

and DT titers is the minimum threshold for protection against these diseases, and is at least 50-fold lower than the values reported by others. Even for TT, it is 10-fold lower. The result of this study should encourage further trials to answer this important question: Are some Indian infants poor responders to the combined vaccines?

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## Breakfast Eating Habit and School Performance: Compelling Associations in Need of a More Refined Analysis

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The role of breakfast in improving school performance has recently received substantial attention in UK policy circles, as reflected by our work on the evaluation of the Primary School Free Breakfast Initiative in Wales (PSFBI)(1). Such efforts draw on a growing, yet inconsistent evidence base for associations between breakfast consumption and cognition(2). Many studies have drawn upon laboratory based work, examining acute impacts upon relatively abstract aspects of cognitive function(3, 4). Fewer studies have examined associations with tangible educational benefits such as performance in academic tasks, in real world settings. It is useful therefore to see a study by Gajre, *et al.*(5) in this issue of *Indian Pediatrics* paying attention not only to the role of breakfast in promoting acute cognitive improvements, but also

focusing upon outcomes such as school performance.

Gajre and colleagues' study(5) offers tentative evidence that breakfast eating habits are directly associated with acute cognitive functioning, as well as achievement in school subjects such as Maths and Science. Whilst these are interesting and important findings, and the authors should be commended for their efforts to investigate these relationships, a number of methodological and analytical limitations ought to be carefully considered when evaluating the article's conclusions.

Firstly, it is a touch unclear why the authors have chosen to examine Maths, Science and English marks separately without an *a priori* statement regarding the likelihood of breakfast differentially

impacting performance in these different subjects. A single composite school performance score may have been sufficient, reducing the number of statistical tests and resultantly, reducing the likelihood of positive findings occurring by chance. Secondly, the use of step-wise regression analysis rather than *a priori* selection of predictor variables perhaps diminishes one's confidence in the analysis, particularly given the number of inter-related measures of socioeconomic status under consideration. Again, a single composite measure of socioeconomic status would have facilitated more interpretable findings and greater confidence that the few positive associations demonstrated do not occur simply by chance. Furthermore, although socioeconomic status is included in the analysis in a superficial manner, its potential association with breakfast skipping, which has been demonstrated previously in a Welsh context(6), receives little attention, and its potential confounding influence on the associations demonstrated could have been scrutinised more explicitly. Furthermore, whilst the article claims to demonstrate a causal relationship between breakfast eating habits and cognitive function/school performance, the likelihood that children who skip breakfast differ fundamentally from those who do not in ways that also affect their school performance cannot be ruled out. Whilst the use of cross sectional methods is appropriate for exploratory research such as this, conclusions deserve not to be overstated.

In relation to reasons for skipping breakfast, it is unclear whether the authors have used a closed forced choice question, or have recoded an open question in order to derive the data presented. Given the limited range of response types, it would perhaps appear that the former is the case. If so, a useful direction for future research would perhaps be to focus less exclusively upon individualistic reasons for non-consumption, such as time and food preference, and consider also wider social and ecological constraints upon children's dietary behaviors. I would caution against a sole focus upon individual determinants of health behaviors due to their potential to add fuel to the victim-blaming rhetoric which haunts much health promotion

literature. Lack of time, for example, is interpreted by the authors as 'poor time management', which perhaps goes a step too far in arriving at a value judgement regarding the behavior of children and parents.

Despite limitations, the article demonstrates some compelling associations between breakfast eating habits and school performance. These trends merit further investigation, using prospective methods alongside a more finely tuned analysis, controlling for the likelihood of confounding by variables such as socioeconomic status. We look forward to building upon the analyses presented here with our ongoing analysis of data from the PSFBI.

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