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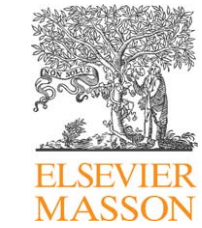

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REVIEW

Shift work and cardiovascular risk factors: New knowledge from the past decade

Le travail posté et les facteurs de risque cardiovasculaire : les nouvelles connaissances de ces dix dernières années

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Summary Cardiovascular diseases remain a major public health problem. The involvement of several occupational factors has recently been discussed, notably the organization of work schedules, e.g. shift work. To analyse the progress of knowledge on the

Abbreviations: ACTH, Adrenocorticotropic hormone; BMD, Benchmark duration; BMI, Body mass index; BP, Blood pressure; CLOCK, Circadian Locomotor Output Cycles Kaput; CRP, C-reactive protein; CVD, Cardiovascular disease; DBP, Diastolic blood pressure; HbA1c, Gycosylated haemoglobin A1c; HDL-C, High-density lipoprotein cholesterol; IDF, International Diabetes Federation; IGT, Impaired glucose tolerance; LDL-C, Low-density lipoprotein cholesterol; NCEP-ATP III, National Cholesterol Education Program Adult Treatment Panel III; OR, Odds ratio; SBP, Systolic blood pressure.

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factors;
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Body mass index;
Lipids;
Metabolic syndrome

relationship between cardiovascular risk factors and shift work. A review of English-language literature dealing with the link between cardiovascular factors and shift workers (published during 2000—2010) was conducted. Studies published in the past 10 years tend to document an impact of shift work on blood pressure, lipid profile (triglyceride levels), metabolic syndrome and, possibly, body mass index. However, the consequences on glucose metabolism are unclear. These results are not yet firmly established, but are supported by strong hypotheses. Some advice could reasonably be proposed to guide the clinical practitioner.

MOTS CLÉS
Le travail posté ;
Facteurs de risque cardiovasculaire ;
Hypertension artérielle (HTA) ;
Indice de masse corporelle (IMC) ;
Lipides ;
Syndrome métabolique

Résumé Les maladies cardiovasculaires demeurent un problème majeur de santé publique. Ainsi récemment, l'implication des plusieurs facteurs professionnels a été évoqué et notamment l'organisation des horaires de travail (travail posté). Analyser l'avancée des connaissances sur les relations entre le travail posté et les facteurs de risque cardiovasculaire. Une revue de la littérature anglaise traitant du lien les facteurs de risque cardiovasculaire et le travail posté a été menée durant la période de 2000—2010. Les études les plus récentes tendent à documenter des effets du travail posté sur la pression sanguine artérielle, sur le profil lipidique (notamment sur les taux de triglycérides), sur le syndrome métabolique et probablement sur l'indice de masse corporelle. Les conséquences sur le métabolisme glucidique restent à préciser. Les résultats ne sont pas encore strictement établit, mais plusieurs hypothèses physiopathologiques les supportent et des conseils pourraient être raisonnablement proposés aux praticiens.

Background

Among the various causes of mortality, deaths attributable to CVDs are the most widespread worldwide, and forecasts suggest they will still rank first in 2030 (World Health Statistics, 2008). The factors implicated in CVD have inspired the development of various prevention strategies over the past 40 years. Although some of these factors are well proven, others remain uncertain. Among those currently recognized, non-modifiable risk factors (e.g. age and gender) are set apart from modifiable ones (e.g. high BP, dyslipidaemia and diabetes). However, despite improvements in therapeutic management, people remain at risk of CVD. This poses the question as to whether undiscovered or unrecognized factors could have a role to play in better overall risk management.

Some occupational factors are now suspected to be related to CVD. Among them, the management of work schedules (shift work) is becoming an increasingly important one. Directive 93/104/EC broadly defines shift work as 'any method of organizing work in shifts whereby workers succeed each other at the same work stations according to a certain pattern, including a rotating pattern, and which may be continuous or discontinuous, entailing the need for workers to work at different times over a given period of days or weeks'. Typically, shift work can be performed in two shifts with a break in the late afternoon and on weekends (2×8), in three shifts with a break on weekends (3×8) or in four or five shifts to ensure working round the clock. This mode of operation may vary depending on the rotation cycle (number of days between two identical sequences), the direction of rotation (clockwise or counterclockwise) and the stability of the time slots planned (permanent night work). Shift work is therefore organized in a wide range of possible schedules. This way of managing work schedules contrasts with a more standard pattern ('daytime work pattern').

In the working world, shift work is a very common mode of operation to serve obvious economic and social goals. In the US, sources from the Bureau of Labor Statistics in 2004 stated that 15% of US employees did shift work. According to the fourth report on working conditions in Europe, issued in 2005, shift work represented an important mode of operation to address the economic circumstances of modern society (15—20%).

A link between shift work and cardiovascular disease has been hypothesized and highlighted increasingly in recent years, but cannot be firmly asserted. A meta-analysis of 17 studies, published in 1999, noted a 40% higher relative risk of CVD among shift workers compared to day workers, for both men and women [1]. A recently published overview of the literature focusing on ischaemic heart disease and based on 16 studies (1972—2008) did not conclude with certainty that shift work has an impact [2]. Broadly, similar results were seen recently from a 22-year period of follow-up of a Finnish cohort which analysed mortality due to coronary heart disease in both genders [3].

The difficulties in analysing to the consequences of shift work on cardiovascular risks remain for several reasons: heterogeneous definitions of shift work; heterogeneity in the confounding factors included in studies; and the pathological and physiological mechanisms considered. We wanted to contribute to this research by proposing a survey of the literature that deals with the impact of shift work on CVD risk factors during 2000—2010. Pertaining to the group of