Dietary patterns in adolescents: a comparison of cluster and principal component analyses

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Traditionally, nutrition research has been focused on the detailed examination of nutrients and dietary components. However, in more recent years public health nutrition has seen a move from research at the nutrient level to the food level. Both cluster and principal component (PC) analysis (PCA) offer a means of exploring dietary patterns at this level. In cluster analysis dietary data are reduced into mutually-exclusive patterns based on differences in dietary intakes. In PCA dietary patterns are derived based on the correlation matrix of the original food variables and individuals receive a continuous factor score for each PC. Without effective intervention poor eating habits developed during adolescence may ‘track’ into adulthood(1). Thus, it is important to document their dietary practices and identify areas in which strategies can be focused. In the literature there are only a few studies on the dietary patterns of adolescents(2,3) and there appear to be none that have compared cluster and PCA methods. The National Teens’ Food Survey was conducted in the Republic of Ireland in 2005–6 on a representative sample of 441 teenagers aged 13–17 years(4). A semi-quantitative 7 d food diary was used to collect information on foods and beverages consumed. Food intake data were reduced to thirty-two food groups. Food groups were expressed either as mean intake (g/d) or as the percentage contribution to total energy intake (%TE). In order to compare the patterns derived by both methods, mean PC scores were calculated and computed across the cluster solutions.

The most sensible clusters were derived based on %TE, which were labelled as ‘Healthy’, ‘Unhealthy’, ‘Rice/pasta dishes’, ‘Sandwich’ and ‘Breakfast cereal & main meal-type foods’. The most interpretable patterns using PCA were derived based on intake (g/d) and were labelled as ‘Healthy’, ‘Traditional’, ‘Sandwich’ and ‘Unhealthy’. Cluster 1 scored highest for PC 1 and lowest for PC 4, indicating that close similarities exist between the ‘Healthy’ pattern derived by both methods, and that it is most different from the ‘Unhealthy’ PC. Cluster 2 scored highest for PC 4, also indicating that for the ‘Unhealthy’ pattern both cluster and PCA derived very similar patterns. In summary, cluster analysis and PCA, although statistically-different methods, identified similar dietary patterns when presented with the same dataset, and these patterns were directly comparable in the adolescent sample.