Commentary

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The Role of Flemish Environment and Health Studies

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Description

The Flemish Environment and Health Studies (FLEHS) are large human biomonitoring surveys that ran in Flanders since 2002, and were preceded by a pilot study in 1999. Markers of genotoxicity and oxidative stress have been measured, including the alkaline comet assay and the micronucleus assay in peripheral whole blood and urinary concentrations of 8-oxo-2-deoxyguanosine.

The alkaline comet assay was originally developed and later adapted by Singh et al. It detects a broad spectrum of DNA lesions including single and double strand breaks as well as single strand breaks associated with incomplete excision repair sites and alkali-labile sites. 8-oxodG, an oxidized nucleoside of DNA, is the most frequently detected and studied DNA lesion. 8-oxodG is excreted in urine after DNA repair or oxidation of the DNA pool present in the cell. Another way of detecting and quantifying genome anomalies is to count MN, which is small round bodies found in the cytoplasm outside the main nucleus. They arise from the encapsulation of chromosome fragments, as well as entire chromosomes that are not incorporated in the daughter cells' nuclei. Thus, the number of MN represents the amount of (un-repairable) double strand breaks and chromosome losses present in a cell. A main difference between the genotoxic biomarkers is the nature of damage measured. The damage assessed by the comet assay or 8-oxodG reflects respectively mostly repairable or repaired transient DNA damage. Whereas, the damage in the MN remains unrepaired and can persist in cells over several generations.

These markers are interesting tools to study the pressure of environmental exposure on DNA integrity. They have been widely used in occupational and environmental bio monitoring studies. The association of exposure with genotoxicity markers was also assessed in all FLEHS campaigns. More specifically the impact of metals, Persistent Organic Pollutants (POPs), volatile organic compounds (VOCs), polycyclic aromatic compounds (PAHs), pesticides, perfl-9uorinated compounds and plastic additives were studied in the age range of newborns to elderly.

This paper describes the pooled analysis of the exposure-effect associations for nine different cross-sectional FLEHS surveys performed in adolescents in a time frame of about 20 years. The aim was to test exposure-effect associations with considerable statistical power, as it was based on a study population of 2283 individuals. By introducing a large variation in exposure, lifestyle and environmental factors, a more profound statistical analysis was done.

This study provided a comprehensive assessment of the association between social support and health using longitudinal data from the Veterans Health Study. Unlike previous studies which examined the relationship between one single domains of social support with either mental or physical health, the present study assessed the effects of three different domains of social support on multiple measures of health. The findings of the study indicated that social support tended to mediate the deleterious effects of non-military traumatic events; whereas the adverse consequences of traumatic events experienced in the military were not affected by social support, suggesting that stressors associated with combat had a long lasting effect on the health status of veterans.

The study results revealed that compared with those with better health, respondents with poor health were more likely to have lower levels of social support, suggesting that poor health might be a barrier to a person's ability to participate and/or maintain social relationships. The study also showed that different types of social support had varying beneficial effects on different measures of health. While perceived support had a strong effect on all the measures of health (except alcoholism) included in the study, living arrangement had a significant effect on post-traumatic stress disorder or physical health and participation in group activities had a strong effect only on physical functioning. The results of the study highlight the need for future research to determine whether particular types of social support affect various aspects of health differently. This simultaneous focus on multiple support functions and health outcomes is important because it provides insight into the mechanisms linking social support to health.

The socioeconomic characteristics of individuals, whether indicated by income, education or occupation, are known to influence both health status and the use of health services. Routinely collected administrative health information is frequently limited in its ability to describe these relationships because of the absence of measures of individual socioeconomic status. To overcome this obstacle, many researchers have attempted to supplement individual-level health information with measures of socioeconomic characteristics of the area of

residence, which are typically derived from census or tax filing information.

When individual-level measures of health status or health service utilization and area-based information on socioeconomic characteristics share complementary geographic identifiers, the merging of such data is relatively straightforward, providing an efficient method of substituting for the absence of individual-level socioeconomic measures. However, little research to date has examined the validity of this methodology in health research. In the use of aggregate measures as proxies for individual level measures, at least two distinct issues of validity arise: the first concerns measurement validity and the second concerns construct validity, specifically, the theoretical specification of health effects influenced by characteristics at both the individual and the ecological level.