Evaluation of telomere length in Brazilian workers exposed to construction environment

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INTRODUCTION

Construction environment is composed of various substances classified as carcinogens or potentially carcinogenic according to the International Agency for Research on Cancer, as crystalline silica and asbestos. Thus, in this study we evaluated the absolute telomere length (aTL) in construction workers in comparison with non-exposed group.

MATERIALS AND METHODS

The aTL measurement was performed by quantitative real-time polymerase chain reaction (PCR) assay according to O' Callaghan and Fenech (2011). The determination of trace elements in blood samples was carried out with an inductively coupled plasma mass spectrometer (ICP-MS).

RESULTS

The aTL was evaluated in 59 men exposed to the construction environment (39.00 ± 13.00 years old with 10 years of service time) and in 49 men non-exposed (32.00 ± 10.00 years old) from State of São Paulo, Brazil.

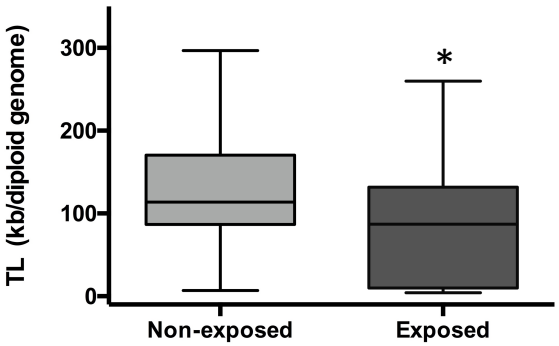

Figure 1. Telomere length for non-exposed (n=49) and exposed (n=53) groups. Data presented as minimum, lower quartile, median, upper quartile and maximum.* Statistical analysis carried out using Mann-Whitney test (p-value = 0.009).

Table 1. Multiple linear models' regression to telomere length. Model Construction Environment Exposure and Age

Variable	Regression Coefficient (ß)	Confidence interval (95%) Lower	Upper	p-value
Model Construction Environment Exposure and Age [a]				
Worker				
Non-Exposed	-	-	-	-
Exposed	-37.4	-67.39	-7.90	**0.014**
Ages				
≤ 39 years old	-	-	-	-
≥ 40 years old	21.58	-9.47	52.63	0.171
Constant	159.92	104.12	201.72	**<0.001**

Dependent variable: aTL (kb/diploid genome). Bold values denote statistical significance at the $p < 0.05$ level. [a] Model in regarding to construction environment exposure and age (≤ 39 / ≥ 40 years old).

Table 2. Multiple linear models' regression to telomere length Model Construction Environment Exposure and Trace elements

Variable	Regression Coefficient (ß)	Confidence interval (95%) Lower	Upper	p-value
Model Construction Environment Exposure and Trace elements				
Worker				
Non-Exposed	-	-	-	-
Exposed	-67.64	-98.53	-36.74	**<0.001**
Arsenic				
Arsenic concentration	-3.12	-4.75	-1.50	**<0.001**
Lead				
Lead concentration	1.14	0.20	2.09	**0.019**
Constant	194.79	138.65	250.93	**<0.001**

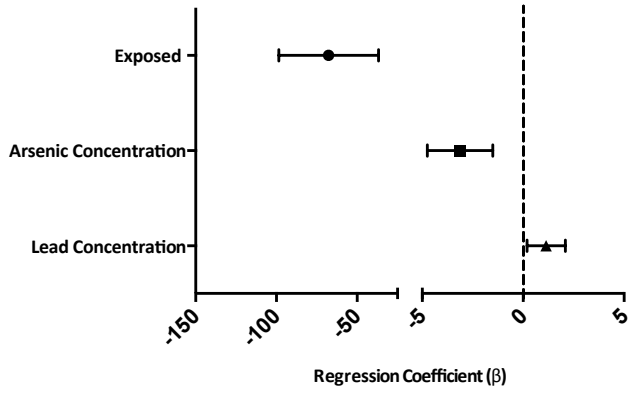

Figure 2. Multiple linear model regression analysis to telomere length in regarding to trace elements concentration analyzed in blood.

CONCLUSIONS

Therefore, construction environment exposure can influence telomere length, mainly by arsenic and lead exposure. Thus, our findings suggest a modulation in aTL by construction environment exposure.

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