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Editorial comment

Whether the weather influences pain: High prevalence of chronic pain in Iceland and Norway: Common genes? Or lack of sunshine and vitamin D?

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In this issue of the Scandinavian Journal of Pain Gunnarsdottir et al. [1] report the findings of a study on the prevalence and impact of chronic pain in Iceland. The most striking finding is that the prevalence is high, close to 31% and exactly as high as in Norway [2]. The prevalence in Iceland and Norway are higher than in most Southern-European countries (in Spain only 12% [2]), but also higher than in the other Nordic countries: 20% in Denmark [3], 18% in Sweden [2] and 19% in Finland [2]. Is this just an accidental finding caused by flaws in the surveyed samples in Norway and Iceland? Whereas one study found a slightly lower prevalence in Norway, i.e. 25% [4], two other major health surveys in Norway confirmed a prevalence of chronic pain of moderate-to-severe intensity to be close to 30% [5,6].

1. Pain sensitivity and response to painful stimuli are determined by genes and environment: Iceland and Norway have genes in common and similar environment

Norbury et al. [7] and Nielsen et al. [8] documented that the sensitivity to painful stimuli and pain tolerability are in a significant part determined by our genes. Norwegians and Icelanders may have many genes in common: About 1000 years ago the first inhabitants of Iceland came from the western parts of Norway, and even today the population of Iceland is genetically quite homogeneous. Although Irish monks came to Iceland and taught the Icelanders how to read and write on calfskin (vellum), these monks most likely did not leave much genetic material on Iceland. But they were one important reason that we do have written accounts of the history of the Iceland and the Norwegian kings from around 1000 AD onward!

Therefore, it may not be a too far fetched hypothesis that there are some genetic similarities between Norwegians and Icelanders in their genetically determined pain sensitivity and pain tolerance.

2. Are lack of sunshine (and vitamin D) more likely reasons for the high prevalence of chronic pain in Iceland and Norway?

Norway stretches from 60° northern latitude (Oslo, in the south of Norway, has the same latitude as Anchorage, Alaska) to 75° northern latitude, which is as far north as the arctic part of Canada (Arctic Bay on Buffin Island is about 73° northern latitude). Iceland lies between 64° and 67° northern latitude, about the same as Alaska and southern part of Greenland. In addition the Norwegian populations live in deep fjords and valleys surrounded by mountains that keep the sun away from people even during much of spring and autumn.

This means we have little, or no sunshine in large parts of the year, and even though most people are fair-skinned and a majority of our populations grow up having to drink cod-liver oil for breakfast, we still are deficient in vitamin D, except during the brief and intense summers. In spite of cod-liver oil for breakfast, we suffer from consequences of low vitamin D, such as having the world record of fractured *collum femoris*, and other problems caused by osteoporosis.

The low amount of sunshine in our part of the world is not enough, even for those who have the typically fair skin, to produce sufficient amounts of vitamin D. With the rapidly growing part of the Norwegian population who are immigrants with dark skin, we have rediscovered diseases such as rickets (*rachitis*), due to extreme vitamin D deficiency [9]. There are striking case stories of adult persons moving to the Nordic countries from Pakistan or India, developing severe generalized pain, and being cured completely by cod-liver oil!

Norwegian patients with severe pain from osteoarthritis, rheumatoid arthritis, and other chronic painful conditions, are able to enjoy extended stays in the Canary Islands or other sunny places during wintertime (courtesy our generous health care system). While in the sunny south, their pain disappears more or less. But after a few weeks back home in Norway, they revert to their customary burdensome pain conditions.

After 30 min sunbathing during the Nordic summertime an adult person will produce as much vitamin D as there is in 250 ml cod-liver oil! But the very effective sunscreen ointments that protect against sunburn and melanoma, also reduce production of vitamin D in the skin [10,11].

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It was noted by cancer researchers at the Norwegian Cancer Hospital that patients who started their cancer treatment during the end of summer or early fall (with high vitamin D in their body) have better prognosis than those who start their cancer treatment during the winter or spring months [10]. This is only one of a number of beneficial effects of vitamin D:

3. Blessings of vitamin D

Vitamin D improves prognosis from cancer treatment [10], reduces risk of developing cancer in internal organs [10,11,12], reduces risk of thromboembolic events [13], reduces risk of developing diabetes mellitus [11], multiple sclerosis [11], osteoporosis and fractures [11], cardiovascular diseases [11], Crohn's disease [11], rheumatoid arthritis [11], and having severe influenza-infection [11]. Vitamin D speeds up recovery from depression [15], it slows the ageing-process (maybe) [14], and reduces all-causes mortality [16]. Vitamin D reduces chronic widespread pain [17].

It is noteworthy and of significance to this discussion that it has repeatedly been documented that the risk of chronic noncancer pain is significantly higher in persons with little education and in lower socioeconomic strata in the Nordic countries [3,6]. This may be related to lack of knowledge and ability of having food-sources of vitamin D (fat fish, etc.).

4. Is it moderate-to-severe musculoskeletal pain that flares up when the sun disappears?

Even in North West England the prevalence of "any pain" and of "wide spread pain" is higher during the seasons with less sunshine, and markedly less in summertime [17].

Wintertime with cold and snow also depresses mental mood and discourages physical activities, both of which also aggravate pain, especially musculoskeletal pain conditions [17].

It is noteworthy that, in the European Survey of chronic pain, carried out during winter and spring of 2003, the prevalence of very severe chronic pain (7–10 on a 10 point pain intensity scale) was about the same in Norway and in Spain, i.e. it is the chronic, mostly musculoskeletal, pain of moderate-to-severe intensity, not the most excruciating pain, that differs between Spain and Norway – and Iceland. It would be too much to hope for that any type of very severe pain could be relieved by sunshine or solarium.

5. Conclusions

Epidemiological studies are consistent in documenting a high prevalence of significant pain in Norway, and the high quality study published in this issue of the Scandinavian Journal of Pain [1] confirms that the prevalence of significant chronic pain and its many deleterious consequences to quality of life, physical and social functions are at least as high in Iceland, as in Norway [2,6]. It is not unlikely that the short summers in our countries close to the North Pole do not secure sunshine induced vitamin D production sufficient for the remaining, dark, part of the year. Vitamin D deficiency has a number of unhealthy consequences, and increased risk of chronic pain is likely to be one important one. Whether a sunny weather influences pain is beyond doubt [17].

It is time to do more proper studies, but it is not too early to start prescribing solarium and a week or two in the sunny south during wintertime for patients with chronic pain in the northernmost parts of the Nordic countries.

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