TOO MUCH SITTING: A NEW HEALTH HAZARD!

TNO innovation for life

It has been known for quite some time now that physical inactivity leads to severe health risks. Something that is virtually unknown is that prolonged sitting (sedentary behaviour) also involves health risks, regardless of whether someone meets the physical activity guideline. In particular, our working lives force us to sit for long periods and so this can be seen as a new occupational risk.

SEDENTARY BEHAVIOUR

Sedentary behaviour is defined as any waking behaviour characterised by a low energy expenditure (≤1.5 MET*) while being seated or in a reclining posture[1]. That means that sedentary behaviour is not the same as a lack of exercise: it is a separate behaviour with its own specific health risks[2,3]. In other words, keen athletes who train intensively three times a week but who otherwise spend most of their time sitting at work and at home are exposed to a health risk after all.

Sedentary behaviour is common, both in the Netherlands and in other countries. Recent data from the TNO Physical Activity and Health monitor show that the amount of time spent by Dutch people in a seated position (or lying down without sleeping) has increased slightly in all age categories, with the exception of the 75+ age group[4].

* MET="Metabolic Equivalent Units": energy consumption when lying still; corresponds to an oxygen uptake of 3.5 ml per minute per kg body weight. The upper limit for sedentary behaviour, 1.5 MET, is therefore one and a half times higher than this energy consumption at rest.

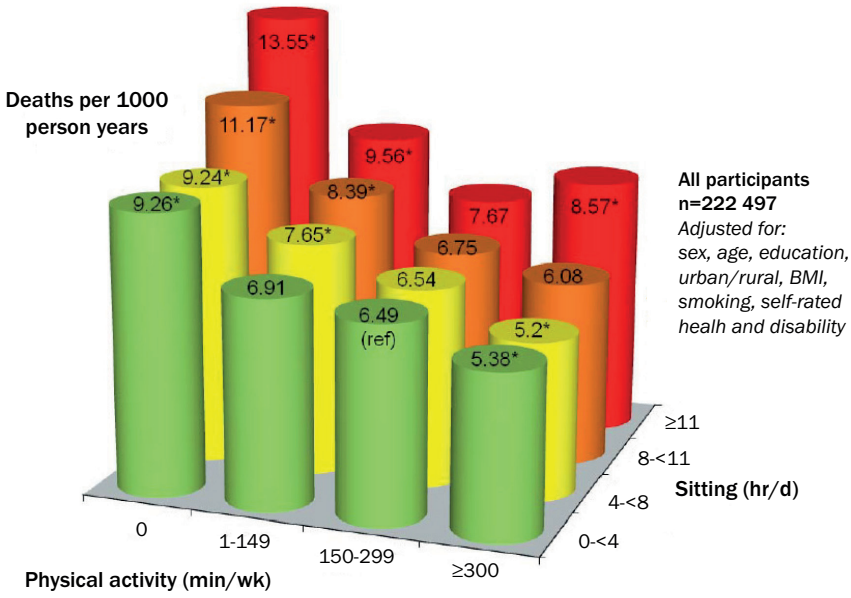
HEALTH RISKS

Scientific research shows that prolonged sitting increases the risk of premature mortality. There are also indications that sedentary behaviour makes illness more likely, regardless of whether individuals also exercise frequently or intensively.

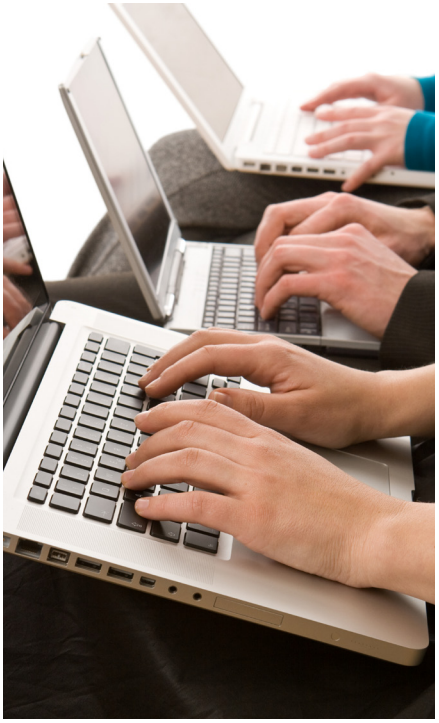
Premature mortality

Sedentary behaviour is a risk factor for premature mortality, regardless of whether an individual meets the physical activity recommendation[5,6]. Australian research has shown that sedentary behaviour accounts for almost 7% of deaths[7].

There is a dose-response relationship: inactive people who sit for prolonged periods had the highest mortality rate. People who sit for 11 hours a day or more are 40% more likely to die in the next three years than people who sit for less than 4 hours a day.



Source: *Van der Ploeg HP, Chey T, Korda RJ, Banks E, Bauman A.* Sitting time and all-cause mortality risk in 222 4897 Australian adults. Arch Intern Med 2012;172(6):494-500.



Illness

Evidence for the relationship between sedentary behaviour and illness is weakened by the fact that the number of studies, and the quality of those studies, are limited. A recent meta-analysis concluded that prolonged sitting is associated with an increase of 112% in the risk of type-2 diabetes and a 147% increase in the risk of cardiovascular disease[8]. There is also limited evidence indicating a link between prolonged sitting and an increased risk of depression[9], as well as indications that sitting for longer periods is associated with an increased risk of some forms of cancer[10,11]. There is still not enough evidence to indicate a relationship between sedentary behaviour and overweight/obesity[12]. Prolonged sitting can also be a risk factor for the development of musculoskeletal disorders[13].

Possible explanation

Research looking at the physiological mechanisms that may explain these links between prolonged sitting and health risks is still in the early stages. It has been suggested that sedentary behaviour can have a direct impact on metabolism, bone mineral content and vascular health[14]. Not only is energy expenditure while standing slightly higher than when seated (this factor may affect weight gain), the benefits of standing seem primarily to be the result of the fact that the postural muscles (particularly the large leg muscles) are continuously active. These muscle contractions no longer occur during prolonged periods of sitting, resulting in unfavourable metabolic processes that can lead to health risks[15,16]. There are indications that regular breaks are needed to reduce the risk associated with long uninterrupted periods of sitting[17-20].

HOW MANY HOURS A DAY SEATED ARE ACCEPTABLE FOR HEALTH?

There is still no international guideline for sedentary behaviour for adults. The Netherlands, but also a range of other countries, do advise people to limit the number of hours they spend seated. In view of the sharp rise in the number of studies in this field, it is expected that national and international guidelines will be drafted within the foreseeable future[21]. They may advise either limiting the amount of time seated per day, but also regular interruptions to prolonged continuous periods of sitting in the form of short breaks to move around[18].

SEDENTARY BEHAVIOUR IS A RISK FACTOR FOR **PREMATURE MORTALITY**

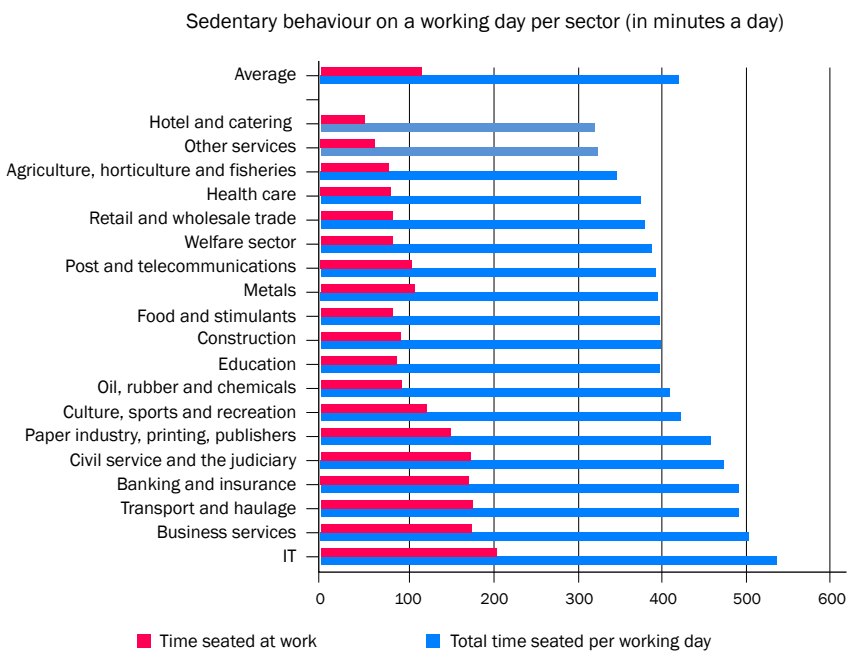
SEDENTARY BEHAVIOUR IS ASSOCIATED WITH AN INCREASED RISK OF:

- **TYPE 2 DIABETES**
- **CARDIOVASCULAR DISEASE**

THERE ARE INDICATIONS THAT PROLONGED SITTING IS ALSO LINKED TO:

- **DEPRESSION**
- **SOME FORMS OF CANCER**
- **MUSCULOSKELETAL DISORDERS**

THE RELATIONSHIP BETWEEN SEDENTARY BEHAVIOUR AND **OVERWEIGHT** IS NOT YET CLEAR.



Source: *Jans MP, Proper KI, Hildebrandt VH.* Sedentary Behavior in Dutch Workers; Differences Between Occupations and Business Sectors. Am J Prev Med 2007;33(6):450-454.

SITTING AT WORK

In more and more occupations, the nature of the work forces us to be seated for hours at a time. As a result, work has become a major cause of this lack of exercise. In the Netherlands, 3.4 million people spend more than four hours a day at work seated[22]. On average, the Dutch working population spends seven hours of every working day in a seated position. In computing, business services, transport, banking and insurance, the civil service and the judiciary, however, people are seated for periods that are substantially above the average (between 9.0 and 7.9 hours a day)[23].

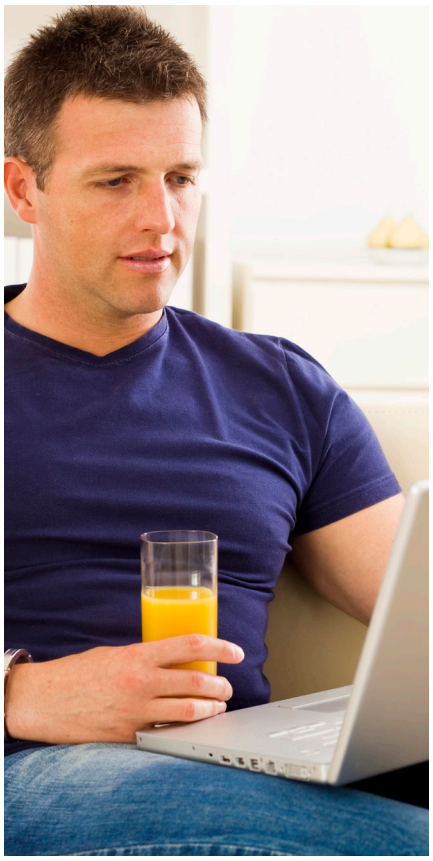
It is to be expected that more and more people will do sedentary work given the expansion of computers and IT. New developments such as teleworking may exacerbate this tendency because the daily amount of exercise accounted for by commuting will no longer be necessary, and working hours at home are spent primarily or even exclusively on a computer. So far, the evidence for a positive correlation between sedentary behaviour at work and health risks is limited. The heterogeneity of study designs, selected outcome measures and findings means that no definitive conclusions can be drawn[24].

LIMITING SEDENTARY BEHAVIOUR AT WORK

Employers have a definite role to play in reducing prolonged sitting at work: on the one hand on the basis of their statutory duty to ensure that occupational risks are mitigated and on the other hand given the importance for them of maximising the potential deployment of their employees. It is widely known that sedentary work in combination with inadequate levels of physical activity constitutes a high risk for absenteeism and longer recovery times, and a pro-active policy in this area can therefore generate financial benefits for employers. It should be borne in mind that possible solutions to reduce prolonged sitting are relatively easy to introduce without involving any loss of production and/or high costs, or safety risks. An example would be the introduction of short breaks to stand up or walk around. Desks at which people can either sit or stand could also be an important way of contributing to the mitigation of sedentary behaviour. Employees have an individual responsibility here: they must be prepared to change their behaviour. Needless to say, this is very much in their own interests because their own health is at stake.

CONCLUSIONS

- There are strong indications that being seated for long periods is associated with an increased risk of premature death.
- There are also indications suggesting an increased risk of various diseases, such as diabetes, cardiovascular disease, depression, cancer, and musculoskeletal disorders.
- These health risks are independent of the degree to which people engage in sports or exercise. People who comply with the physical activity guidelines are therefore at risk as well.
- Sedentary behaviour results in damage to health and can - when this lack of exercise persists in the working environment - be seen as a modern occupational risk.
- The health risks can be reduced by cutting down on the total amount of time spent seated per day.



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