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Developing a Successful Physical Activity Intervention in Primary Schools

Evidence indicates that the prevalence of overweight and obesity amongst children and young people is increasing, with a third of children in the UK reported as being either overweight or obese (Foresight, 2007). Levels of physical activity within this population are insufficient to halt this rise, leading to an increase in levels of obesity and the risk of long-term disease (Rukavina & Li, 2008). A wide range of physical activity interventions have been implemented to prevent and reduce the incidence and prevalence of childhood obesity. The school has been the most frequently used setting for the delivery of such interventions, providing opportunities to draw on existing resources to create supportive environments for the promotion of physical activity and health-related behaviours (Ward, Saunders, Felton, et al., 2006). Previous school-based physical activity interventions have targeted changes in the attitudes, choices, beliefs and knowledge of individuals. However, it has recently been suggested that considering environmental determinants of health and well-being using a collaborative facilitative whole-school ecological approach may provide the best opportunity for a successful and sustainable school-based physical activity intervention (Ward, et al., 2006).

The study

The purpose of this study was to develop a primary-school based pilot intervention to

increase daily moderate-to-vigorous physical activity. Factors that influence health behaviours, children's motivations for physical activity, and the perceived impact of the environment of physical activity behaviours were examined using a mixed method qualitative and quantitative methodology. Studies have previously measured physical activity levels and trends, but relatively few have employed qualitative methods to develop physical activity interventions.

Pre-Intervention Phase

Eight primary schools in Stoke-on-Trent were randomly selected to take part in the study. Four intervention primary schools were matched to four similar control schools not receiving the intervention according to population and levels of deprivation. Baseline physical activity levels of a representative sample of primary school children (n=325) were measured over a seven-day period using minute-by-minute accelerometry (Accelerometers measure energy expenditure during physical activity).

Baseline findings showed almost one third of the participants were classified as overweight or obese, representative of national levels of overweight and obesity (Department of Health, 2004). Physical activity levels were significantly lower during school time than out of school. In school, physical activity contributed to only

30% of total weekly physical activity. However, inclusion of school-related physical activity levels (before 4pm) resulted in no significant differences between physical activity levels in school or after school. This highlights the important role of activity levels accumulated in activities undertaken immediately before and after the school day.

To identify barriers and facilitators to physical activity within the school environment, seven focus groups were held with 31 children (5-11 years) from the intervention schools. Topics included health promotion within school; influences on health behaviour change; attitudes towards school playgrounds, play-spaces and facilities; attitudes towards physical education (PE); and attitudes of school staff towards health and school policy.

Grounded Theory analysis showed that facilitators to physical activity were: enjoyment; choice; participation in age-appropriate activities; support from parents, peers, and siblings; and PE and play-ground facilities and resources. Main barriers to physical activity were dislike of competition and team-sports; lack of choice in PE and play-ground activities; gender stereotyping of activities by staff and parents; and negative experiences of school environment.

An environmental audit tool (available from the author) was developed to explore the school environment and impact on physical activity. Significant correlations were found between activity levels during school time and school facilities, and the quality of PE and school sport. This suggested that focusing on improving the quality and provision of school facilities, and the quality of PE and school sport could have significant impact on levels of physical activity.

These baseline findings revealed that a multi-faceted physical activity intervention was required. Therefore a pilot intervention was designed using the Social Ecology Model (Stokols,1992: 2000) to work at

policy, physical, economical and social levels, with emphasis on creating a "whole school" environment that facilitated increased physical activity.

Intervention Phase

The physical activity intervention was designed to draw on existing resources available to schools to promote sustainable behaviour change. Using existing resources would increase the chances of the intervention being sustained once the pilot intervention ended, and minimise extra cost. The intervention was informed and developed with reference to findings from the baseline environmental audit and focus group interviews held with pupils, parents/guardians and staff.

The design of the intervention was based around improving the quality of PE and school sport; determining the best use of space for physical activity within each school; addressing the type and time of activities currently on offer within each school; and assessing quality and availability of the physical activity and sports equipment.

The emphasis of the intervention differed in each school depending on the existing provisions for PE and school sport; the types of activities already on offer at each school; the physical space available for physical activity; and the quality and availability of existing physical activity and sports equipment. The Stoke-on-Trent School Sport Partnership Development Managers and school staff were closely involved in developing the intervention to ensure that the intervention was relevant to each of the schools.

The pilot intervention was delivered over one academic year (September - July), in collaboration with the School Sport Partnership, and school and community staff. A playground initiative was delivered in all of the intervention schools, as none of the schools involved in the pilot physical activity intervention had any type of

playground intervention. *The Golden Mile* is a physical activity initiative which aims to encourage children of all ages and fitness abilities to increase their levels of activity within their own school environment. The appeal of *the Golden Mile* was the ease and flexibility with which it could be administered, and the simplicity of its implementation. *Golden Mile* courses were measured in all possible outdoor school physical activity spaces and pupils were responsible for counting how many 'laps' they achieved in each session.

School staff were strongly encouraged to use *the Golden Mile* flexibly, and to incorporate it into the school day wherever possible. It was anticipated that fifty miles could be comfortably achieved by pupils during one academic year, and bronze, silver and gold certificates were used as incentives.

Other initiatives were implemented to increase the opportunities that children had to be physically active. These were implemented as part of the PE lessons, to encourage increased levels of physical activity during PE, and as part of after-school and lunch time activity clubs. Multi-skills and Mini-Tennis sessions were delivered in before and after school clubs, and within the curriculum, in addition to regular PE sessions and after-school clubs. The times, days and delivery of the sessions were co-ordinated and organised by the researcher, in collaboration with school staff.

The opportunities for children to make healthy behaviour choices, and the sustainability of such motivations, can depend on the choices of the family. Therefore, it was important to include activities which would encompass a family approach.

The Family Fun and Fitness Zone was piloted in two of the intervention schools. Two-hour sessions were held every week, for six weeks. All families were invited to participate, with a maximum of twelve

being able to attend. Twelve families responded and were invited to attend the sessions, and all twelve continued to attend for the six-week period. A mixture of school pupils, siblings, parents, grandparents and school staff participated.

The sessions comprised of an introductory discussion; a fifteen minute presentation on an aspect of health (such as advice on physical activity importance and ideas to incorporate into daily routines, and healthy but economic shopping); a half-hour practical session where families received hands-on experience of creating something they could take home at the end of the session (for example 'healthy packed lunches', 'grow your own veg', 'make your own smoothies', 'make your own pizza'); a half-hour activity session (alternating dance and 'fun' circuits comprising activities such as mini-golf and football penalty taking) each week. Each session finished with a question and answer session, and finally everyone participated in a physical activity DVD.

Physical activity was also integrated into the curriculum in each of the intervention schools. Such an approach included educating children about physical activity and health related behaviours through a variety of means. For example, encouraging teachers to use physical activity and health related references through the curriculum, from maths to art.

Finally, a *Health Week* was implemented in each of the intervention schools during the summer term. Many of these took an Olympic theme as it was an Olympic year. *The Health Week* comprised a heavy curriculum focus around physical activity, healthy eating and well-being. Activity sessions and games were held each day for the children.

Post-intervention Phase

Physical activity levels were measured using the same procedure as at baseline, both immediately post-intervention and at

6-months post-intervention. Findings revealed significant differences between the physical activity levels of the intervention group at pre- and post-intervention, and a maintenance of these physical activity levels at 6-months post-intervention.

There were no significant differences between the physical activity levels of the control group pre- and post-intervention. Levels of physical activity during school time had also significantly increased in the intervention group post-intervention.

Environmental audits and focus groups have also been undertaken to compare differences in the perceived barriers and facilitators to physical activity, and to detect changes to the school environment post-intervention.

Findings from the audits revealed a significant increase in audit scores of the intervention schools post-intervention, but no significant difference in the audit scores of the control schools.

Significant correlations remained between physical activity during school time and school facilities, and the quality of PE and school sport. Findings from the focus group interviews revealed that the number of PE and school sport policy facilitators had increased to include promotion of physical activity; social facilitators now included support from peers, teachers and other school staff; a physical facilitator was weather; and physical and economical facilitators now included the types and availability of equipment.

The barriers to physical activity had decreased post-intervention where physical and economic barriers were negative experiences of the school environment caused by wet play and lack of indoor equipment. Weather was classed as a physical barrier to physical activity.

Age limit was classed as a PE and school

sport policy barrier to physical activity.

Conclusion

The unique nature of this mixed-methods approach to developing and evaluating a physical activity intervention, which uses a whole school ecological approach, adds to the existing knowledge base in this area.

Analysis of the school environment has provided an understanding of some of the gaps, barriers and facilitators to physical activity embedded within the political, economic, physical and social context of the school environment. Barriers and facilitators to physical activity have been identified, and this information used to develop a pilot intervention to increase physical activity using a collaborative facilitative whole-school ecological approach. The findings show that this is an effective and sustainable method of increasing physical activity, whilst employing limited resources.

References

- Department of Health. (2004). *Choosing Health: Making Healthier Choices Easier*. Public Health White Paper.
- Foresight (2007). *Tackling Obesities: Future Choices - Modelling Future Trends in Obesity and Their Impact on Health*. Government Office for Science.
- Rukavina, P. B., & Li, W. (2008). School physical activity interventions: Do not forget about obesity bias. *Obesity Reviews*, 9, 67-75.
- Stokols, D. (1992). Establishing and maintaining health environments. Toward a social ecology of health promotion. *American Psychologist*, 47, 6-22.
- Stokols, D. (2000). Social ecology and behavioural medicine: implications for training, practice, and policy. *Behavioural Medicine*. 26, 129-138.
- Ward, D.S., Saunders, R., Felton, G. M., Williams, E., Epping, J. N. & Pate, R. R. (2006). Implementation of a school environment intervention to increase physical activity in high school girls. *Health Education Research*, 21, 896-910.