FOOD-CT-2005-007036

EARNEST

EARly Nutrition programming- long term follow up of Efficacy and Safety Trials and integrated epidemiological, genetic, animal, consumer and economic research

Instrument: Integrated Project

Thematic Priority 5.4.3.1: Food Quality and Safety

Final public report on activity 2.2.2:
Collect data on blood pressure and body composition

Period covered from 15.04.2005 to 14.10.2010
Start date of project: 15.04.2005 Duration: 5,5 Years

Organisation Name of Lead Contractor for this report: University of Bristol

Avon Longitudinal Study of Parents and Children

The Avon Longitudinal Study of Parents and Children (ALSPAC) is a geographically-based birth cohort investigating the health and development of children, which is described in detail elsewhere (Golding J, Pembrey M, Jones R, 'ALSPAC--the Avon Longitudinal Study of Parents and Children. I. Study methodology.', Paediatric and Perinatal Epidemiol 2001; 15 (1): 74-87) and on the study website (www.alspac.bris.ac.uk**)**. Briefly, all pregnant women living in three health districts of Bristol (formerly known as the Avon Health Area), England with expected delivery dates between April 1st 1991 and December 31st 1992 were eligible to take part in the study. A total of 14,541 were enrolled, and 13,678 had a singleton, live born child. Detailed data have been collected by self-completed questionnaires (relating to the mother, her partner, and her offspring) from pregnancy onwards. From the age of seven, all children have been invited to regular research clinics. Ethical approval was obtained from the ALSPAC Law and Ethics Committee and the three Local Research Ethics Committees.

Aim of Activity 2.2.2

The aim of activity 2.2.2 was to collect blood pressure and body composition data on 5000 children at age 15 years. The 15 year clinic was completed in June 2008. Data were collected using the methods described in Activity 2.2.1.

Blood pressure data

We have blood pressure data on 5091 children. The figures below show the distribution of systolic blood pressure (Figure 1) and diastolic blood pressure (Figure 2).

Figure 1: Systolic blood pressure distribution at age 15 years

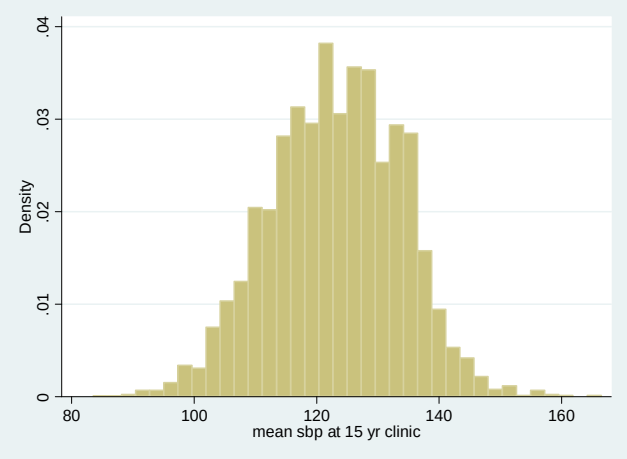
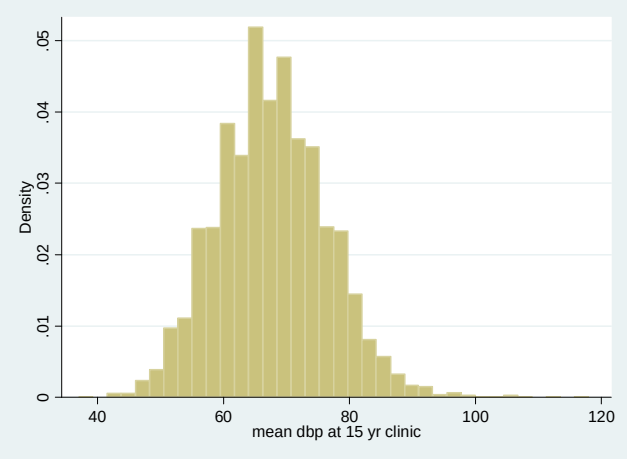


Figure 2: Diastolic blood pressure distribution at age 15 years



The distributions are approximately normal as expected. Mean (standard deviation) systolic blood pressure was 123.1 (10.8) mmHg and was higher in males than females as expected (126.0 (10.4) mmHg in males vs 120.6 (10.5) mmHg in females). Mean (standard deviation) diastolic blood pressure was 67.6 (8.8) mmHg and was higher in males than females (68.3 (9.2) mmHg vs 67.0 (8.4) mmHg).

The values are comparable with earlier data from the same cohort, collected at age 7, 9, 11 and 13 years, with a steady increase over the time period. The values are also comparable with other studies reporting on blood pressure data at age 15 years. For example, a UK study based in Merseyside recorded blood pressure values for 128 15 years in 1995/96 (Stevenson CJ, West CR, Pharoah POD. Dermatoglyphic patterns, very low birthweight, and blood pressure in adolescents. Archives of Disease in Childhood Fetal and Neonatal Edition 2001;84:F18-22. Note data reported here are based on the control group of normal birthweight). The mean (SD) blood pressures were 11.5 (10.6) mmHg for systolic and 58.3 (7.5) mmHg for diastolic. Although the means were a little higher, the standard deviations were very similar, especially for systolic blood pressure.

In a larger cohort (388 males and 359 females), part of the Dunedin Multidisciplinary Health and Development Study based in New Zealand, blood pressure was measured at age 15 years in 1987/88 (Williams S, Poulton R. Birth size, growth and blood pressure between the ages of 7 and 26 years: Failure to support the fetal origins hypothesis. American Journal of Epidemiology 2002;155:849-52). Systolic blood pressure was 120.9 (10.3) mmHg for males and 116.0 (9.7) mmHg for females, while diastolic blood pressure was 64.8 (8.5) mmHg for

males and 66.5 (7.5) mmHg for females. In this study the means were a little lower than in our study, but again the standard deviations were very similar.
So, in conclusion, we have usable data on adequate numbers of children, which can be used to explore associations with maternal modifiable exposures, namely smoking during pregnancy, age at childbirth and prenatal diet.

Body composition data

We have body composition data measured by DXA on 5134 children. The figures below show the distribution of fat mass (Figure 1) and lean mass (Figure 2).

Figure 1: Fat mass distribution at age 15 years

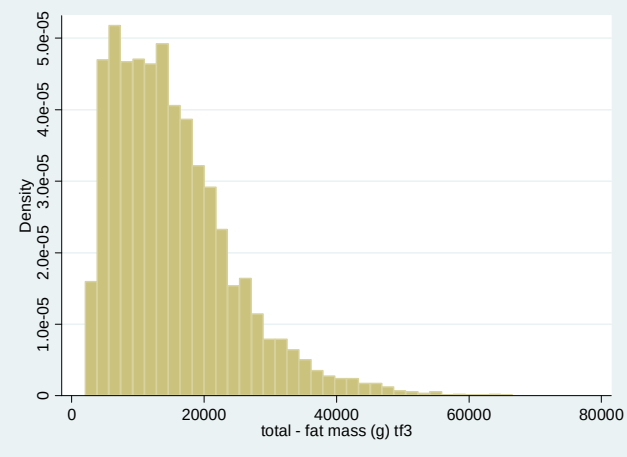
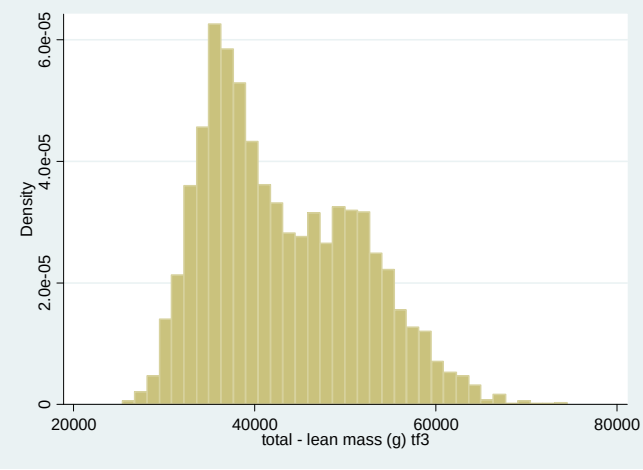


Figure 2: Lean mass distribution at age 15 years



The distributions for both fat mass and lean mass are positively skewed as expected. Median (interquartile range) fat mass was 13.7 (8.4, 20.1) kg and was lower in males than females as expected (8.6 (5.9, 13.5) kg in males vs 17.4 (13.4, 22.6) kg in females). Mean (standard deviation) lean mass was 41.4 (36.2, 49.7) kg and was higher in males than females as expected (49.9 (45.5, 54.0) kg vs 36.7 (34.3, 39.3) kg).

The values are comparable with earlier data from the same cohort, collected at age 9, 11 and 13 years, with an increase over the time period. Some other studies have measured fat and lean mass using DXA machine at around age 15, although we have not been able to identify any studies in the UK. The following two examples of non-UK studies with relevant data present mean (standard deviation) values rather than medians and interquartile ranges, so we have calculated those statistics for comparison purposes only. Mean (standard deviation) fat mass was 15.4 (9.2) kg (11.4 (8.4) kg in males vs 19.0 (8.2) kg in females). Mean (standard deviation) lean mass was 43.7 (8.4) kg (49.7 (6.7) kg in males vs 36.9 (3.9) kg in females).

A study based in Sweden recorded DXA fat and lean mass for 203 15 year olds (Lantz H, Bratteby LE, Fors H, Sandhagen B, Sjostrom L, Samuelson G. Body composition in a cohort of Swedish adolescents aged 15, 17 and 20.5 years. Acta Paediatrica 2008;97:1691-7). Mean (standard deviation) fat mass was 9.7 (7.0) kg for males and 15.4 (6.1) kg for females. Mean (standard deviation) lean mass was 48.4 (7.1) kg for males and 38.1 (3.7) for females. These values are very similar to our study, particularly for lean mass.

An Australian study recorded DXA fat and lean mass for 183 16 year olds in 2004/05 (Foley S, Quinn S, Jones G. Tracking of bone mass from childhood to adolescence and factors that predict deviation from tracking. Bone 2009;44:752-7). Median (interquartile range) fat mass was 12.5 (9.4, 20.1) kg for males and 20.0 (17.0, 27.3) kg for females. Mean (standard deviation) lean mass was 56.1 (7.3) kg for males and 42.2 (4.8) kg for females. These values are a little higher than those from our study, which would be expected as the subjects in our study are one year younger.

So, in conclusion, we have usable data on adequate numbers of children, which we can use to explore associations with modifiable early life exposures, namely smoking during pregnancy, breastfeeding and infant sleep duration.