

Cardiovascular Risk for Workers in Big, Infrastructure Projects

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Abstract

For many years the Florentine area has been involved in carrying out big, infrastructure projects. These projects are very complex and the workforce employed to construct them, coming from all parts of Italy and also from abroad, are represented by workers with a high level of specialization, exposed to several and harmful risk factors. The majority live far from their family for long periods of time, mainly in base camps far from residential areas, sometimes isolated, without the possibility of dedicating their free time to social, cultural, sport and/or recreational activities. The objective of our study is to evaluate in this category of workers which working risk factors and styles of life represent a major risk factor for arterial hypertension which, in turn, significantly increases cardiovascular risk. A significant majority of workers carry out mansions of carpenter/soldered and of machine/excavator driver, in charge of dirt handling. The sample also includes numerous miners and drivers. The workers' average age is 45 years old and a high working seniority. Arterial hypertension is present in 139 subjects, equaling to 54% of the sample. The distribution of frequency of arterial hypertension is greater in the class of drivers, followed by the class of site managers and construction machines/excavator drivers. It is believed that the risk factors to which the workers studied are exposed, constitute elements that facilitate the onset of a state of arterial hypertension; among these, the stress correlated to a task which requires, lengthened attention and concentration, resulted as being the most important factor.

Keywords: Workforce; Hypertension; Cardiovascular risk; Workers

Summary

For many years the Florentine area has been involved in carrying out big infrastructure projects: construction of highways, viaducts and railroad tunnels for high speed trains. These projects are very complex and the workforce employed to construct them, coming from all parts of Italy and also from abroad, are represented by workers with a high level of specialization, exposed to several and harmful risk factors. The majority live far from their family for long periods of time, mainly in base camps far from residential areas, sometimes isolated, without the possibility of dedicating their free time to social, cultural, sport and/or recreational activities. The objective of our study is to evaluate in this category of workers which working risk factors and styles of life represent a major risk factor for arterial hypertension which, in turn, significantly increases cardiovascular risk. 257 workers were subject to three investigation instruments, following the French ESTEV methodology [1], modified in Italy by Barbini and Squadroni [2] and later by Barbini, Bigger [3]: one questionnaire was on professional conditions, one on the styles of extra work life, and was a medical questionnaire to obtain the objective health conditions of the workers. A significant majority of workers carry out mansions of carpenter/solderer and of machine/excavator driver, in charge of dirt handling. The sample also includes numerous miners and drivers. The workers' average age is 45 years old (range 18-67) and a high working seniority. Arterial hypertension is present in 139 subjects, equaling to 54% of the sample. The distribution of frequency of arterial hypertension is greater in the class of drivers, followed by the class of site managers and construction machines/excavator drivers. It is believed that the

risk factors to which the workers studied are exposed, constitute elements that facilitate the onset of a state of arterial hypertension; among these, the stress correlated to a task which requires, lengthened attention and concentration, resulted as being the most important factor (OR=3.71).

Introduction

Arterial hypertension is considered a very important risk factor for the development of cardio and cerebral-vascular pathologies [4], and is one of the disorders with the highest prevalence in advanced age [5,6]. In Italy, 31% of the general population suffers from hypertension and 17% is borderline [7]. Few studies have examined the relationship between work and health state, especially considering prolonged working life and the presence of always older subjects at work [5,6]. Some studies considering these factors have shown a high frequency of arterial hypertension in specific working groups [2]. But independently from age and other extra professional risk conditions, some work conditions are associated to a high risk of developing arterial hypertension [8-11]. In some studies, arterial hypertension has been associated more frequently with "blue collars" than with "white collars" [12], a positive association is also present in bus and taxi drivers [13], meaningfully higher compared to mechanical maintenance technicians [14,15]. Workers with exposition to noise superior to 85 dB(A) for longer than 30 years have shown a risk of hypertension 1.5 times higher [16]. Among the professional factors clearly associated with an excessive risk of arterial hypertension we find work organizational constrictions [3] and studies dealing with the subjective evaluation of workers regarding their own work and work organization rather than with traditional risk factors, are becoming

Yes	73	28.4%
No	183	71.2%
Do-it-yourself actin99Yes		

Required to do different things than the assigned task?	181	70.4	76	29.6
Required to take care of inferior or superior tasks than the assigned task?	181	70.4	76	29.6
Is often interrupted during work?	198	77.0	59	23.0
Job requires prolonged attention and concentration?	234	91.1	23	8.9
Can't avert eyes from job?	202	78.6	55	21.4

None

Warehouse worker	5	2	40.00	3	60.00
Electrician	7	4	57.14	3	42.86
Site manager	12	8	66.67	4	33.33

Table 6 Presence of arterial hypertension in the different professions

From Table 7, in which are shown the results obtained in the associations with some working characteristics, it can be observed that working inside the tunnel, rather than outside, is not significantly associated with the presence of hypertension. Several working

conditions are associated with arterial hypertension, nevertheless, some of these record a higher risk probability, like for example a task that requires prolonged attention and concentration, a condition for which risk increases more than 4 fold (OR 4.82).

	OR	IC 95%	P-value
Up to 45 years	0,29	0,17-0,49	0,0000
>45	3.38	2.02-5.66	0.0000
Works inside tunnel	1.41	0.83-2.37	0.19
Works>46 Hours/Week	2.04	1.24-3.37	0.004
Shift work	2.78	1.55-5	0,0004
Night shifts	2.55	1.45-4,48	0.0004
Weights>5 Kg	1.93	1.07-3,51	0,02
Strain on equipment	2.46	1.40-4,32	0.001
Exposed to loud noise	2.21	1.18-4,13	0,001
Exposed to high temperatures	1.93	1.11-3,36	0,01
Exposed to weather conditions	1.28	0.67-2,45	0.44
Exposed to dusts and/or smoke	1.51	0.79-2,91	0.20

Arterial hypertension risk is very high in relation to shift work (OR 2.78), sleeping in irregular patterns (OR 2.76), eating in irregular patterns (OR 2.62), night shifts (OR 2.55), not being able to turn the eyes away from one's task (OR 2.50), work strain on instruments and machines (OR 2.46).

The biometric parameters able to influence arterial hypertension were evaluated. Considering as a risk factor waist circumference superior to 94 cm, it has been seen that there is a statistically significant association between this variable and the presence of hypertension (OR 2.84, IC 1.71-4.73). Hence, as demonstrated in literature (24), a condition of obesity represents a significant risk factor for the pathology studied, as in the group of examined workers, were having a waist circumference equal to or higher than 94 cm increases the risk of hypertension by 2.8 times. This element is confirmed also if the body mass index is considered: in fact, to a value of BMI higher than 25 corresponds an analogous estimate of risks, with OR 2.88, IC 1.7-4.89. Basically, in this group of workers, the condition of overweight is able to augmenting of 3 fold the risk of becoming hypertensive.

In order to further address risk factors for the insurgence of arterial hypertension, the association with extraprofessional parameters was studied (Table 8).

	OR	I.C.	P value
Smoking	0,99	0,56-1,77	0,49
Sports	0,71	0,41-1,23	0,22
Drinking beer	0,72	0,43-1,22	0,23
Drinking wine	1,31	0,80-2,14	0,28
Gardening	1,15	0,70-1,90	0,57
Watching television	1,04	0,38-2,79	0,93

Imposition of frequent rhythms, the high level of concentration and attention, the high danger intrinsic of the tasks and the working

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