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Cardiac arrest: work on global prevention, global at prevention at work?

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Over the last three decades, there have been major improvements in out-of-hospital cardiac arrest management,[1] in many countries all around the world.[2,3] Interestingly, since 2005, the International Liaison Committee on Resuscitation has included prevention of out-of-hospital cardiac arrest as the first link in the survival chain, along with “early recognition” and “call for help”. Many interesting papers on secondary prevention of cardiac arrest have since been written. For instance, one review advocated that better education in recognising and responding to pre-arrest clinical deterioration can be considered both a preventive measure and treatment, leading to passionate and interesting discussions [4–6]. Last year, an editorial entitled “It’s time to talk about the ‘prevention of resuscitation’”, [7] by Nehme and Smith discussing a paper on suicide-related out-of-hospital cardiac arrest,[8] pleaded for new public health interventions that promote primary prevention for such a cause of cardiac arrest, even though suicides are not the primary cause.

In this issue of *Resuscitation*, Park Ho et al went beyond the usual prevention of out-of-hospital cardiac arrest to the primary prevention of all types of sudden cardiac arrest by studying the impact of healthy lifestyle factors and cardiovascular comorbidities on the occurrence of sudden cardiac arrest in a multicentre case-control study in Korea.[9] The authors confirmed the importance of unhealthy risk factors associated with cardiac arrest, by using these factors separately, including smoking, diet and exercise, and by using an innovative continuous scale that combines these factors. Though the association between unhealthy behaviours and cardiovascular diseases is known, and sudden cardiac arrest is caused by cardiovascular diseases, the purpose of the paper is to show that healthy lifestyle factors and sudden cardiac arrest are also directly associated, which can have a potential implication on prevention. It is true that the study has some limitations, including the design, which is observational, potential selection effects due to the number of respondents (31.3%), the control panel comparability, which is always questionable and potential misclassification due to self-reported risk factors. The new scale used in this study allows the authors to consider a possible

dose response relationship between health behaviours and sudden cardiac arrest. However, it should be noted that the risk factors included in the scale may not be similar in terms of strength of association and might be related to each other. Furthermore, socio-occupational factors were not available and might be particularly important to consider.

The topic of primary and secondary prevention of out-of-hospital cardiac arrest, particularly in the workplace, has some singularities to consider in line with the work of Park Ho et al. Firstly, though out-of-hospital cardiac arrests are exceptional, [10] the number of years of life saved is generally high because of the younger age of the victims, [11] and the implementation of automated external defibrillators and the first-aid training in occupational settings have greatly improved. Secondly, workplaces are a remarkably interesting location for prevention, and a global strategy of prevention is recommended, integrating occupational safety, health protection and health promotion.

Occupational health interviews and interventions are an interesting path for suicide prevention, as mentioned previously, [7] and applied to job stress.[12] They are also a good opportunity to promote healthy behaviours,[13] and raise awareness of lifestyle risk factors, as described by Park Ho et al in their study.[14] Moreover, some lifestyle risk factors may be driven by occupational determinants: for instance, long working hours have been found to be associated with the occurrence of stroke or ischemic heart disease, including sudden cardiac arrest, as well as an increase in mortality from these conditions. The last World Health Organization and the International Labor Organization joint collaboration on the occupational burden of diseases estimated that more than 700,000 deaths by stroke or ischemic heart disease were attributable to long working hours in 2016.[15] The mechanisms underlying the association between long working hours and cardiovascular events are complex and include both a direct and indirect pathway, which is mediated by unhealthy lifestyle factors,[16] though the low effect size and the rare outcome hinders the ability to demonstrate this theory.[17] Finally, the tertiary prevention of sudden cardiac arrest overlaps the issue of return-to-work, which is increasingly studied. Physically intensive occupations were associated with a

decreased probability of return to work, with fatigue being the most frequently reported barrier to returning to work.[18] Patients with a higher-level job were more likely to return to work, as reported in two other studies.[19,20] However, return to work must be supervised by a collaboration between the specialist, general practitioner and occupational physician, as potential harmful effects can occur. Indeed, some authors suggested that exposure to long working hours after suffering a myocardial infarction increased the risk of recurrent coronary events.[21]

In conclusion, the workplace setting is a remarkably interesting arena which perfectly illustrates the prevention of out-of-hospital cardiac arrest (figure 1). Three types of preventions are included in the workplace: (i) primary prevention consisting of lifestyle risk factors, as raised by Park Ho et al, as well as their determinants at work, (ii) secondary prevention with the implementation of Automated External Defibrillators and first-aid training, and (iii) tertiary prevention with return to work improvement. These three levels of prevention emphasize on the transdisciplinary effort of different health actors centred around the patient, from emergency care, public and occupational health and physical rehabilitation backgrounds. Furthermore, research in cardiac arrest, as well as company stakeholders and policy makers, should also be involved in such prevention.

Conflict of Interest

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Figure 1. Global prevention at the Workplace arena.

