

Letters to the Editor Benzene and Leukemia

Dear Editors:

Although there were numerous case reports showing the possible role of benzene in the development of leukemia, the first epidemiologic study on this problem appeared in 1974 (1). From 1967 to September 1973, 26 patients with leukemia were investigated among 28,500 shoe, slipper, and handbag workers chronically exposed to benzene in Istanbul, Turkey. Seventeen of them were studied at the Second Internal Clinic of Istanbul Medical School (1). The remaining nine leukemic workers were investigated in the hospitals in Istanbul, five at the First Internal Clinic of Istanbul Medical School, three at the Therapeutic Clinic of Cerrahpasa Medical School, and one at the Hematology Department of the same faculty (1). The incidence of leukemia among these shoe workers was 13/100,000, which is a markedly and statistically significant increase over that for leukemia in general population. In 1974 the number of leukemic shoe workers in Istanbul increased to 31 (2). Thus, the incidence of leukemia among them was 13.59/100,000. The peak incidence of leukemia among shoe workers in Istanbul occurred in 1973. The number of leukemic shoe workers in Istanbul started to decrease following the prohibition and discontinuation of the use of benzene from 1969 onward (3). The working conditions were not good, and their shops were usually small, not hygienic, and poorly ventilated. The concentration of benzene was found to reach a maximum of 150 to 650 ppm when adhesives containing benzene were in use. The benzene levels in 98 adhesives and thinners available between 1970 and 1972 in Istanbul were determined by gas chromatography and ranged between 9% and 88% (4).

In their paper "Review and Update of Leukemia Risk Potentially Associated with Occupational Exposure to Benzene" in *Environmental Health Perspectives*, Volume 82, Brett et al. (5) considered these estimations unsatisfactory because they supposed the shoeworkers might have been exposed to volatile hydrocarbons in addition to benzene, curing agents, dyes, and other chemicals used in the shoe industry. Other than benzene and toluene, no other material including curing agents and dyes was used in shoe workplaces during the period 1960 to 1974. Only occasionally was shoe varnish used. But this material did not evaporate. In Turkey, until recent years, toluene and benzene available in the market were obtained from the coke plants. As is well-known, benzene, toluene, and xylene produced in the coke plants contain other homologs of aromatic hydrocarbons. According to Brett et al. (5), our exposure data were very limited. On the contrary, we determined the concentration of benzene in 35 work environments in Istanbul and in the coke plants of the Zonguldak area by a Dräger multi-gas detector. The results of this investigation were published in 1970 (6). In addition, the results of this study were noted in the

Uniscience Book of *CRC Benzene Carcinogenicity* (7). The concentration of benzene ranged between 150 and 650 ppm in these work environments.

Contrary to the assumption of Brett et al. (5), the number of workers exposed to benzene in our study was not obtained from official sources. A commission headed by Associate Professor Dr. I. Topuzoğlu, Public Health Department, Hacettepe Medical School, Ankara, Turkey, prepared a report on the benzene problem in Turkey in 1972 (4). Concerning the benzene problem in Istanbul, he collaborated with the trade union for shoe, slipper, and handbag workers in Istanbul (4). He prepared a report on the benzene problem in Istanbul. We used his results for the workers involved in shoe, slipper, and handbag production in Istanbul. This reference was mentioned in the original paper of our study published in *Blood* (1) and in *CRC Benzene Carcinogenicity* (7). For the standard population we used leukemia mortality rate as 6 per 100,000 instead of 2.5 to 3 per 100,000, which was the official rate of leukemia for Turkey during the period of 1973 to 1974 (8). Because our results on this problem were the first ones, we preferred to use the unfavorable data for our calculations. The reason dermal absorption of benzene was not considered in our study is that dermal absorption was not clearly known during the period of 1969 to 1974. This problem was clarified only following the study by Suston et al. in 1984 (9).

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