A STRATEGY TO ADJUST FOR CONFOUNDING USING MULTIFACTOR STATISTICAL MODELS IN EPIDEMIOLOGICAL RESEARCH

Anatole N. Varaksin, *The Institute of Industrial Ecology, the Urals Branch of the Russian Academy of Sciences, Russia*
Vladimir G. Panov, *The Institute of Industrial Ecology, the Urals Branch of the Russian Academy of Sciences, Russia*
Julia I. Kazmer, *The Institute of Industrial Ecology, the Urals Branch of the Russian Academy of Sciences, Russia*

Background and Aims: There are two main methods to adjust for confounding at the stage of data analysis in epidemiology: standardization (stratification) and multifactor statistical modeling. Comparison of results obtained with the help of these methods is, therefore, of interest to us. The mathematical equivalence of these methods to adjust for confounding has not been fully investigated in scientific papers. Besides, it is customary to assume that the results of both methods coincide when they are applied to the same primary dataset.
Methods: We have considered different statistical methods to adjust for confounding, such as simple and logistic regression, and analysis of variance and covariance. Strict mathematical methods have been used to compare the results obtained by standardization and by including a confounding variable into the multifactor statistical model. We have used our datasets for performing calculations. These datasets include 1577 adults and 1350 children living in the Middle Urals (Russia). For each of the individuals, we gathered data concerning health status, environmental pollution and information about individual risk factors.
Results: It is shown that the multifactor variance model represents the standardization procedure in the best way. The covariance model could allow us to make the same adjustment for confounding as a standardization procedure if we took into account some special conditions. Multiple regression models (both simple and logistic) give results which are different from those obtained with the standardization procedure.
Conclusions: Formal application of regression models (both simple and logistic) to adjust for confounding may lead to incorrect results. Admittedly, the only reasonable method to adjust for confounding is variance models, and occasionally, covariate models. It has to be admitted that a reasonable method to adjust for confounding is variance models only, and covariate models on some occasions.