Pollution Impact of Oil, Gas and petrochemical Industries on Cardiovascular System

System	Diseases/risk factor	Methods	Results	References
Cardiovascular system	• BMI • Hypertension • Fasting glucose • Cholesterol • TG	An observational retrospective cohort study Italian workers 3 occupational medical examination(2000-2005-2010) The information about workers were extracted from a computerized management individual medical services database	A constant and significant increase of the average Body Mass Index and serum cholesterol were found , and in particular in workers < 36 years: BMI was 24.4 (2000) and 25.8 (2010) with p<0.001, and cholesterol was 188.3 mg/dl (2000) and 206 mg/dl (2010) with p< 0.001.	(1)
Cardiovascular system	• pressure (BP) • urinary PAH metabolites • C-reactive protein • homocysteine • gamma-glutamyl transferase • Cholesterol HDL, LDL, and triglycerides	cross-sectional study of 151 chimney sweeps and 152 controls investigate early markers of CVD personal history of disease and symptoms questionnaire Exposure assessment by measurement of PAH metabolites in urine Blood pressure measurement and sampling	Chimney sweeps had up to 7 times higher concentrations of PAH metabolites in urine than controls (P < 0.001). Compared with controls, chimney sweeps had increased homocysteine, cholesterol, and HDL (β = 3.4 µmol/L, 0.43 mmol/L, and 0.13 mmol/L, respectively, P ≤ 0.003, adjusted for age, BMI, and smoking). PAH exposure among chimney sweeps resulted in elevated levels of markers for CVD risk.	(2)
Cardiovascular system	• systolic or diastolic blood pressure	2,028 residents (aged 18–80) in a cross-sectional survey of both Questionnaire	More than one-third of participants were hypertensive (37.4%). Half of the participants were from oil-polluted areas (51%).Only15% of participants reported family history of hypertension.	(3)

		estimate systolic or diastolic blood pressure		
Cardiovascular system	• body mass index (BMI) • hypertension • fasting glucose • cholesterol • triglycerides • current smoking habits	observational cross-sectional study conducted on 1073 workers the observation period 2000-2010 The information about workers were extracted from the GIPSI (Gestione Informatizzata Prestazioni Sanitarie Individuali, Computerized Management of Individual Medical Services) database.	In particular, we found that workers > 45 years had significant higher risk to have obesity (OR = 3.8, CI 95% = 2.5-5.7), hypertension (OR = 2.7, CI 95% = 2.1-3.6), high blood fasting glucose (OR = 2.6, CI 95% = 1.2-5.5), high cholesterol (OR = 2.7, CI 95% = 2.0-3.6), high triglycerides (OR = 1.8, CI 95% = 1.4-2.4) compared to younger (< 45 years).	(4)
Cardiovascular system	• Blood pressure • Blood glucose (fasting) • Totalcholesterol • Triglycerides • High Density Lipoprotein • Weight • Height • Waist and hip circumference	A descriptive cross sectional survey. Lifestyle questionnaire Exercise Diet Smoking 121 onshore and 110 offshore workers participated.	Overall the cardiovascular risk profile of onshore versus offshore workers in the oil industry was worse. Onshore workers had increased waist circumference, though there was no significant difference in the Waist-Hip Ratio, increased rates of metabolic syndrome, diabetes and hypertension and were less physically active. Conversely the offshore workers had a higher BMI and lower levels of protective HDL. Overall, in this population, the BMI and the number of diabetics were higher and the HDL lower than the country figures.	(5)

Cardiovascular system	• body mass index, blood pressure, blood lipids and blood aromatics were assessed.	comparative cross-sectional screening study. All the workers (n=200) were examined by a cardiologist	There has been established significant incidence of arterial hypertension (31.4%), dyslipidemia (61.0%) and overweight (68.0%) in the employees working in conditions of exposure to aromatic hydrocarbons. There have been defined relationships of aromatic hydrocarbons with dyslipidemia (P<0.05).	(6)
Cardiovascular system	• waist circumference • blood pressure measurements, • laboratory tests (blood glucose, total cholesterol, triglycerides, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), leptin and uric acid levels).	The object of the study included 242 oil-extracting company workers (oil and gas production unit), which are subject to the occupational exposure to aromatic hydrocarbons, as well as their working conditions and lifestyle. A specialized clinical and laboratory investigation of workers was conducted, as well as a survey on assessment of social and lifestyle factor , examination by a cardiologis.	It was found that among the workers exposed to aromatic hydrocarbons the prevalence of metabolic syndrome is increased by 16% and hypertension by 13.9%. In occupational groups exposed to aromatichydrocarbons, the individual components of the metabolic syndrome such as hyperuricemia (EF 52,33%) and hyperleptinemia (EF 33,02%) and the metabolic syndrome in general (EF 36,75%) are occupation-related. Etiological contribution of benzene and toluene in the development of the metabolic syndrome is 4.62 %.	(7)

References:

1. Mannocci A, Pignalosa S, Nicosia V, Saulle R, Sernia S, La Torre G. Cardiovascular Diseases Risk Factors in oil and gas workers: a ten years observational retrospective cohort. Annali di igiene: medicina preventiva e di comunita. 2016;28(2):122-32.

2. Alhamdow A, Lindh C, Albin M, Gustavsson P, Tinnerberg H, Broberg K. Early markers of cardiovascular disease are associated with occupational exposure to polycyclic aromatic hydrocarbons. Scientific reports. 2017;7(1):9426.

3. Ezejimofor MC, Uthman OA, Maduka O, Ezeabasili AC, Onwuchekwa AC, Ezejimofor BC, et al. The burden of hypertension in an oil-and gas-polluted environment: a comparative cross-sectional study. American journal of hypertension. 2016;29(8):925-33.

4. Mannocci A, Pignalosa S, Saulle R, Sernia S, Sanctis SD, Consentino M, et al. Prevalence of major cardiovascular risk factors among oil and gas and energy company workers. Annali dell'Istituto superiore di sanita. 2015;51:148-53.

5. Iwot IA. A comparison of coronary heart disease risk factor prevalence among offshore and onshore workers in the petroleum industry in Nigeria: Stellenbosch: Stellenbosch University; 2009.

6. Baidina A, Nosov A, Alekseev V. Metabolic syndrome risk factors among oil production enterprise employees. Ekologiya Cheloveka/Human Ecology. 2013(12):44-7.

7. Baydina A, Alexeyev V, Nosov AY, Shirinkina YA. ASSESSING THE RISK OF DEVELOPING THE METABOLIC SYNDROME AS A PREDICTOR OF CARDIOVASCULAR PATHOLOGIES IN OIL-EXTRACTING COMPANY WORKERS.