Educational attainment, nutrition and home conditions

The renewed discussion of the inadequacies of the educational achievement of schoolchildren, centring once more on how much low achievement is due to poor teaching and how much to poor home conditions, has stimulated us to report on the hitherto unpublished results of an extensive study we carried out soon after the outbreak of the Second World War, about 50 years ago. Our objective at that time was to assess the status of Cambridge schoolchildren in the light of food rationing and the extent to which their nutrition could, if necessary, be improved by the administration of vitamin supplements. Physical tests, tests of intelligence and of school performance were made.

Our subjects were about 1000 children of the age of 9 years attending two elementary schools in Cambridge. One school (A) had relatively new buildings and was in a relatively well-off area of the town. The other (B) had buildings from the last century and was in a poor area.

The food rationing system at that time was regulated so that the quantity of the food available to each child ensured, as far as possible, an adequate supply of highly nutritional food available to everyone.

Our research was designed as a 'randomized controlled trial' in order to answer the question whether a simple supplement of vitamins produced any measurable improvement in the children's health. Half the children in each school were given daily a pill containing the vitamins, the other half a 'placebo' pill, known only to the investigators. A brief report of the physical state of the children and the effects of the supplement was published[1].

Among the tests carried out by the children was Raven's test of intelligence and the Northumberland tests of educational attainment standardized by Professor Cyril Burt. We then compared for each school the correlation between intelligence and educational attainment as so measured. In School A there was a close correlation between intelligence and attainment. In School B the correlation (coefficient) was significantly lower. That is, attainment in School B was at least partly determined by factors related to the differences between the schools, the attainment of some children, including some of high intelligence, falling short of that to be expected from their intelligence, for reasons which we set out to discover.

We concluded that the quality of the teaching was *not* one of the main reasons, on the grounds that the educational attainment of many of the children in School B was up to the same level as those of similar intelligence in School A.

Nutrition

Another possibility was that the children in School B had been less well fed. While there were no obvious clinical signs of *malnutrition*, there were indications that their diet had been less than optimal. They were slightly but significantly shorter, weighed less, had a weaker grip with a dynamometer, and had lower haemoglobin levels.

It has been generally accepted that the height of prepubertal children is affected by their nutrition. At that time Cambridge schoolchildren were on average one inch taller than London schoolchildren of their similar age, and these in turn were one inch taller than Glasgow children. Cambridge and Glasgow children did not differ in height when an allowance was made for the amount of money spent by their families on food[2].

The difference between the children in Schools A and B may have been due partly to *family size*, the average in School B being 3.1 compared with 2.6 in School A[3]. Their larger size would have added to the financial pressures on the less well-off families served by School B, and caused them to choose cheaper but perhaps less nutritious food.

Retesting the children after a year did not reveal any effects of the vitamin supplements in either school on intelligence, educational attainment or height. There were differences in two other respects. The 'supplemented' group, when compared with the 'placebo' group, had had significantly fewer and less severe respiratory infections; and their alertness and general response at school, as assessed by their teachers, had improved.

That malnourished children tend to be inattentive, listless and tired, and unable therefore to benefit as much from the teaching as they should, has been well recognized, and was indeed the reason why the extra meals and milk in schools were provided. It is still true that children from poorer families are shorter than children from wealthier families, suggesting that the diets of these children are nutritionally inadequate[4]. Evidence is lacking on which to decide whether, despite the affluence of the many, there is nowadays sufficient under- or mal-nutrition among the children of poorer families to warrant measures to supplement the diets of the few.

A reason for low educational attainment relative to intelligence lay, we concluded, in the *conditions in the homes* of the children in School B especially, among these conditions being what has been called in American research the 'stimulation value'; this depends upon, not only whether the parents encourage and give opportunities to their children to learn, but also whether the general conditions in the home are conducive to study.

The *educational tests* now being introduced will supply the data on which the quality of the teaching in a school can be assessed, provided of course that due allowance is made for differences in such other variables as intelligence, nutrition, family size, and home conditions. Perhaps of greater importance, they will identify those children whose educational attainment falls short of that to be expected from their intelligence.

The traditional questions can then be asked: why is this child backward educationally? Is there evidence of under- or mal-nutrition? Have defects in vision or hearing or other health problems been missed? Is the child being held back educationally by conditions in the home? And finally, what remedies can be applied to help the child?

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