused by water pollution include diabetes type-2, uric acid, rheumatic disease, vascular diseases, myocardial infarct, nervous system damage, liver damage, and cancer. These factors can accelerate aging process. The aim of this study is to analyse the diseases of elderly people in the Bedadung Watersheds area, Jember, Indonesia. These are needed to develop an aging health care strategy. This study is conducted by interviews and questioners in the elderly who live in the Bedadung watersheds area randomly (n=77), who are willing to fill in informed consent. The source of drinking water for the community consumption comes mainly from the dig wells. Groundwater contamination for Bedadung watersheds area is mostly caused by sewage households, plastics waste, natural waste, styrofoam, chemical waste water, baby diapers and menstrual pads. Elderly who consumes drinking water from dig wells generally suffer more than one disease. Diseases suffered by elderly in the Bedadung watersheds area of are uric acid, hypertension, cholesterol, gastric ulcers and skin diseases (five common diseases). Elderly who suffering diseases are 62.79%. Accordingly, educational and awareness programs should be organized to control the water pollution.

Keywords: degenerative diseases, water pollution, elderly people, water consumption

Introduction

Water is one of the important natural resource in human's lives.¹ One person a day needs minimum of 7.5 litres of water to fulfil their needs for drinking, preparing food, and personal hygiene. Standard requirement of water per person is 50 litres to ensure all their needs.² One of the source of the water is a river but in many developing countries, river is heavily polluted mainly due to human activity.³ Water pollution will change the water quality which leads to environment damage and decrease quality of human health.¹ Drinking water from ground water, although generally has low pathogen concentrations, because the water is filtered during transit through underground layers by sand, clay, or rocks, but water-soluble chemicals can harm health body.³ Besides that, there are nonpoint-source pollution involves many small sources that combine to cause significant pollution. It is very difficult to control and may come from different sources like sewage from households, pesticides, fertilizers, industrial wastes, etc. Non-point source pollution is the main and leading cause of water pollution.⁴

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Bedadung river is one the big river in Jember, East Java, Indonesia which has 16 watersheds. Bedadung River flows through the Jember city so it's a well-known river. This river has 46,875 meters long and enable to irrigate the rice field up to 93.000 hectare.⁵ Characteristic of this river is very unique due to easily overflow on rainy season but have very low which tend to dry in the dry season. The number of population in Bedadung watersheds area is increasing every year. It is means that the need for clean water also increasing.⁵

Bedadung watersheds area receive a variety of pollutants, either from pollutants that flow directly into the river or from non-point sources.⁶ There are a lot of people aware about this but some of them are doesn't know or doesn't care about these things. The water of Bedadung river is used for drinking, laundering, bathing, and toileting. Often too, the people throw the garbage in this river.⁵ Polluted water is harmful to our body due increase risk for the disease.⁷

Epidemiological evidence shows that one of the major epidemiological trends of this century is the rise of chronic diseases that affect more elderly than younger people.⁸ Many diseases associate with polluted water are diabetes type-2, uric acid, rheumatic disease, vascular diseases, myocardial infarct, nervous system damage, liver damage, and cancer.⁹ This study is an preliminary study about the effect of water pollution in health status of elderly people in Bedadung watersheds area. The aim of this study is to determine the characterize of elderly people in Bedadung watersheds area.

Material and Method

This is the descriptive analytic study. Population of this study are elderly people (>45 years old, pre-elderly) who live in Bedadung watersheds area (Sumbersari sub-district, Jember, East Java, Indonesia). This study conducted with 77 elderly people, who are willing to fill in informed consent. This sample was randomly chosen from three village in Sumbersari sub-district.

This study conducted with questioner and interview with elderly people. Before taking questioner, the elderly people were asked to fulfil the informed consent. The questioner consist of identity of the sample, source of water for consumption, and health status of elderly people. The questioner was made by the researcher with collaboration with Research Centre for Elderly People in University of Jember, East Java, Indonesia.

Result

Based on observation in Bedadung watersheds area is contain much garbage and waste product, especially areas that pass through Jember district. The people who dwelling in watersheds areas is still have bad behavior, such as often throw the sewage into the riverbank, dispose of toilet waste into runnel and rivers. The area in riverbanks is very dirty.

Characteristic of elderly peoples in three area Sumbersari sub-district, Jember, are shown generally consume drink water from dug well (Fig 1). As known, dug wells in Bedadung watersheds area can receive water from groundwater that flows from river water and from various places, which may have been contaminated with various pollutants from anywhere places. The long-term accumulation of water pollutants in the body can stimulate various chronic diseases for many elderly people. Majority elderly people consume drink water from dug wells followed with refilled water, tap water, and packaged drinking water. Generally, the distance of dug wells with septic tanks is less than 10 m (52%). This is showed that the elder people dwelling in Bedadung watersheds area consumed the contaminated water which may harm their health status.

The consumption of drinking water as presented in Figure 2 shows the relation to diseases suffered by the elderly in the watersheds as listed in table 1. Table 1 showed many diseases which suffered by the elderly people who consume drinking water from several

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sources. Table 1 also shows that Female more suffered diseases than male. Generally, diseases suffered by elderly more than one. The most diseases suffered by the elderly are uric acid disease, and five main diseases suffered by elderly living in sumbersari sub-district Jember include uric acid, hypertension, cholesterol, gastrointestinal disorder, and rheumatic disease.

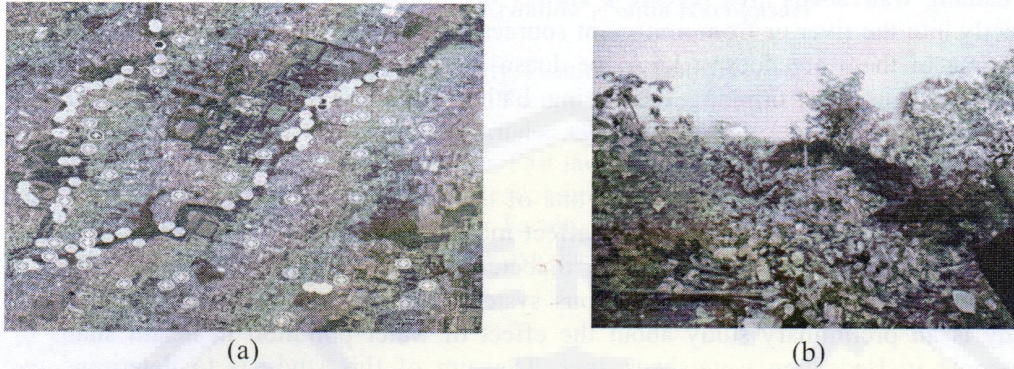


Fig 1. Condition the Bedadung watersheds area. Garbage spot (yellow spot) are surrounding the Bedadung watersheds area (greenline) (a) and garbage heap (b) in garbage spot.

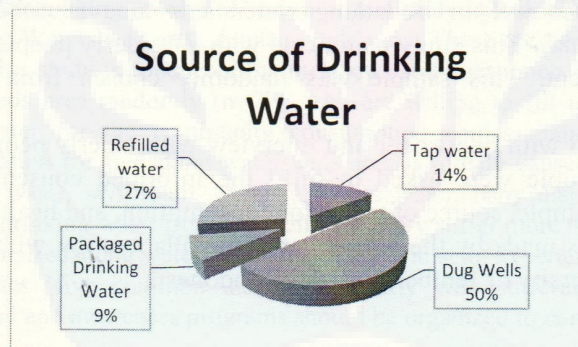


Fig 2. Source of drinking water for elder people in Sumbersari sub-district, Jember

Table 1. Source of drinking water and Health status of elderly people dwelling in Bedadung watersheds area

No	Diseases	Water service owned by government (tap water)		Dug Wells		Packaged Drinking Water		Refilled Water	
		M	F	M	F	M	F	M	F
1.	Uric acid disease	2	1	4	6	-	-	2	2
2.	Hypertension	-	4	1	3	-	1	-	-
3.	Cholesterol	-	-	-	4	1	1	-	1
4.	Gastrointestinal disorder	-	2	1	2	-	-	-	2
5.	Rheumatic disease	-	2	2	-	-	-	2	-
6.	Allergy	-	1	-	2	1	1	1	-

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7.	Vertigo	1	1	1	-	-	-	-	1
8.	Asthma	1	-	-	-	1	-	-	-
9.	Cataract	-	-	1	-	1	-	-	-
10.	Migraine	1	-	-	-	-	-	-	-
11.	Stroke	-	1	-	-	-	-	-	-
12.	Diabetes Mellitus	-	2	-	-	-	-	-	1
13.	Toothache	-	1	-	-	-	-	-	-
Total		5	15	10	17	4	3	5	7
Percentage (%)		6,50	19.48	12.99	22.08	5.19	3.90	6,50	9.09

M (male); F (Female)

Discussion

Water pollution and health problem have a great association, especially for elder people who are very susceptible to diseases.^{1,3} Based on this results shows generally the community dwelling in Bedadung watersheds area drink water from dug wells (50%), which can be caused by water contaminants.

The most diseases suffered by the elderly in sumbersari sub-district Jember, are uric acid disease. Few studies have investigated the association between serum uric acid (UA) and cadmium exposure.¹⁰ Higher blood cadmium (CdB) level have positive relationship with serum UA. Serum uric acid (UA) is the final enzymatic product when the body breaks down purine. Increased production or decreased excretion of UA causes hyperuricemia. Previous studies have indicated that hyperuricemia is associated with cardiovascular diseases and metabolic diseases such as diabetes, hypertension and dyslipidemia.¹¹⁻¹⁶ In fact, uric acid has a useful antioxidant function in cell regeneration. Every cell rejuvenation we need uric acid. However, if the body lacks antioxidants, there will be many free radicals that kill the body cells. Humans are known to be the only mammals that can not make their own antioxidants. Therefore, humans (especially elderly) need to get antioxidants from the outside, such as vitamin E and vitamin C.

The accumulation of uric acid in the organs of the body can cause the emergence and development of disease. The accumulation of uric acid in the heart causes the emergence of heart disease. Although not clearly the relationship between heart disease and blood vessels caused by uric acid yet. However, research shows that patients with high uric acid levels are at risk for heart disease and blood vessels (hypertension and other blood vessel disease).

Tap water is a source of water that can cause illness, after dug wells, but tap water more trigger incidence of hypertension than uric acid. It seems need to know further why condition like this happen, and why women are generally more easily contaminated by water pollutants. Refilled Water also seem potential to cause illness in the elderly. This is allegedly because the purification process is done less perfect.

Prevention of the occurrence and development of diseases due to water pollution in the elderly living in the Bedadung watershed area needs to be anticipated through education to the community to maintain clean water sources and the impacts on health. In addition, clean living behaviors as well and need to be done so that they can live healthy. Together with that, waste management around the Bedadung watersheds area needs to be well regulated, so as not to impact on public health more broadly.

Conclusion

Major sources of water pollutions in the Bedadung watershed are household waste, natural waste, plastics, agriculture wastes (pesticides and fertilizers). The most diseases suffered by the elderly in sumbersari sub-district Jember, are uric acid disease, follows by hypertension, cholesterol, gastrointestinal disorder, and rheumatic disease. Prevention of

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diseases by water pollution and improve the health status of the elderly need to be done through education and awareness programs.

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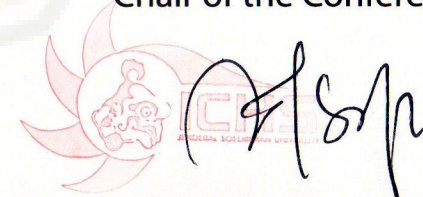
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