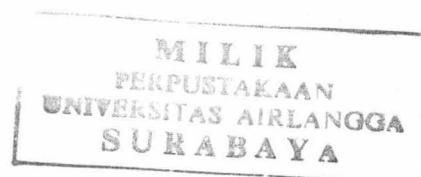


ABSTRACT

The objectives of this study were to investigate the effects of antimicrobial used on the incidence rate and the characteristics of the resistance plasmids in hospital waste water. The characteristic of plasmids were defined as the plasmid size and the joining presence of non-ampicillin resistance expressed gene in ampicillin selected transformant cells. The selected antimicrobial chosen in this research were beta-lactam drug, particularly ampicillin, and consequently the plasmid that encodes for ampicillin resistance. Two hospital's wards as research locations were Psychiatry ward and Urology ward of Dr. Soetomo Regional General Hospital Surabaya.

The usage of ampicillin and the total amount of the beta-lactam drugs, in Psychiatry ward were significantly less than in Urology ward. These differences were the frequency of inpatient who got an antimicrobial drug or the averages of the drugs dose (in g) consumed per patient. The frequency of Psychiatry ward patients receiving an ampicillin and all kinds of beta-lactam drug were 5.33%, and 8.28%, and no patients got sulbenicillin or cephalosporine, whereas in Urology ward, the patients got an ampicillin, sulbenicillin, cephalosporine and all kinds of beta-lactam drug were 23.83%, 32.64%, 23.83% and 73.58% respectively. The average dose of the drug consumed per patient, for ampicillin and the total amount of the all beta-lactam drugs, in Psychiatry ward were 0.3728 g and 0.5024 g per patient and no patients got sulbenicillin or cephalosporine; whereas in Urology ward patients got an ampicillin, sulbenicillin, cephalosporine and the



total amount of the all beta-lactam drugs were 0.9793 g, 2.3927 g, 0.9684 g and 4.444 g respectively.

The bacteria's samples were 210 *Escherichia coli* strain isolated from each hospital ward. The isolated ampicillin resistance strains were 171 (81.4%) strains from Psychiatry ward and 174 (82.90%) strains from Urology ward, and the difference was not statistically significant.

The plasmids mediated ampicillin resistance were detected on 28 (16.37%) strains of *Escherichia coli* isolated from Psychiatry ward, and 58 (33.33%) strains from Urology ward. These results were significantly different. The plasmids sizes of Psychiatry ward origin were significantly smaller than Urology ward origin. Conversely, the amount of any resistance antimicrobial gene (ampicillin and non-ampicillin) on each ampicillin associated plasmid, were not significantly different for both locations.

The conclusions are: the incidence rate and characters of antimicrobial (beta lactam drugs) resistance plasmids can be used as a tools for detecting environmental antimicrobial uses. The bacteria of hospital waste water can be used as a sample for predicting the antimicrobial susceptibility pattern in environment as a consequence of antimicrobial uses in hospitalized patients

Key words Antimicrobial resistance plasmid, Beta-lactam drug, Ampicillin, Hospital waste water, *Escherichia coli*