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Occupational Medicine Clinical Update

Dedicated to the prevention of occupational illness and injuries, and promoting the well-being of all workers

Occupational Health Clinics for Ontario Workers Inc, Sarnia-Lambton

This Issue:

Coming Issues:

- Silica and CTD
- Hodgkin's Disease
- Parkinson's Disease

Back to school: Are there health risks lurking in our classrooms?

10:45 a.m. on a Monday and you are already an hour behind. The next chart you reach for is thick and bears the ominous name of Gary Jenkins, an elementary school teacher. He's booked for ten minutes and has never required less than 30. You muster your courage and have the patient sent in.

"I've been reading on the internet. I have all the symptoms of MS and a recent study says that I got it from work - from being exposed to all those sick kids. I think you should be testing me for MS and I need a note for work. Did you also know that as teachers we have higher rates of all kinds of cancers, Parkinson's and all sorts of other diseases?"

You glance at the stack of charts on the corner of your desk: this is definitely going to take more than ten minutes.

Teachers can be a challenging group to deal with medically. They are well-educated individuals with varying degrees of scientific background and have ready access to scientific resources. Compounding all this, they have all summer to read!

Consequently you may be (if you haven't already) faced with inquiries from teachers about a study[1] published last year that found significant excess mortality amongst teachers from autoimmune diseases (see box below). The findings of this study beg the question: what is different about teacher's patterns of disease?

In medicine the maxim is, "children aren't simply little adults", and it appears teachers may be subject to a different set of health problems from other professionals. They do appear to suffer excesses of a number of different cancers (see table on page 2) as well as non-malignant diseases (see below).

Do Teachers Get Sicker Than the Rest of Us?

Overall the news is actually good: two large studies (U.S. and Nordic countries) have shown teachers have a lower incidence of cancers than the general population[2]. Thus, although there are excesses in certain cancers, there are also significant deficits in others.

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The Autoimmune Question

Walsh and DeChello[1] compared mortality rates from autoimmune diseases in teachers to other professionals using 5,842,532 US death certificates covering the period from 1985-95.

Standardized proportional mortality ratios (PMR) from autoimmune disease were elevated for teachers in all age groups (and by 13% overall), but most notably in the 35-44 year group which were 49%.

PMR's for specific diseases were elevated in 11 of the 13 autoimmune diseases studied however only 4 were statistically significant: MS, RA, SS and SLE. Death from MS was 61% higher in teachers than other professionals, and it accounted for 40% of the excess autoimmune deaths in teachers. Rheumatic diseases accounted for 53% of the excess deaths.

The studies' findings suggested that, "...relatively early in their careers, teachers experience an occupational exposure that increases risk of autoimmune disease."

Relatively early in their careers, teachers may experience an occupational exposure that increases risk of autoimmune disease

Autoimmune diseases are believed to result from a genetically susceptible individual being exposed to an environmental trigger. Infectious diseases (EBV as an example) have been implicated in the pathogenesis of autoimmune diseases.

The *hypothesis* put forward by Walsh and DeChello was that teachers' exposures to respiratory infections may be playing a role in susceptible individuals.

They did, however, point out that elevated PMR's for autoimmune diseases amongst other occupational groups *without* greater potential for exposure to infectious diseases, suggested other factors may be acting as triggers.

Lastly, before your teacher/patient feels somewhat alone in all this, it may be worth pointing out there are other professionals with high rates of autoimmune diseases such as MS, for example: physicians. Walsh is working on a study of autoimmune mortality in other occupations.

O H C O W

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Table 1: Rates* of Selected Malignancies in Teachers

Cancer Site	Rates	Comment
Brain/CNS	??	Studies conflicting
Breast	?	Multiple studies, most positive - confounders?
Hematologic	?	NHL, MM, CLL consistently, HD less so
Lung	?	Lower smoking rates
Melanoma	?	Consistent finding
Ovarian	??	Studies conflicting
Prostate	?	May be related to SES
Thyroid	?	??

* represents composites of incidence and mortality studies

(Continued from page 1)

There seem to be elevations in those cancers thought to be related to hormones and/or higher socioeconomic status (SES), with deficits in cancers typically associated with smoking and/or alcohol intake[2].

Thus, lifestyle factors appear to be confounding the results of some studies. For example, teachers have been shown to have lower smoking rates than the rest of the population, and lower rates of lung cancer. This confounding may be particularly at play in studies on breast cancer and occupation, many of which have not taken into account hormonal/ reproductive factors, nor those of SES.

In response to this lack of attention to individual risk factors, and potential for bias, at least one large cohort of teachers is being assembled to take these factors into account (the California Teachers Study).

With respect to non-malignant disease, very few strong consistent patterns of excess have emerged. Not surprisingly teachers have a preponderance for voice disorders. More worrisome was a Canadian study[3] showing an odds ratio (OR) of 2.50 (95% CI = 1.67-3.74) for Parkinson's disease (PD) and teaching.

What May be Causing the Excesses?

Various factors in the teaching environment (besides frequent exposures to infections) have been suggested as possibly contributing to the reported disease excesses. These include issues of indoor air quality (ventilation, molds), asbestos, pesticides, exposure to photocopier and cleaning fluids, off-gassing from new flooring materials, furnishings, paints and chemicals in science labs.

Interestingly, the hypothesis in both the PD study (which the authors cautioned could have been subject to referral bias), and the Walsh autoimmune study, was that exposure to respiratory infections may be triggers. Thinking back to our own rotations as medical students, you will no doubt recall the spate of infections suffered on pediatric rotations. Is this playing a role?

Although there are many potential confounders it appears clear that the childhood infection exposure hypothesis needs to be explored. It could help explain the elevations seen in autoimmune diseases, NHL and PD amongst teachers. The development of NHL (which is globally on the rise) appears related to immune stimulation/suppression. Infection with EBV has been shown to contribute to the development of certain types of NHL, and has also been implicated in the development of autoimmune diseases including MS, RA, SS (scleroderma) and SLE.

Hypotheses and speculation aside, it appears there is something unique about the exposures encountered as a teacher that leads to different patterns of disease. At this point there are many more questions than answers and the familiar refrain, "requires further study" will likely echo for years to come. In particular, unraveling the effects of occupational factors from those of lifestyle and SES will remain a major epidemiological challenge.

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After 43 minutes you have reassured Gary that he does not have MS. He does have what we all developed in med school: "medical student syndrome" - the attribution/development of symptoms after reading about a disease.

Regarding the Walsh study, you explain that for all teachers there is a 13% higher chance of dying from an autoimmune disease compared to other professionals. In terms of absolute numbers, he has a 2.3% chance of dying from autoimmune disease, and a 97.7% chance of dying from something else!

You also point out that his overall risk of cancer is actually lower than the general population.

"But, should I stay away from kids with colds Doctor?"

"It sounds like maybe we both should."

References

1. Walsh SJ, DeChello LM. 2001. Excess autoimmune disease mortality among school teachers. J Rheumatol. Jul;28(7):1537-45.

2. Reynolds P, Elkin EP, Layefsky ME, Lee GM. 1999. Cancer in California school employees, 1988-1992.Am J Ind Med. Aug;36(2):271-8.

3. Tsui JK, Calne DB, Wang Y, Schulzer M, Marion SA.1999. Occupational risk factors in Parkinson's disease. Can J Public Health. Sep-Oct;90(5):334-7.

There are 28 additional references used in this review that are available on request but not provided due to space constraints.