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**Exploring the impact of the *Burnley Food
and Fitness Aimed at Lowering Obesity
(BUFFALO)* project**

Executive Summary

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Executive Summary

Introduction

The *BUFFALO* project (Burnley Food and Fitness Aimed at Lowering Obesity) is a children's obesity prevention project targeting Year 5 (9 to 10 year old) pupils in primary schools in Burnley. It is co-ordinated and delivered by Burnley Borough Council in partnership with East Lancashire Primary Care Trust. The *BUFFALO* project involves curriculum input during the normal school day for one afternoon per week in each Year 5 class for the first school term, followed by a 10 week programme of after school activities. The *BUFFALO* project team commissioned the Centre for Public Health Research at the University of Chester to explore the impact of the *BUFFALO* project using data which had been routinely collected.

Analysis of data

The Centre for Public Health Research at the University of Chester received a database from the *BUFFALO* project team in order to undertake the analysis. The database contained anonymised records of all children who had participated in the project over a three year period (September 2006 – August 2009) and included data on weight, height, body mass index (BMI), fitness levels and dietary habits. The primary outcome measure was change in BMI z-score – the age and sex adjusted BMI standard deviation score. Prevalence of overweight and obesity was used as a secondary outcome variable using the $\geq 85^{\text{th}}$ centile (overweight) and the $\geq 95^{\text{th}}$ centile (obese) to classify children, based on the British growth reference charts, as recommended for monitoring population groups. A series of additional secondary outcome measures were also included in the analysis.

Key findings

- In total, 299 children who had taken part in the *BUFFALO* project were on the database provided by the *BUFFALO* project team. Of these, 65 were excluded from the analysis because of incomplete data (age, sex and/or BMI). Therefore, a total of 234 children were included in the analysis.
- The sample of children was slightly skewed in favour of males (52.6%). The majority of children (approximately 82%) were aged nine at the beginning of the project. In terms of ethnicity, the children were broadly representative of children in Burnley as a whole. Free school meal eligibility varied across the participating schools, ranging from 65% to under 20%.

- For all variables – with the exception of the primary outcome variable, BMI z-score – the mean value increased over the intervention period, and, with the exception of flexibility, these changes were all statistically significant. These increases might be expected and could be accounted for by the children's growth and maturation over the course of the academic year. It is thus difficult to attribute these changes to the intervention although it cannot be ruled out that the intervention may have contributed, to a greater or lesser degree, to improving outcomes among these children.
- In terms of the primary outcome, the mean change in age and sex standardised BMI z-score showed a small decrease, which was statistically significant. This indicates that for the group as a whole, there has been an improvement in their weight status. The improvement might be linked to the intervention, although this conclusion should be treated cautiously in the absence of a control group for comparison.
- BMI z-scores were further analysed by sex and by school in order to see if there was any differential impact of the intervention. No significant differences were evident between males and females. Casterton Primary School was found to be significantly different from all other schools. This was the school that had the largest change in BMI z-score (-0.37). No significant differences in BMI-z scores were observed between any of the other schools.
- There were small increases in the percentage of children classified as overweight and obese post-intervention. An increase in the number of children who were classified as being underweight was also observed following the intervention. However, none of the observed changes were significant. This might indicate that the intervention has contributed to preventing an increase in the number of children who are classified as overweight or obese.
- Self-reported fruit and vegetable consumption increased significantly post-intervention. Significant differences were evident between males and females both pre- and post-intervention, with females consuming more fruit and vegetables than their male peers. Total self-reported television viewing and physical activity increased, differences that were not statistically significant.
- Overall, the qualitative data revealed that the *BUFFALO* project provided a range of activities that were positively welcomed and enjoyed by children and parents alike. Whilst teachers also commented on a number of positive aspects of the project, some comments revealed a concern with the extent to which *BUFFALO* activities impacted on the time that was available for curriculum

subjects. The views expressed illustrate the different ways in which the *BUFFALO* project was seen as influencing children's health behaviour.

Recommendations

In order to ensure a robust evaluation of the *BUFFALO* project, the following points are worthy of note.

- Recruit a control group that is comparable in relation to key variables (age, sex, free school meals).
- Review data collection procedures in order to minimise missing data.
- Continue to collect data routinely and comprehensively in order to facilitate the monitoring of trends in overweight and obesity in Year 5 children in those schools that participate in the *BUFFALO* project.
- Monitor and review the implementation of the *BUFFALO* programme to ensure that it is being delivered to maximum effect and keep records of any problems that occur.
- Review the anthropometric outcome measures in order to ensure that data are only collected on variables that are genuinely of use to understanding the impact of the intervention.
- Given the nature of the intervention (an individual child participates in one term of curriculum-based activities and one term of after school activities) review what it is reasonable to expect in terms of outcomes (such as changes in BMI or the percentage of children classified as overweight or obese) over one year.
- Consider the use of skin fold measurements to assess lean body mass as this might provide more insight into any physiological adaptations occurring, although the measurement of skin fold thickness is a skill that requires considerable training to acquire.
- Consider undertaking longer term follow up of participating children, as the changes that the programme is designed to promote are likely to take time to become apparent.