Institution: University of Worcester

Unit of Assessment: 26 Sport & Exercise Sciences, Leisure & Tourism

Title of case study: Addressing the Childhood Obesity Problem in the West Midlands: enhancing child weight management programmes

1. Summary of the impact

Childhood obesity is a national problem but it is a problem even more keenly felt in the West Midlands where statistics show the percentage of children classified as obese is higher than the national average. Research demonstrating that simple measures such as waist circumference and body mass index (BMI) are every bit as effective as complex and expensive measuring processes such as magnetic resonance imaging (MRI) scans in identifying high risk obese children has fed into the evaluation and subsequent improvement of child weight management programmes in the region and more widely in the UK. It also informed the development of an obesity strategy and action plan for Worcestershire for the period 2008-11.

2. Underpinning research

Professor Derek Peters (2001-present) has an established track record in research into childhood obesity, particularly focusing on adipose tissue patterning and implications for health in children and adolescents. A key strand of this work has examined the efficacy of using simple anthropometrical measures – such as waist circumference or Body Mass Index (BMI) – as an indicator of obesity compared to criterion adipose tissue values measured by expensive and time consuming MRI scans. The ability to identify high risk obese children using simple and affordable surrogates of central fat distribution is critical to healthcare providers tackling the increasing prevalence of obesity in children and adolescents.

An international study pooled data from existing world studies (Peters contributing approximately 20% of this data) where MRI assessment of visceral adipose tissue and anthropometrical measures had been taken (**Reference 1**). Analysis indicated that waist circumference was the single best predictor of visceral adipose tissue and BMI was the single best predictor of subcutaneous adipose tissue. It was thus proposed that simple anthropometrical assessments could be used as surrogate measures for the identification of high risk obese children. Peters undertook further work in collaboration with the University of Bristol to validate the use of waist circumference across the full range of BMI. 179 12-13 year old children underwent MRIs and anthropometric assessments confirming the findings of the earlier international study (**Reference 2**). Further research sought to determine the accuracy of dual-energy x-ray absorptiometry (DXA) for the assessment of abdominal adipose tissue in children (**Reference 3**). The study indicated a lack of precision at the individual level for estimating abdominal fat levels and concluded that in some situations, particularly at group monitoring level, anthropometric measures would be the preferred assessment choice.

Peters brought this expertise to an evaluation study of child weight management programmes funded by the Department of Health West Midlands (**Grant a**) and undertaken with colleagues from Worcester's Psychological Sciences Unit (Professor Dominic Upton 2006-present and Dr Penney Upton 2007-present) in 2009. At the time of the evaluation, seven family based intervention programmes were in service across the West Midlands and four of these had no published evidence of their effectiveness. The research reported that none of the seven programmes routinely assessed all of the essential evaluation measures highlighted by the National Obesity Observatory's Standard Evaluation Framework. Analysis of waist circumference and BMI indicated variable outcomes across the programmes for short term effectiveness, and very few reported long term (> 6 months) effectiveness **(Reference 4)**.

Further research reflected upon the impact of the timing of measurement within the school day on National Child Measurement Programme statistics (**Reference 5**). The study showed a systematic increase in BMI across the school-day for 81% of its sample due to variations in weight and height. Consequently when a child was measured would affect which BMI category a child was placed in, and thus the 'follow-up' process initiated potentially resultant from lack of measurement time standardisation.

3. References to the research

1. Brambilla, P., Bedogni, G., Moreno, L.A., Goran, M.I., Gutin, B., Fox, K.R., Peters, D. M., Barbeau, P., De Simone, M. & Pietrobelli, A. (2006) Cross validation of anthropometry against magnetic resonance imaging for the assessment of visceral and subcutaneous adipose tissue in children. *International Journal of Obesity*, 30, 23-30.
2. Benfield, L.L., Fox, K.R., Peters, D.M., Blake, H., Rogers, I., Grant, C. & Ness, A. (2008) Magnetic resonance imaging of abdominal adiposity in a large cohort of British children. *International Journal of Obesity*, 32, 91-9.
3. Benfield, L.L., Peters, D.M., Fox, K.R., Blake, H., Wenyika, R. & Ness, A.R. (2009) Dual energy x-ray absorptiometry (DXA) estimation of children's abdominal adiposity measure by magnetic resonance imaging (MRI). *International Journal of Body Composition Research*, 7 (4), 131-39.
4. Upton, P., Taylor, C.E., Peters, D.M., Errol, R. & Upton, D. (2013) The effectiveness of local child weight management programmes: an audit study. *Child: Care, Health and Development*, 39 (1), 125-133.
5. Routen, A.C., Edwards, M.G., Upton, D. & Peters, D.M. (2011) The impact of school-day variation in weight and height on National Child Measurement Programme body mass index-determined weight category in Year 6 children. *Child: Care, Health and Development*, 37 (3), 360-7.

Grants

a. Upton, D., Upton, P., Bold, J. & Peters, D. *Regional Evaluation of Weight Management Programmes for Children and Families*, Department of Health West Midlands, March-December 2009, £80,000.

The University is confident the underpinning research meets the excellence threshold. References 2 and 3 are returned to UoA26 in REF 2014 with Output ID "Peters4" and "Peters1" respectively. Reference 1 has been cited 286 times, a measure of its significance within the field. Reference 4 resulted from a funded project (Grant a) won through competitive tender and it is argued that this is indicative of its 2* quality. Reference 5 resulted from a University of Worcester funded studentship undertaken in collaboration with the University of Birmingham.

4. Details of the impact

The West Midlands has consistently reported above the national UK average for overweight and obese children based on National Child Measurement Programme (NCMP) data with, for example, 21.2% of year 6 pupils measured being recorded as obese for the year 2011/12 (against a national average of 19.2%).[i] Weight management programmes are a key part of the strategy adopted by West Midlands Primary Care Trusts (PCTs) to combat this problem. A significant contribution of the research has been to improve the delivery of child weight management programmes by PCTs across the West Midlands. In addition, it has led to changes in practice relating to the NCMP and it influenced the development of the Worcestershire Childhood Obesity Strategy and Action Plan 2008-11.

The evaluation study was central to the first of these impacts (though it must be stressed that this study itself was underpinned by Peters' previous work on the value of anthropometrical measures). Key outcomes of the evaluation were a set of recommendations for commissioners of weight management programmes (**Source A**) and a toolkit of validated measures for use by programme leads (**Source B**). In February 2010, the research team presented the findings from the evaluation at a workshop held by the Department of Health West Midlands (DoHWM) which was attended by 65 weight management programme leads, commissioners, health improvement specialists and others involved in developing, running and evaluating public health interventions from across the region (**Source C**). DoHWM published a document in March 2011 setting out the legacy of its Healthy Weight programme which describes in detail the impact of the evaluation (**Source D**). At a general level, it is stated that the evaluation enabled Primary Care Trusts (PCTs) to improve measurement, data collection and evaluation within their programmes (with concomitant benefits for those children and families engaged in the programmes); reassured PCTs that they were

commissioning effective programmes; led to PCTs adopting the National Obesity Observatory's Standard Evaluation Framework (SEF) when making commissioning decisions. More specifically, one PCT specified that the SEF and the University of Worcester's evaluation tools and findings *must* be used by service providers. The same PCT also used the evaluation and associated tools for their revised NCMP service. Another PCT decided to pilot their own in-house child weight management programme, incorporating best practice identified through the evaluation; while another decided not to continue funding their current programme which had been evaluated as part of this. Perhaps the key overarching impact is that all West Midlands' PCTs accepted the recommendation that they should continue to invest in child weight management programmes.

The research relating to school-day variation in weight and height has been fed into the practice of PCTs in data collection for the NCMP. Peters contacted PCTs directly with the outcomes of the research and a number responded to state that they would in future be recording whether measurements were taken in the morning or the afternoon such that school-day variation could be built into the outcome statistics (**Source E**).

More generally, Peters' expertise led to him being invited to sit on the Worcestershire Childhood Obesity Strategy Group in 2008-9 (**Source F**). Within this Group, Peters held particular responsibilities for research, specifically relating to childhood obesity intervention programmes which are set out in the final version of the strategy and associated action plan (**Source G**).

5. Sources to corroborate the impact

A. Recommendations for commissioners of weight management programmes: http://www.obesitywm.org.uk/resources/Recs_of_Commissioners_of_CWM_Progs.doc.

B. Toolkit of validated measures for use by weight management programme leads: http://www.foodwm.org.uk/resources/CWM_-_Revised_toolkit_final_20_04_2010.pdf.

C. List of delegates at workshop to report findings of the evaluation of child weight management programmes: http://www.obesitywm.org.uk/resources/CWM_Attendees.xls.

D. Saunders, K., Baker, J. & Davis, J. (2011) *The Healthy Weight Programme in the West Midlands Legacy Document. Department of Health West Midlands*: http://www.obesitywm.org.uk/panlist.aspx?id=OBESITY_LEGACY_REPORT .

E. Emails from Primary Care Trusts.

F. Minutes of meetings of the Worcestershire Childhood Obesity Strategy Group 16/10/2008, 29/1/2009, 24/4/2009

G. Childhood Obesity Strategy Worcestershire PCT 2008 and Worcestershire Childhood Obesity Action Plan 2008 – 2011: http://www.worcestershire.gov.uk/cms/pdf/pct_2008-05-30_childhood_obesity_strategy2.pdf.

[i] Department of Health (2012) *National Child Measurement Programme: England, 2011/12 school year.*