

Infection Risk of Fecal Coliform Contamination in Drinking Water Sources of Urban Slum Dwellers: Application of Quantitative Microbiological Risk Assessment

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Abstract : Water is one of the fundamental basic needs for human life, particularly drinking water sources. Although water quality is getting better, fecal-contamination of water is still found around the world, especially in the slum area of mid-low income countries. Drinking water source contamination in urban slum dwellers increases the risk of water borne diseases. Low level of sanitation and poor drinking water supply known as risk factors for diarrhea, moreover bacteria-contaminated drinking water source is the main cause of diarrhea in developing countries. This study aimed to assess risk infection due to Fecal Coliform contamination in various drinking water sources in urban area by applying Quantitative Microbiological Risk Assessment (QMRA). A Cross-sectional survey was conducted in a period of August to October 2015. Water samples were taken by simple random sampling from households in Cikapundung river basin which was one of urban slum area in the center of Bandung city, Indonesia. About 379 water samples from 199 households and 15 common wells were tested. Half of the households used treated drinking water from water gallon mostly refill water gallon which was produced in drinking water refill station. Others used raw water sources which need treatment before consume as drinking water such as tap water, borehole, dug well and spring water source. Annual risk to get infection due to Fecal Coliform contamination from highest to lowest risk was dug well (1127.9×10^{-5}), spring water (49.7×10^{-5}), borehole (1.383×10^{-5}) and tap water (1.121×10^{-5}). Annual risk infection of refill drinking water was 1.577×10^{-5} which is comparable to borehole and tap water. Household water treatment and storage to make raw water sources drinkable is essential to prevent risk of water borne diseases. Strong regulation and intense monitoring of refill water gallon quality should be prioritized by the government; moreover, distribution of tap water should be more accessible and affordable especially in urban slum area.

Keywords : drinking water, quantitative microbiological risk assessment, slum, urban

Conference Title : ICWES 2017 : International Conference on Water and Environmental Sciences

Conference Location : Singapore, Singapore

Conference Dates : March 29-30, 2017