COMMENTARY

BIRTHWEIGHT AND THE DISPLACEMENT HYPOTHESIS

AN ANALYSIS OF METHOD

I have read with interest the article on cigarette smoking during pregnancy by Yerushalmy in your June 1971 issue (1). I should like however to take up a point concerning some of the statistical treatment.

In attempting to account for the fact that low birthweight (less than 2.5 kg) babies of smoking mothers have a lower neonatal mortality than low birthweight babies of nonsmoking mothers, Yerushalmy examines the so-called "displacement" hypothesis. According to this, smoking in pregnancy will lower birthweight by about 200 gm, but leave the neonatal mortality rate the same as that which is associated with what the birthweight would have been had the mother not smoked.

In table 8 of his paper Yerushalmy estimates there would be only 121.5 babies of smokers weighing less than 2.5 kg if their mothers hadn't smoked, compared with an observed 237. The excess, of 115.5 babies, he then assumes have each been displaced by 200 gm from a higher birthweight. He then goes on to estimate the mortality rate among these, assuming the displacement hypothesis to be true, and obtains results which appear to reject this hypothesis.

This is not however a valid test of the displacement hypothesis. The hypothesis states that the average displacement of all babies is 200 gm, but Yerushalmy has effectively considered only about half (115.5) the babies to be displaced and the remainder (121.5) as not being displaced. If the expected number of deaths is recalculated, as in table 9, but assuming that all the low birthweight babies are displaced, then we obtain a figure of 21.1 expected deaths which is not significantly different from the 27 observed deaths. In fact, the figure of 21.1 is likely to be an underestimate, both because the group intervals in table 9 are 250 gm rather than 200 gm, and because a full analysis would need to take account of the actual distribution of the birthweight displacement instead of assuming that it is exactly 200 gm for each baby.

Thus, contrary to what is stated in the article, the data do not appear to provide evidence for rejecting the displacement hypothesis.

REFERENCE


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