[Experiences of company medical services with vitamin C]
[Article in German]
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This report was translated as background material for the Cochrane review on vitamin C and the common cold by Harri Hemilä and Elizabeth Chalker

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http://www.mv.helsinki.fi/home/hemila
http://www.mv.helsinki.fi/home/hemila/VitC_colds.htm
http://www.mv.helsinki.fi/home/hemila/CC.htm (Cochrane review)
http://www.mv.helsinki.fi/home/hemila/CC (Cochrane review references)

This translation is located at:
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Scanned version of the German paper is located at:
In contrast to the distinct deficiency disorders, latent vitamin deficiencies still occur rather frequently even in our regions despite improved nutritional habits. While for example “classic” cases of scurvy can rarely be observed or at most in artificially fed infants, latent vitamin C deficiency exists in wide parts of the populations due to an insufficient supply of this active substance through the nutrition. Mass screenings that were carried out a few years ago on more than 1,200 residents of two large West-German cities (5) have shown that the average annual supply of vitamin C is insufficient in 65% of the men and in 40% of the women. This insufficient supply is especially distinct during the winter months and in the spring (up to including May/June), in which the vitamin C content of vegetables and especially in potatoes (the consumption of which decreases more and more) is only very low.

Another cause for the development of latent deficiencies to be considered in this context is the communal catering through canteen kitchens providing the main meal for the majority of the working population, as this type of diet often only supplies a fraction of the vitamin quantities desirable for the coverage of the daily requirement (10). Long storage periods and transport routes as well as the fact that the food often has to be kept warm for several hours lead to the fact that the vitamins still present in the food before the preparation are largely destroyed. Thus, health-related damages are caused at an increasing rate by the automation of modern life through an insufficient vitamin supply, which are bound to lead to devastating consequences over time.

High losses of vitamins that in parts amounted to up to 80% in case of vitamin C were determined in analyses of food served by canteen kitchens (13, 23). The alarming results of these mass screenings indicate that it is not possible with the current state of the food technology to supply the participants in communal catering with the quantities of vitamin C necessary to cover the requirement without additional administrations of this active substance. An administration of 75-100 mg must be presumed to ensure the coverage of the daily requirement of vitamin C.

However, some authors also specify higher values regarding the vitamin C dose to be administered daily, which is certainly indicated in persons who might already exhibit a latent deficiency for this active substance (11). In such cases in which first a deficit has to be covered and the reserves have to be refilled, the daily supply can be changed to 75-100 mg once the vitamin C balance has been restored. That these situations are not rare by far is also proven by recent findings in “clinically healthy” test persons who received 1,000 mg vitamin C and did not eliminate the reduced substance in the urine afterward (15). Obviously, the vitamin C administered was needed to refill the latent deficit in these cases.

One of the most important known functions of vitamin C is the maintenance of the resilience against infections. In the event of a vitamin C deficiency, the immune system of the organism is clearly impaired. On the other hand, the vitamin C requirement is clearly increased when an infectious disease is present. Especially the reticuloendothelial system must be regarded as point of attack of the vitamin C in the context of an immune response. Vitamin C promotes the formation of antibodies and increases the phagocytic potential of the leucocytes, whereby the bactericidal effect of the blood increases significantly. In addition, the vitamin is involved in the synthesis of corticosteroids, which are also of decisive importance for the immune response (6, 7, 12, 13, 16). All of these mechanisms are impaired in the event of an insufficient supply of vitamin C so that the immune response against colds is highly impaired as a result.

Aside from these theoretical reflections, a prophylactic administration of vitamin C for the prevention of colds can certainly be called a recommendable measure for the reduction of the sickness rate based on numerous reports from the practice (1-4, 17-22). Experiences of company medical services were reported especially by Scheunert (20) as well as Renker and Wegner (17) in this context, who carried out studies on 4,000 or respectively 1,200 persons. The findings of Ritzel (19) from a double-blind study in participants of a ski camp with daily administrations of 1 g vitamin C should also be mentioned, the statistical evaluation of which
clearly confirmed the prophylactic efficacy of vitamin C.

According to the observations of different authors, a sufficiently high dose of vitamin C appears to be the prerequisite for achieving a prophylactic effect. We therefore selected a daily dose of 1,000 mg for our own tests in the local plant. In contrast to other researchers (17, 20), the administration of the vitamin C tablet was not entrusted to the plant foremen or other persons but carried out by the author himself or his employees and carefully monitored. Our observations cover a time period of six months (October 1965 to March 1966) and relate to a total of 200 employees of the main factory supplied daily with vitamin C tablets. These test persons certainly present a representative cross-section of those departments of the factory that have a high level of public traffic or where employees are especially at risk for infections due to their activities. This especially concerns the staff of the company health insurance, employees in a training workshop, lorry drivers, drivers of electric trolleys and shunters of industrial railways who exhibited an exceptionally high number of sick days due to colds in the previous years and in whom a prophylaxis would be especially indicated. The selection of study participants from these groups of employees occurred based on coincidental circumstances. A possible economic downturn was not to be anticipated at the time of the execution of our study so that an effect on our result was not to be assumed in this regard. This assumption is supported by the development of the total number of sick days in the first quarter of 1966.

The test persons received one Cebion® effervescent tablet* daily. The tablets were distributed to the test persons for their days off with the instruction to take one tablet each day. The daily supply of a 1 g vitamin C dose can be regarded as completely safe measure as the active substance is “a completely safe substance, even if daily amounts are chronically supplied that exceed the requirement” (14). Even the supposedly unfavourable effects of high doses of vitamin C on the carbohydrate metabolism (9) that were discussed some time ago have been disproven in the meanwhile by different work groups (8, 15). The results of our study clearly indicate the value of a prophylactic administration of vitamin C in plant employees especially at risk of infections. While the number of the cases of respiratory infections in the staff not protected by an additional vitamin C supply amounted to 2.15% (fourth quarter 1965) or 2.82% (first quarter 1966) with a total sickness rate of 7.4% or respectively 8.6% in the two quarters, no respiratory infections were observed at all in the persons treated with Cebion in the fourth quarter of 1965 and only 1.5% in the first quarter of 1966 (see table).

<table>
<thead>
<tr>
<th>Respiratory disorders Without vitamin C</th>
<th>With vitamin C</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV/65 2.15%</td>
<td>0</td>
</tr>
<tr>
<td>I/66 2.28%</td>
<td>1.15%</td>
</tr>
</tbody>
</table>

Respiratory disorders thus accounted for maximally 17% of the total sickness rate in the plant employees supplied with prophylactic vitamin C in comparison to 29-33% in the unprotected staff; accordingly, they could be reduced by approximately half. Whilst mild upper respiratory tract infections did occur in some test persons in the fourth quarter of 1965, these however did not lead to an incapacity for work, so that the conclusion that the cold did not break out in these cases due to the administration of vitamin C is certainly justified. Based on these observations, the prophylactic administration of vitamin C can definitely be recommended as measure implemented by the company medical services to reduce the number of sick days due to colds.

Summary
The value of a vitamin C prophylaxis implemented by the company medical services was tested in 200 randomly selected test persons of a plant at risk for infections via Cebion® effervescent tablets. The tests carried out over a six-month period (October 1965 to March 1966) indicated that the prophylactic administration of vitamin C can be recommended as a highly valuable measure for the reduction of the sickness rate due to colds.

Literature

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