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# Moorefit – increasing physical activity in adolescent girls using the Health Promoting Schools framework

Changes in the environment and the curriculum supported enjoyable, informal, non-competitive physical activities in a mainly non-English speaking girls' high school in Australia.

A partnership between the Health Promotion Service, South East Health, the Department of Education and Training (DET), a local girls' high school and other agencies guided this project to address the issue of physical inactivity in adolescent girls. The government school is in Sydney's south with a mixed socio-economic population of more than 800 girls, 86% of whom are from non-English speaking, mainly Middle Eastern and Asian, backgrounds. The school implemented the project from 1998 to 2001 using the Health Promoting Schools framework as a guide.<sup>1,2</sup> The Health Promotion Service provided a \$7,000 grant and a part-time project officer to support the project.

### Why physical activity?

Adequate physical activity is known to have a preventive impact on a variety of lifestyle diseases and conditions.<sup>3</sup> Physical activity and improved fitness are also known to have an immediate effect on young people's health (e.g. bone mass, weight, social skills and the ability to concentrate and learn).<sup>4,5</sup>

### Why adolescent girls?

Studies have shown that women are generally less physically active than men; the level of physical activity starts to decline as girls reach puberty and continues to do so throughout adolescence.<sup>6,7</sup>

The 1997 New South Wales (NSW) Schools Fitness and Physical Activity Survey<sup>8</sup> found adolescent girls to be less physically active, less fit and to have poorer motor skills than boys. Factors that appear to contribute to this are socio-economic status, attitudes, social norms, self-efficacy for physical activity, peer and family support and access to facilities.<sup>9,10</sup>

Women from non-English speaking

backgrounds were found to be less likely than women from English-speaking backgrounds to play sport.<sup>11</sup> Since health behaviours adopted in childhood and adolescence are carried into adulthood,<sup>12</sup> a project to increase physical activity levels among adolescent girls could be expected to have long-term benefits.<sup>3</sup>

### Why schools?

The World Health Organization (WHO) has identified schools as settings for health-promotion action.<sup>13</sup> While health education in schools may improve knowledge and skills, it is less likely to have an impact on health behaviours.<sup>14,15</sup> Evidence suggests, however, that school-based programs that are "comprehensive and integrated and include the curriculum, the environment and the community are more likely to lead to advancements in the health of school children and adolescents".<sup>16</sup> The Health Promoting Schools framework for action<sup>17</sup> is one such multi-strategy, comprehensive approach, recognised as best practice by WHO.

### Methods

Advisory, planning and student committees developed and implemented strategies reflecting the Health Promoting Schools framework (see Table 1). Strategy development was informed by a literature review examining adolescent physical activity, focusing on females, especially those from culturally and linguistically diverse backgrounds; consultations with more than 40 parents to gain insight into parent/school communication;<sup>18</sup> baseline research (see Evaluation) and seven focus groups with students (Years 7 to 10). The focus groups investigated students' attitudes to and perceptions of barriers and enablers to

physical activity at their school.

Strategies (see Table 1) took into account the expressed preferences of less active students for enjoyable, informal, non-competitive physical activities, rather than traditional sports, and for changes to the school environment to support these.

Table 1: Project strategies guided by the Health Promoting Schools framework.

Element	Strategy
The formal curriculum	<ul style="list-style-type: none"> <li>Professional development workshops for teachers</li> <li>New physical activity/sports options e.g. bush dancing</li> <li>HSC option in Personal Development, Health and Physical Education</li> <li>New physical activity curriculum resources</li> <li>Cross curriculum focus on physical activity</li> </ul>
Physical environment	<ul style="list-style-type: none"> <li>Sports uniform modified for cultural appropriateness</li> <li>Informal physical activities at breaks</li> <li>Facilities improved, new equipment purchased and made available at lunchtime for informal activity</li> <li>Free after-school activities for students</li> </ul>
Social environment	<ul style="list-style-type: none"> <li>Peer physical activity leaders training</li> <li>Physical activity options e.g. yoga, aerobics for staff to encourage role modelling</li> <li>Whole school physical activity focus days to encourage new activities</li> <li>Year 7 classes named after famous sportswomen</li> <li>Registration as an Active Australia school</li> </ul>
Organisational environment	<ul style="list-style-type: none"> <li>Advisory, planning and student committees</li> <li>Key teacher and health promotion officer to drive the project</li> <li>Changes in staff supervision rosters to allow lunchtime activities</li> </ul>
School-home-community links	<ul style="list-style-type: none"> <li>Formal funding agreement between school and Area Health Service</li> <li>Government, non-Government and ethnic organisations on advisory committee</li> <li>Local sports/dance groups in activities for whole school physical activity focus days</li> <li>Consultation with parents at parent/teacher interview night</li> <li>Project information in school newsletters</li> <li>English/health education classes for parents</li> </ul>

## Evaluation

### Tools

The project officer monitored strategy implementation using minutes of meetings and recorded processes and staff comments in a diary. Impact evaluation assessed changes in students' physical activity behaviour and attitudes and the social, physical and organisational environments within the school. Data were collected in pre and post self-administered quantitative surveys with historical controls. Surveys measured changes in students' participation in and attitudes towards physical activity, and their perceptions of barriers and enablers. The use of a historical control group allowed a comparison of behavioural and attitudinal changes between the 2001 Year 10 group after three years of intervention and the 1998 Year 10 girls that were not influenced by the project. At baseline, in October 1998, the survey was administered to 111 Year 7 students (intervention group) and 127 Year 10 students (historical control group). Administration of the survey was repeated in October 2001 with 94 Year 10 students (i.e. the intervention group, formerly Year 7). The survey was based on the 1997 NSW Schools Fitness and Physical Activity Survey.<sup>8</sup> Prior to this project the survey instrument was administered to students in 90 schools across NSW.

The questionnaire that was used in Moorefit included an additional question on time spent doing homework and chores and two additional items relating to the girls' perceptions of the sports uniform and their cultural background as barriers. These additions were made as a result of the focus groups and with permission of the author. The amended questionnaire was piloted in another girls' school with a similar population.

A pre and post environmental audit, from the 1997 NSW Schools Fitness and Physical Activity Survey,<sup>8</sup> provided evidence of perceived changes to the school

environment to support physical activity. The questionnaire was administered to the deputy principal, one teacher from each faculty and all of the Personal Development/Health/Physical Education (PDHPE) staff. At baseline it was administered to 10 staff members and at post to 11. Documented minutes of meetings of the project's committees confirmed the teachers' self reports on the environmental changes.

Telephone interviews conducted by an independent interviewer with seven key staff members, selected by the key teacher, gave an insight into perceptions of the project's success and were used to triangulate the results of the students' survey and environmental audit.<sup>19</sup> Interviews were audio-taped, with consent, and transcripts provided on request.

At the end of the project, health promotion staff conducted two focus groups of Year 10 students (10 in each) to investigate perceived changes at school. Procedures for administering the groups at post were the same as those at the beginning of the project. Trained health promotion staff facilitated the focus groups, which consisted of approximately 10 students from a number of cultural backgrounds in each<sup>20</sup> grouped according to year and whether they were considered to be participators or non-participators in physical activity. Parental consent was required. To ensure confidentiality, no teachers were present and, with the students' consent, all discussions were audio-taped and monitored by trained observers.

### Analysis

Student survey data were analysed on Surveycraft and SPSS for Windows. Aggregation of variables followed the guidelines outlined in the 1997 NSW Schools Fitness and Physical Activity Survey report.

Students participating in 'vigorous activities' have been defined as those who participate in vigorous aerobic activities at least three times per week for at least 20

minutes per session i.e. activities with a metabolic equivalent (MET) value of 6.0 or greater and which require rhythmic use of the large muscle groups. Students participating in 'moderate (adequate) activities' have been defined as those who participate in at least three-and-a-half hours of moderate intensity over at least five sessions in a normal week. Moderate intensity activities were defined as requiring at least three-and-a-half METs. All other students were considered as 'inadequately active'.<sup>8</sup> The environmental audit data were analysed on SPSS for Windows.

Categorical data were analysed using the chi-square test. T-tests for independent samples were used to assess whether the changes in mean scores between baseline and post were statistically significant. Descriptive statistics such as means and proportions were used to provide additional detail.

All taped telephone interviews and student focus groups were transcribed. Analysis involved sorting data into categories and identification of the most common themes. The questioning route provided the initial outline for the themes. Data analysis was guided by the work of Miles and Huberman.<sup>21</sup>

## Results

The project mainly influenced students with inadequate<sup>8</sup> levels of physical activity. The proportion of students in the intervention group and the control group who were vigorously active was the same (see Tables 2 and 3).

Girls in the intervention group participated in more activities than girls in the control group (63% more in summer and 43% more in winter). Results indicated that increases in levels of participation occurred during school hours and in activities generated by the project. This was confirmed by teachers' observations:

"When it [the project] first started I remember sitting in the staff room and saying 'this is the first

Table 3.1: Changes in students' summer activities.<sup>a</sup>

	Intervention group (%)	Historical group (%)	Significance
Walking	79	65	$\chi^2=5.21, p<0.05$
Dancing	43	30	$\chi^2=3.77, p=0.05$
Volleyball	19	8	$\chi^2=6.21, p<0.05$
Yoga	13	2	$\chi^2=11.42, p<0.01$
Cricket	12	2	$\chi^2=7.94, p=0.05$
Fishing	6	0	$\chi^2=8.33, p<0.05$
Horse riding	4	0	$\chi^2=5.50, p<0.05$
Sailing	3	0	$\chi^2=4.11, p<0.05$

(a) Tables 3.1 and 3.2 present only the results of sports and activities where differences in participation were significant.

Table 3.2: Changes in students' winter activities<sup>a</sup>

	Intervention group (%)	Historical group (%)	Significance
Dancing	40	21	$\chi^2=10.45, p<0.01$
Walking	63	44	$\chi^2=7.55, p<0.01$
Aerobics	18	6	$\chi^2=7.48, p<0.01$
Yoga	14	6	$\chi^2=3.67, p=0.05$
Self defence	6	1	$\chi^2=5.51, p<0.05$
Ice skating	3	13	$\chi^2=6.82, p<0.01$
Touch football	4	16	$\chi^2=7.37, p<0.01$

(a) Tables 3.1 and 3.2 present only the results of sports and activities where differences in participation were significant.

time I've ever seen the girls do anything in a break. ... it's not something the staff have organised, the kids just get up and do it in the quad, and I'd not seen that prior to the project." (Teacher)

The student survey showed that, outside school, there was no difference in the self-reported amount of time students spent being physically active. This was confirmed by teachers' interviews and student focus groups.

"In anecdotal talks with the girls I haven't really seen them increase their physical activity on the weekends but definitely they've increased their physical activity at school." (Teacher)

"I like it [physical activity, sport] at school - but at home I have no friends to do it with." (Student)

Students from the intervention group reported spending less time on sedentary recreation than students from the control group (3.2 hours per day cf 3.9 respectively. Independent samples t-test,  $t=2.48, p<0.05$ ). Fifty per cent of students in the intervention group, however, reported participating in paid work compared with 36% of the students in the control group. Results do not identify clear differences in attitudes between the intervention and control groups.

Teachers, however, noticed a change in some students' attitudes towards sports and physical education.

"I feel that the students are more willing now... I do notice now that you don't get as much whingeing in just walking." (Teacher)

Results may indicate there was an improvement in the perceptions of barriers among girls from the intervention group (see Table 4).

In the environmental audit, teachers reported increased utilisation of facilities such as the gymnasium, fitness lab, playing fields and indoor and outdoor playing spaces. More teachers at post than at baseline thought that the school facilities and equipment for sports and physical education (PE) were in good condition (85% cf 47%). They reported an increase in availability, 2-3 times a week, of organised lunchtime physical activities for students (67% cf 20%,  $\chi^2=4.79, p<0.05$ ) and an increase in a range of strategies to promote physical activity among students.

Teachers interviewed considered the whole-school focus days to be successful and reported increased access to facilities, provision of lunchtime activities and increases in physical activity during breaks as benefits of the project. They also attributed improvements in facilities and equipment to

the project and reported a more positive attitude from the staff towards physical activity.<sup>18</sup>

"I think the staff were getting enthused about and enjoying thinking about physical activity, like at sport they'd ask can we go with the walking group or can we do this ... there was a change in the attitude that it was good to be active." (Teacher)

## Discussion

The use of formative research identified the needs of the students and led to appropriate strategy development. This approach is in line with the fundamentals of community development theory, "starting where the people are at" to achieve "ownership and success in the change process".<sup>22</sup> The resultant changes in the environment and the curriculum supported enjoyable, informal, non-competitive physical activities. These appear to have facilitated improved attitudes, perceptions and increased participation in physical activity inside but not outside school.

The 1997 NSW Schools Fitness and Physical Activity Survey<sup>8</sup> showed that girls in Year 10 were less active than in Year 8. This decline in physical activity was shown to be greater for girls from Middle Eastern and Asian backgrounds. The project did not change this trend of declining levels of vigorous activity from Years 7 to Year 10, but does appear to have reduced the proportion of Year 10 students who are inadequately active. The project appears, therefore, to have had an impact on those students who could be said to need it most.

Changes in students' perceptions of physical activity as 'fun' could be due to the activities offered by the project. Vescio et al.<sup>23</sup> found that girls from culturally diverse backgrounds enjoyed being involved in physical activities because they considered them to be 'fun' and recommended that schools increase the fun elements in their physical activity programs and decrease emphasis on competition. Similarly, Kandy<sup>9</sup> found that girls seemed to want to participate in activities that they enjoyed and

Table 2: Level of participation in physical activities

	Intervention group in 1998 (%)	Intervention group in 2001 (%)	Historical control group (%)	Significance <sup>a</sup>
<b>Summer activities</b>				
Participation in vigorous activities	85	48	47	$\chi^2=14.8, 2 df$
Participation in moderate (adequate) activities	8	31	13	$p<0.01$
Participation in inadequate activities	7	21	40	
<b>Total summer activities</b>	<b>100</b>	<b>100</b>	<b>100</b>	
<b>Winter activities</b>				
Participation in vigorous activities	52	33	35	$\chi^2=6.24, 2 df$
Participation in moderate (adequate) activities	17	22	10	$p<0.05$
Participation in inadequate activities	31	45	54	
<b>Total winter activities</b>	<b>100</b>	<b>100</b>	<b>100</b>	

(a) Significance calculations were done only for comparison between the intervention group in 2001 and the historical control group.

Table 4: Changes in students' perceptions of barriers to physical activity.<sup>a</sup>

Perceived barrier	Intervention group (%)	Historical control group (%)
I don't have enough time	51	62
My culture restricts me from some sports	14	22
I don't like getting changed into my sports uniform at school	49	55
I don't have enough energy	37	43
My teachers don't encourage or help me	26	32
The right facilities are not available	33	39
I don't have anyone to exercise or play sport with	36	41
My parents don't encourage or help me	30	25
Others laugh or make fun of me when I try to play	26	21
My health is not good enough	38	33
I am self conscious about my looks	64	55

(a) Table 4 presents only results where percentage differences between the intervention and control group were at least 5%

that some schools had found that options such as dance were more appealing to girls than sport.

Changes in students' physical activity levels seem to be related to the type of activities provided by the project within school hours, with more students in the intervention group being involved in activities such as dancing, walking, volleyball, etc. A study in the United States also found that the activities reported as most likely to be taken up by girls from Years 7 to 9 and Years 10 to 12 were walking and dancing.<sup>24</sup>

Using the Health Promoting Schools framework helped to ensure a comprehensive approach to strategy development.

Based on the needs assessment, the school added new physical activity options to the personal development, health and physical education curriculum. Some cross-curriculum work was also introduced to support the project. These changes added to the awareness of physical activity within the school.

The upgrade of equipment and facilities, increased provision of a range of supervised lunchtime activities and encouragement from staff and peer leaders provided a more supportive environment for informal physical activity at break times within the school. School playgrounds have been found in other studies to provide opportunities for students to be active during breaks in the school day.<sup>25,26</sup> High levels of supervision and improvements in the physical environment were linked to increased students' participation in physical activity.<sup>24-26</sup>

Attempts to provide a supportive environment for participation in activity outside school proved less successful for a variety of reasons. Although free after school activities were offered in response to the students' stated preferences, not enough students signed up for any to run. This could be attributed to the reported increase in homework and housework duties as the students get older and to the increase in students' participation in paid work. Discussion with parents at the beginning of the project<sup>17</sup> also revealed they did not encourage after-school activities. Vescio et al. reported similar findings.<sup>23</sup> Parents' expectations, religious and cultural beliefs may also have played a part.<sup>10,27</sup>

Organisational support has been identified as a key element for successful Health Promoting School projects<sup>28</sup> and is thought to contribute to quality programs and extend their sustainability.<sup>29</sup> Project implementation was guided by recommendations of earlier Australian studies for gaining the support of and working successfully with schools i.e. having a health promotion facilitator who understood school cultures,<sup>30,31</sup> the involvement of at least two key staff

members and the formation of a committee.<sup>29,31,32</sup> The project officer also perceived the leadership provided by the principal and school executive, as demonstrated by the memorandum of understanding and commitment of time for staff professional development sessions, to be crucial to success. Changes made to the playground supervision roster to allow lunchtime activities were indicative of staff support for the project and played a key role in influencing the school's physical and social environment.

Partnerships, including links with parents and community agencies, are also regarded as a key factor in enhancing health promotion in schools.<sup>29,40</sup> Involvement of outside agencies in this project facilitated access to expertise, programs and resources and added to the range of strategies implemented. Involving parents, however, proved to be more difficult. Results of many studies<sup>33-37</sup> identify a wide range of barriers for parental participation and reinforce the difficulty observed in this study in involving parents. Studies have also found that parental participation is more likely to occur in primary schools than in high schools.<sup>34,38,39</sup> This may indicate that parental involvement is not a critical factor for success in high schools and may be an area for further research.

#### Study limitations

Resources available determined the decision to use historical rather than concurrent controls. Although this was cheaper, it was not possible to compare the controls' level of physical activity when they were in Year 7 with that of the intervention group in Year 7 and see whether both groups had similar levels of activity when they started high school. It also did not allow the monitoring of external secular influences that could have influenced the girls' behaviour.

#### Conclusion

Continuing research in schools and their communities about attitudes and barriers to physical activity for students from non-English speaking backgrounds will be essential to further improve young women's involvement in physical activity as adolescents and then into adulthood.

#### Acknowledgements

The authors wish to acknowledge the commitment and enthusiasm of the staff and students of Moorefield Girls High School, as well as the excellent work of Nora Scicluna, Moorefit project officer 1998-2001, and the support of Jo Mitchell, Director of Health Promotion Service, South East Health, and all project partners.

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### Developments since publication of the evaluation study

In 2002 the 'Moorefit at Moorefield' project was the winner of the 'Healthier People' category in the prestigious New South Wales Baxter Health Awards. The publicity from this event was an added incentive to the school to maintain their focus on physical activity and they continue to market their school as a place where girls are supported and encouraged to be physically active every day. Feedback indicates that Moorefield school staff still consider a sustainable shift in culture has occurred as a result of the project.

Currently, following the success of 'Moorefit at Moorefield', the Health Promotion Service South Eastern Sydney and Illawarra Area Health Service is attempting to replicate the project in two other high schools with different demographics and socio economic mix, to see whether Moorefit's environmental strategies would again be successful. The two high schools participating in this project are both co-educational, and one of them has a low non-English speaking background student population.

The success of 'Moorefit at Moorefield' along with the publicity surrounding the increasing number of children / adolescents being classed as overweight or obese, influenced the decision to again focus on physical activity. At the request of the two schools consumption of water by students during school hours is also being targeted.

### Fit to Learn

The new project, which has been named 'Fit to Learn', aims to:

- ~ increase the percentage of students who are adequately physically active;
- ~ increase the percentage of students who consume water daily; and
- ~ decrease the percentage of students who consume soft drinks daily

Like 'Moorefit at Moorefield' the 'Fit to Learn' project is guided by the Health Promoting Schools framework and is using a range of environmental strategies.

A consultation process has been undertaken in its first year with students and

teachers as a strategy for identifying appropriate activities and building project ownership. The consultation investigated enablers and barriers to participation in physical activity and consumption of water, and possible environmental strategies (social, organisational and physical) that would be implemented in the school.

Evaluation of the physical activity intervention is using the same tools that have been used in 'Moorefit at Moorefield'. However since there is very little data on attitude to and consumption of water by high school students, evaluation of the water consumption intervention required the development of new tools. Evaluation of 'Fit to Learn' is also using two concurrent control schools.

'Fit to Learn' commenced in February 2004 and is expected to be completed in February 2007. So far, results from the baseline data collection have been fed back to the two intervention schools and presented at two conferences: The 18th World Conference on Health Promotion & Health Education, 26-30 April 2004, Melbourne, Australia and, at the 15th National Health Promotion Conference, 13 - 16 March 2005, Canberra, Australia.

The process undertaken both at 'Moorefit at Moorefield' and 'Fit to Learn' projects highlights the complexity of issues that need to be considered and addressed in the school context to promote the health of the school community. They also reinforce the need to work in partnerships, actively involve students and consider changes in the physical, social and organisational environments for health gains to be successful.

For more information about 'Fit to Learn' please contact:  
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