

ANALISIS FAKTOR RISIKO PAPARAN KARBON MONOKSIDA TERHADAP KARBOKSIHEMOGLOBIN DALAM DARAH PEKERJA CLUB MALAM “ FP ” DI SURABAYA

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RISK ; CARBON MONOXIDE'S; BLOOD

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SUMMARY

RISK FACTORS ANALYSIS ON CARBON MONOXIDE'S EXPOSURE TOWARDS CARBOKSIHEMOGLOBIN LEVELS IN "FP" SURABAYA NIGHT CLUB EMPLOYEES' BLOOD"

Recently, the air pollution is getting worse. Industrial, transportation, office and housing units' activities are the main source of air pollution. One of the parameters of air pollution is carbon monoxide (CO) levels in the air. CO itself is a highly toxic gas; it is colorless, odorless, and tasteless. On low level exposure, CO can cause headache (dizziness) and at high level, can be deadly. The effect of continuous (acute) CO exposure triggers binding formation of CO in the blood (carboxihemoglobin). Carbon monoxide has stronger ability to bind hemoglobin compare to the ability of oxygen in producing carboxihemoglobin (COHb), this process delays the supply of oxygen to the body. It is known that CO exposure can affect the work of the heart (cardiovascular system), central nervous system and all organs which are sensitive to oxygen deprivation. The effect of CO, even in a low level, on the cardiovascular system is very obvious. Patients with heart and lung illness are sensitive to CO exposure.

The general objective of this research is to study the effect of risk factors include age, time of service, working hours, and smoking habits on COHb levels in blood in "FP" Surabaya Night Club employees'. Whilst the specific objectives of this study are to: 1) identify the individual characteristics, include age, time of service, working hours, and smoking habits, 2) find out the levels of CO in the air at "FP" Surabaya Night Club, 3) determine the levels of COHb in "FP" Surabaya Night Club employees' blood, 4) analyze the influence of risk factors include age, time of service, working hours, and smoking habits on COHb in "FP" Surabaya Night Club employees' blood, 5) identify the "FP" Surabaya Night Club employees' complaints/symptoms and 6) asses the health risks of CO's exposure in the air at "FP" Surabaya Night Club.

This study is an analytic observational study which conducted cross sectional. The research was conducted within May to August 2010. Data collection was performed at the 3rd week of June 2010. The population in this study is 43; they were the employees of "FP" Surabaya Night Club. The sample of this study is 30 people who are willing to give their blood sample. Examination on blood COHb levels and interview with the help of a questionnaire were done to determine age, time of service, working hours, and smoking habits. In this research, the measurement of CO concentration in the air at "FP" Surabaya Night Club was done at three points, those are around the stage, around the bartender and the dance floor area. The

researcher used a multiple linear regression to analyze the risk factors : age, time of service, working hours, and smoking habits on COHb levels in blood.

The result of this study shows that the individual characteristics of "FP" Surabaya Night Club employees are mostly men at 60% (18 people), 27 people at 90% are ≤ 40 years old, 18 people at 60% have > 1 year time of service, 20 people at 66.7% have ≤ 8 hours/day working hours, 16 people at 53.3% have smoking habits, they consume 10-19 cigarettes/day (mild level smokers). The levels of CO in the air at "FP" Surabaya Night Club range from 13.33 ppm to 18.67 ppm with an average concentration of 16.55 ppm. Since the average of CO concentration in the air at "FP" Surabaya Night Club is at 16.55 ppm, it means that CO concentration in the air exceeds the threshold limit values (TLVs) of CO in indoor air. The levels of COHb in "FP" Surabaya Night Club employees' blood range from 2.35% to 11.55% with an average concentration at 7.57%, which means exceeding the biological exposure indeces (BEIs).

Based on the statistical calculation using multiple regression, it is obtained $p = 0.028$ for the variable of age, $p = 0.030$ for the variable time of service, $p = 0.000$ for the variable smoking habits and $p = 0.272$ for the variable hours of work. Thus, the findings of the study indicate that only some factors give statistically significant influence on COHb levels in blood. Those are age, time of service and smoking habits. While working hour variable does not give significant influence towards COHb levels in blood. Moreover, Club Night's employees experience symptoms or complaints such as mild headache, nausea, blurred vision/eye pain, heart pounding, asphyxia and distraction. Health risk assessment of CO's exposure in the air at "FP" Surabaya Night Club is in scale four at the risk decision range, which means that the CO's exposure in the air at "FP" Surabaya Night Club is in the level of "significant".

Based on explanation above, Night Club management is advised to provide more local exhaust or air conditioning system inside the club to dilute the CO contents which are produced by cigarette smoke. On the other hand, the employees who get carbon monoxide exposure are suggested to consume vitamin C and vitamin E as antioxidant that can reduce the toxic in their body. If there is any employee who gets severe poisoning caused by inhaling carbon monoxide gas at a high level, it would be better if he/she are taken into the nearest hospital as soon as possible to get intensive treatment. In addition, not only rolling and shift system should be made, but also regular health checks have to be performed towards the employee.

ABSTRACT

"RISK FACTORS ANALYSIS ON CARBON MONOXIDE'S EXPOSURE TOWARDS CARBOXYHEMOGLOBIN LEVELS IN "FP" SURABAYA NIGHT CLUB EMPLOYEES' BLOOD"

The aim of this research is to study the effect of risk factors include age, time of service, working hours, and smoking habits on COHb levels in "FP" Surabaya Night Club employees' blood. This study is an analytic observational study which conducted cross sectional. The research was conducted within May to August 2010. Data collection was performed at the 3rd week of June 2010. The population in this study is 43; they were the employees of "FP" Surabaya Night Club. The sample of this study is 30 people who are willing to give their blood sample. Examination on blood COHb levels and interview with the help of a questionnaire were done to determine age, time of service, working hours, and smoking

habits. In this research, the measurement of CO concentration in the air at "FP" Surabaya Night Club was done at three points, those are around the stage, around the bartender and the dance floor area. The researcher used a multiple linear regression to analyze the risk factors : age, time of service, working hours, and smoking habits on COHb levels in blood. The levels of CO in the air at "FP" Surabaya Night Club range from 13.33 ppm to 18.67 ppm with an average concentration of 16.55 ppm. Since the average of CO concentration in the air at "FP" Surabaya Night Club is at 16.55 ppm, it means that CO concentration in the air exceeds the threshold limit values (TLVs) of CO in indoor air. The levels of COHb in "FP" Surabaya Night Club employees' blood range from 2.35% to 11.55% with an average concentration at 7.57%, which means exceeding the biological exposure indeces (BEIs). Based on the statistical calculation using multiple regression, it is obtained $p = 0.028$ for the variable of age, $p = 0.030$ for the variable time of service, $p = 0.000$ for the variable smoking habits and $p = 0.272$ for the variable hours of work. Thus, the findings of the study indicate that only some factors give statistically significant influence on COHb levels in blood. Those are age, time of service and smoking habits. While working hour variable does not give significant influence towards COHb levels in blood. Based on explanation above, Night Club management is advised to provide more local exhaust or air conditioning system inside the club to dilute the CO contents which are produced by cigarette smoke. On the other hand, the employees who get carbon monoxide exposure are suggested to consume vitamin C and vitamin E as antioxidant that can reduce the toxic in their body. In addition, not only rolling and shift system should be made, but also regular health checks have to be performed towards the employee.

Keywords: Risk factor analysis, Carbon monoxide levels in the air, COHb levels in blood, Night Club employees