# Prevalence of cardiovascular disease risk factors in a Nepalese post-seismic population: a comparative study using *propensity score matching*.

Tiago Adrega (MD) [1], Anabela Rocha (PhD)[2] e M. Cristina Miranda (PhD) [2,3]

[1]Serviço de Cardiologia, Centro Hospitalar Baixo Vouga, Aveiro
[2]ISCA e CIDMA, Universidade de Aveiro
[3]CEAUL, Universidade de Lisboa
E-mail: cristina.miranda@ua.pt

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## 1. INTRODUCTION

Non-communicable disease are the leading causes of death in developed and developing countries worldwide (1). Nepal is an example of this paradigm - from 2005 to 2015, the ischemic heart disease increased around 25.3% and brain vascular disease increased 25.7%. (2) The April and May 2015 earthquakes imposed critical social and epidemiological pressures, resulting in critical lifestyle changes, namely regarding cardiovascular disease (CVD) risk factors.(3) Various organisations provided support to these people and engaged in various activities aiming to opportunistically improve this CVD burden.

The aim of this study was to appraise the prevalence of CVD risk factors and health behaviours in two cohorts of a native Nepalese population, with a common origin from a remote village that were separated in two groups after the incidents of the May 2015 earthquake, using a Propensity Score Matching (PSM) analysis.

## 2. METHODS

This study is an observational, cross-sectional study that was carried out during a humanitarian mission in Nepal, aimed to provide medical care to the people of Sindhupalchok, a northern Nepalese region, with approximately 1200 inhabitants. With the seismic event this population got separated in two groups of dislodged individuals: victims that stayed nearby the village area and those who went towards Kathmandu looking for support in temporary settlements. Both these populations were supported by the medical mission.

Cross-sectional data was collected approximately 18 months after the earthquake and included demographic data, anthropometric data, previous medical history, CVD risk factors and health behaviours. The assessment of CVD risk factors and health behaviours was based in a question-by-question guide provided by the WHO(4)(5)(6).

The obtained sample is thus a set of two groups formed accordingly by the place they were allocated after the earthquake and the following events. This means that the selection of the elements of each group was not carried out respecting the principle of randomness, as it should be. This is often the case in this type of studies due to reasons such as ethics, practical issues or even non-viability (7). Analysis of the resulting data can thus lead to biased conclusions.

Without random groups we can at least try to form samples that are homogeneous with respect to the observed covariates, reducing this bias. One possible way to achieve this is with the so-called methodology, *propensity score matching (PSM)*(8).

When the nature of the experience allows randomness, the probability of each individual being selected for a group is the same for all elements of the population. When it is not possible, the probability of an element being selected is unknown and depends on covariates. PSM methodology is an attempt to overcome this problem and was first proposed by Rosenbaum (9). The idea is to estimate those probabilities conditional to some observed covariates.

With PSM we were able to obtain two balanced samples relative to a set of chosen covariates: one for the people that stayed nearby the village and another with the individuals in temporary settlements. We then proceed with statistical analysis aiming to compare the two groups with respect to prevalence of CVD risk factors.

After an exploratory data analysis we used parametric and non-parametric tests to compare some variables related to CVD risk factors and health behaviours.

## 3. RESULTS

From the PSM methodology results, two homogeneous samples regarding the set of covariates, thought comparable in terms of the study of the main variables of interest.

For the biomass index we assumed asymptotic Normality and, having not detected significant differences between variances of the two groups we compared the mean values with a one sided t-test concluding that this index tends to be higher in nearby village located people. As the hypertension variable is a dichotomous one, we performed a proportion test concluding that the proportion of people with hypertension is significantly greater in the nearby village group. We also noticed more severed smoking and alcohol habits in the same group. In these cases a non-parametric test revealed a significant greater median value for both variables.

We also compared the variables exercise, overweight and diabetes having not found significant differences between people nearby village and the ones that were in the temporary settlements.

## 4. DISCUSSION AND CONCLUSIONS

The performed tests reveal significant differences between the two groups. Namely, there is a tendency for greater values of the biomass index, hypertension alcohol and smoking in those people that stayed nearby the village. As far as the exercise, presence of diabetes disease and overweight we did not establish significant differences among the two groups.

Long-time exposition to the daily living in a provisional camp aimed to provide support to dislodged Nepalese people after the earthquake, might have an effect in some health behaviours and prevalence of CVD risk factors.

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