

## **SOCIOECONOMICS AND WATER USE SANITATION BEHAVIOURS AMONG PEOPLE IN THE DOWNSTREAM AREA OF MUSI RIVER, PALEMBANG, SOUTH SUMATERA, INDONESIA**

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### **Abstract**

Water use sanitation behaviors are one of the most important aspects towards sustainable healthy lives in which every year approximately two to three million people die because of poor sanitation. The study aimed to determine the water use sanitation behaviors and the association between socioeconomic status and water use sanitation behaviors. An analytical cross-sectional study was conducted by administration of structured questionnaire interview. Simple random sampling was applied to select 215 samples from 817 population based on six sampling points. Multiple logistic regressions were performed for data analysis. Almost all of the samples were male 97.21% (209 respondents). The mean age was 35.66 ±8.20 years old. The education background of the respondents was mostly graduate from the secondary education (73.49%) while 67.91% of them had monthly income less than Rp.2,000,000,- (149 US dollars). The majority of the samples were farmers or laborers (51.6%) in which 53.9% of them had high level of knowledge on water use sanitation while 49.77% had inadequate knowledge. However, most of the respondents had appropriate perception on how treat unsafe water (68.37%). As high as 78.14 % (95% CI: 72 to 83) of respondents had inappropriate water use sanitation behaviors. The multivariate analysis indicated that poor attitude on water use sanitation was statistically significant in association with inappropriate water use sanitation behaviors (Adj. OR=2.14; 95% CI: 1.03-4.45; p-value = 0.040). Those with lower monthly income had poorer sanitation behaviors (Adj. OR = 0.14; 95% CI: 0.04-0.51; p-value < 0.001). Those who completed the secondary or higher education level had better water use sanitation behaviors than those only completed the primary education level (Adj. OR=0.09;95% CI: 0.01-0.73; P-value < 0.001). Most of people living in the downstream area of Musi River practiced inappropriate water use sanitation behaviors and brought damages such as pollution in the river. Improvement on social economic status and attitude towards water use sanitation behaviors should help improving the situations.

**Keywords: Socioeconomics, water use, sanitation, behaviors.**

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## INTRODUCTION

Every year, approximately two to three million people die due to inadequate sanitation, poor hygiene, and contaminated food and water, in which most of these people reside in rural Asia and Africa. In Bangladesh particularly in the rural areas, the sanitation progress was rather slow during the 80s and 90s where the sanitation coverage growth rate was merely 1% per annum. [1]. Worldwide with around 2.5 billion people were without any improved sanitation and around 1.1 billion people mostly lived in rural areas and practiced open defecation. The factors are correlated with sanitation behaviors including the lack of interest in attending cluster meetings, poverty, and the lack of willingness which are definitely the factors that impede knowledge and hygiene practices [2].

Indonesia has approximately 250 million citizens with the fact 100 million of them have inadequate access to proper sanitation and as many as 66 million is practicing open defecation. Nevertheless, poor sanitation conditions lead to a high prevalence of fecal borne illnesses, such as typhoid and diarrhea, which in any two-week period afflict approximately 11% of Indonesia's children. These diseases are linked directly to more than 40,000 deaths among children aged 5 years-old each year in Indonesia. In addition to these dire health consequences, communities living without improved sanitation have a propensity to suffer significant economic losses. A study carried out by the World Bank showed that Indonesia loses 2.4% of its overall GDP or USD 6.3 billion, annually, to solve the problems of inadequate sanitation, poor hygiene, and lack of access to safe water [13].

Musi River with a length of 510 km is the largest and longest river in the province of South Sumatra. Household wastes comprising of garbage, human waste, and detergent inflow to the main river which trigger the pollutions of Musi River flow throughout the city of Palembang. In addition, in adjacent to Musi River, there are many farms and rubber plantations disposing chemical wastes into the river beside many people who wash or dispose pest controllers to the stream [3]. The upstream area of Musi River segmented with protected forest ecosystems have changed as the results of human activities. Meanwhile, the downstream area of Musi River are full of industries including refineries oil company (PERTAMINA oil company), fertilizer plants (PUSRI COMPANY), natural rubber processing (HOKTONG COMPANY), plywood, and others companies which potentially lead to the degradation of environmental quality, particularly the river water quality. Even the downstream area of Musi River is used as a source of water by the residents along the river, in addition to as the source of water and a place to dispose the waste liquids by the industries that worsen the river water quality [3].

The water quality assessment of Musi River was carried out by taking water samples from 18 points ranging from the upstream to the downstream area of Musi River. The results indicated that Musi River water was polluted and the characteristics were classified into class II and III water quality from four classes of the water quality. The Class I is the water level for drinking water, Class II is fairly clean water which should be managed properly, Class III is water suitable for fishing, and Class IV is water for agricultural uses [4]

The report of the entire health centers in Palembang City indicated that there were more than 27,000 people suffered from diarrhea in period of January to September 2014. It is the evidence that community's knowledge on sanitation was very low. The residents performed improper and non-hygienic waste disposal practices that as many as 85% of the residents dispose the wastes into the river. In addition, only 42% utilized water taps whereas 32% used river water for washing. These practices could have extended impacts on the water quality and their personal health and well being [5].

Therefore, the current study was aimed to determine the water use sanitation behaviors and the association between socioeconomic status and water use sanitation behaviors among people who lived in the downstream area of Musi River, Palembang, Indonesia.

## **METHOD**

An analytical cross-sectional study was conducted to assess water use sanitation behaviors and socioeconomic factors among people who lived in adjacent to Musi River. This study used simple random sampling technique to select the observed families as the participants from the total number of 817 families in the study areas. Subsequently, the head of each family represented the family in responding the interview in the form of structured questionnaire.

The study population was people living in the banks of Musi River spanning from Ilir I Sub-district Palembang City to Perajin Village, Banyuasin District. The target population was the family resided in the areas of Musi River banks. There were a total of 817 families in the study areas in 2015.

The sample of 215 families became the respondents to detect the proportion of households with the categories: family had toilet with septic tank, family had toilet directly connected to the river, and family used public toilet, among people who lived in the downstream area of Musi River. It was reported that approximately 80% of the household had toilet directly connected to the river with power of 84% and significant level of 0.05 [6].

The structured questionnaire interview was conducted after the written inform consents from the respondents were accepted by the researcher. The interview was conducted in the community nearby their house. The interview was performed between 30-50 minutes for each respondent.

Data was entered in Microsoft Excel (Windows Version) and transferred to STATA (Version 13, Stata Corporation, College Station TX) for the analysis. The categorization of data based on sex, education background, and others was expressed in number and percentage. Mean, standard deviation, median and range (minimum: maximum) were used to describe the continuous variables such as the age and income. The proportion of samples was calculated to show the magnitude of the categorical variables. Odds ratio (OR) and their 95% confident intervals (CI) was estimated using unconditional logistic regression with inappropriate sanitation behavior as an outcome. Bivariate analysis was performed to measure the effect of each variables of interest.

This study was obtained an ethical approval from the Ethical Committee of Khon Kaen University, Thailand. The number of certificate of ethical clearance was HE 582291.

## **RESULT AND DISCUSSION**

A total of 215 head of families were simply randomly selected from the population in the study areas. Most of the respondents were males 97.21% (209 males). The inclusion criteria of the sample was ‘the head of the family’ who lived in the downstream area of Musi River, since the head of the family had authority in decision making dealing with the important issues such as the management of household water supply, sanitation, and health.

The mean age of the respondents is  $35.66 \pm 8.20$  years old. The respondents should be healthy people in addition to the working age group and, in fact, most of respondent are married. Only six respondents were female and all of them are widows and served as the head of household. Women, more than men, suffer from the indignity of being forced to defecate and urinate in the open area, where they often had to walk to remote locations outside the village leading to the vulnerability of being assaulted. Most of the samples graduated the secondary education (73.49%) followed by the primary education (20.47%). Education is one of the most important instruments for combating child malnutrition and diarrhea. There were some evidences indicated that literacy among women was associated with diarrhea from sanitation behaviors. The average of monthly income of most of the respondents (67.91%) was less than Rp.2,000,000,- or 151 USD. It means that they earned the monthly income less than the minimum wage of Palembang city. The daily life of the respondents was mostly relied on the river including for bathing, washing, and doing their jobs. The majority of the respondents are farmers and laborers (51.6%) and fishermen (34.42%).

As high as 78.14 % (95% CI: 72 to 83) of the respondents practiced inappropriate water use sanitation behaviors. The findings was similar with previous study conducted on the community of Ulu 11 Village (one of the community live along the river bank) that found out the unhealthy behaviors as the result of 57% household's toilets directly discharged into the river and 19% utilized public toilets. The sewer system of all respondents outlet directly into the river and usually disposed the household waste to the river. In addition, 97.75% of respondents practiced open defecation in the river [5]. The prevalence of open defecation in this area was similar with those of Nepal (48.1%) [7].

The multivariate analysis identified that the respondents graduated the secondary or higher education level had better or healthier water use sanitation behaviors (Adj. OR=0.09; 95% CI: 0.01 to 0.73; P-value < 0.001). Household with higher education level might also had better understanding on sanitation compared to those with lower education level including to prevent the river from the pollutant of human defecation or household wastes. Knowledge and education provide better perspectives related to sanitation whereas the community builds their own toilets or sewage. Despite the fact that all situations have their positive and drawback consequences, but education support people with higher educational background to overcome their problems. The respondent of this study realized that polluting the river with human defecation and household waste would affect them since they utilized the river as the source of drinking water. Households with higher education level were more likely to participate in improving the quality of the river through sanitation behavior as part of "river life", whereas those with lower education level also had less concern on sanitation [8].

Households with lower monthly income had poorer sanitation behaviors than those earned higher monthly income (Adj. OR=0.14; 95% CI: 0.04-0.51; P-value<0.001). This result confirmed a study carried out by The United Nation Human Settlement which indicated that one third of households in Bangladesh with monthly income of less than 50 dollars did not facilitate their houses with appropriate toilet. They utilized public toilets with a ration one toilet for 5 households [9].

Multivariate analysis was used to assess the child characteristics, parent socioeconomic status, and household composition which yielded the fact that low levels of equalised household income increased the odds of poor health and poor sanitation.

Subsequently, families with poor attitude of water use sanitation were more likely to have inappropriate water use sanitation behaviors (Adj. OR=2.14; 95% CI: 1.03 to 4.45; P-value 0.040). The study on attitude and sanitation behaviors were limited but the study on safe drinking water and attitude showed that most of the respondents understand about ideal methods of water collection, treatment and storage [10]. However, they still practiced inappropriate methods. Some attitudes were contradicted with safe drinking water practices. For instance, many households perceived that their drinking water source was safe and harmless and obtained water from open source such as rivers. In addition, they preferred to store drinking water in clay pots as they kept the water cold instead of utilizing narrow-necked containers that limit exposure to contaminants. Hand washing with soap to avoid contact with waterborne hazards was also rarely practiced in their daily lives. However, the government of Indonesia has conducted various training programs on drinking water safety that advocated appropriate water use, hygiene, and sanitation strategies [11].

Regarding with the importance of sanitation, the respondents' attitude could be considered as good. They recognized the linkages between sanitation and health that it helped them to stay away from water borne diseases. It reaffirmed the findings of a study carried out in Nepal which demonstrated people awareness on sanitation had reduced medical expenses. They also perceived that sanitation affected their daily earnings particularly for those who were laborers and van pullers or rickshaw pullers as they had to take day-off if they suffered from waterborne diseases. Good sanitation maintained the children in good health and they were able to go to school regularly. In addition, some people also think that sanitation ensured social dignity with social standard practices. However, some of them neglected the link between sanitation and wellbeing [12].

Actually, most of respondents in this study were aware of basic hygiene practices. However, hygienic practices were very diverse particularly among the poor areas of the country. In areas where the community had attended hygienic advocacy, most of the people washed their hands, foods and cookeries by using safe water, regularly cut their nails, used cover on water storage. They also kept their court-yard and houses clean, used soap or ash for cleaning hands which was not common among the poor with the absence of hygienic advocacy.

## CONCLUSION

Most people in the downstream area of Musi River had inappropriate water use sanitation behaviors that resulted on the river pollution. Poor attitude of water use sanitation, low income, low educational background were statistically significant in association with inappropriate water use sanitation behaviors. Therefore, appropriate strategies and measurement to improve social economic status, to reduce poverty, and to improve people attitude towards water use sanitation behaviors are required.

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