A randomised control trial of experiential learning to promote physical activity

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A randomised control trial of experiential learning to promote physical activity

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WHAT IS ALREADY KNOWN IN THIS AREA
⦁ There is a lack of good-quality training in physical activity (PA) counselling in undergraduate medical schools.
⦁ Doctors who themselves are more physically active are more likely to promote physical activity to their patients.

WHAT THIS WORK ADDS
⦁ It is possible to encourage medical undergraduates to increase personal PA behaviour by goal setting as part of a programme of experiential learning.
⦁ This experience led to insights into barriers patients may face when attempting behaviour change and improved students’ confidence in PA counselling.

SUGGESTIONS FOR FUTURE RESEARCH
⦁ More research is needed to determine if changes in undergraduate training regarding health promotion lead to increased and more effective health promotion in later practice.

Keywords: behaviour change, experiential learning, health promotion, medical education, pedometers, physical activity

SUMMARY

Introduction
The paucity of training in physical activity (PA) promotion in UK medical schools is a barrier to health professionals’ promotion of PA to their patients. Doctors who are more physically active are more likely to counsel patients in this regard. We used a randomised controlled trial (RCT) to examine the effect of an intervention which engaged students in goal-setting, using pedometer step counts, on their PA behaviour and intentions to promote PA in future practice.

Methods
We invited fourth-year medical students to participate in the study during their four-week placement in primary care. Following baseline pedometer
measurement of daily step counts for one week, students were randomly allocated to intervention (individual step count goal-setting) or control groups. Using pedometers, both groups monitored their PA during the following week. Intentions to promote PA were assessed using a questionnaire based on the theory of planned behaviour at baseline, four weeks and nine weeks. Focus groups explored the students’ experiences of PA measurement, goal-setting for behaviour change and health promotion teaching.

Results

One-hundred and thirty-six students participated (70 intervention; 66 control). The mean change in daily step count was greater ($P=0.001$) in the intervention group (1245, 95% CI 762 to 1727) than in the control group ($-65$, 95% CI $-644$ to 573). Scores for perceived behavioural control over PA counselling increased in both groups, with a trend for higher scores in the intervention group. Intervention group students described how experience of personal PA behaviour change gave insights into barriers patients may face and improved their confidence in PA counselling.

Conclusions

Medical students’ personal experience of goal setting in increasing PA appears to lead to a more positive perception of their ability to deliver effective PA promotion in future practice. Inclusion of this learning experience within the undergraduate curriculum may improve doctors’ skills in health promotion.

INTRODUCTION

Physical activity is the bulwark against the increasing burden of chronic disease. Whilst the most effective method for doctors to impact positively on their patients’ PA behaviours has not been established, there is increasing pressure from policy makers for action in this regard. The role of doctors in PA promotion has been likened to their role in encouraging smoking cessation, with brief targeted interventions likely to be cost-effective.

One of the most commonly cited barriers to PA promotion by healthcare professionals is a lack of training in this area. Despite medical students having largely positive attitudes towards health promotion, reviews of undergraduate training in both the US and the UK have revealed a dearth of good-quality public health training in general and in PA promotion in particular. A recent review of training in PA promotion skills in UK medical schools found that overall it was ‘sparse or non-existent’.

There is compelling evidence that the personal PA behaviour of doctors and medical students strongly influences frequency and confidence in PA counselling. There has been interest in developing a ‘lifestyle curriculum’ where healthy behaviours are encouraged in undergraduate medical students during health promotion training.

The model of experiential learning describes a continuous process whereby concrete experience leads to observation and reflection, abstract conceptualisation and then active experimentation. We hypothesised that measurement of their own PA would lead students to reflect on this; to increase their PA would require them to develop concepts to address challenges to this and putting these ideas into practice would provide further learning experience. Within this context we sought to determine the effect of goal-setting, using pedometer step count measurements, on students’ PA and on their intentions regarding PA promotion in future practice. Goal-setting has been identified as a standalone behaviour change technique that can be effective in its own right in a recently published taxonomy of behaviour change techniques. Behaviour change techniques are active, irreducible and replicable components of an intervention. We used a randomised control trial design and, following the intervention, explored students’ perceptions of their experiences of pedometer use, goal-setting and health promotion teaching.

METHOD

Participants and setting

The study was conducted at Queen’s University Belfast, UK (QUB). The medical degree programme follows a five-year integrated curriculum model. Fourth-year medical students undertake a 4-week course in primary care, consisting of one week’s lectures and a 3-week placement in a general practice (GP) surgery, returning to the University each Friday for lectures and an assessment at the end of the course. All fourth-year students attending between January 2010 and November 2010 were invited at the start of their course; exclusion criteria were an inability to walk or absence from lectures on the day of study enrolment. The study was approved by the QUB Ethics Committee (Ref:09/18, 1/10/09).

Study design

All participants were given a pedometer (Yamax Digiwalker 701) and asked to record daily step counts over the following week in a diary supplied. This pedometer has a memory function and is one of the most reliable available. All participants were sent a simple text message twice weekly, to remind them to wear their pedometers.

After one week of recording steps all students took part in a health promotion seminar. They were asked...
to discuss and demonstrate methods of influencing patients with regards to smoking, alcohol, diet and PA, and the evidence behind such methods was presented. Students were then randomly allocated into two groups using a computer database function and the groups were taken to separate rooms.

The control group was asked about any problems they had in using pedometers and to continue recording daily step counts during the following week, without any review of their step count data. Following a ten-minute talk outlining the health benefits of walking and some common strategies people employ to increase their daily step counts, for example, by parking further away from their place of work, the intervention group was invited to review their step counts and to discuss any problems they had in using pedometers. They were then asked to set, individually, personal goals to increase their daily step counts during the following week, to write this goal into their personal diary and to continue recording daily step counts during the following week.

OUTCOMES

The primary outcome was the change in mean daily steps measured over seven days, from week one to week two. Students were asked only to record the total steps for days where they had worn the pedometer all day, partial days were not recorded. A weekly mean was only calculated if three or more days had data returned, by dividing total steps by number of valid days worn.

The secondary outcome was the change in intentions to promote physical activity in future practice. This was measured with a questionnaire based on the Theory of Planned Behaviour (TPB). TPB-based questionnaires measure attitude, subjective norms (what peer group expects), perceived behavioural control (confidence, self-efficacy) and Intentions with regards a particular activity and are predictive of actual future behaviour.27 This theoretical framework has been used to measure intentions to participate in PA28,29 but not as yet to measure intentions to promote PA.

The questions (Table 1) were based on published examples28 and guidance on TPB questionnaire design;30 responses were measured using seven-point Likert scales. The questionnaire was completed at baseline, at the end of the placement (at four weeks) and at follow-up (at nine weeks).

Sample size

The target sample size in each of two groups was 61, based on a previous study of a pedometer intervention for university students, which found a standard deviation of 1470 steps/per day.31 The study was powered to detect a change of 750 steps per day, with 5% significance and 80% power.

Table 1 Theory of Planned Behaviour questions

<table>
<thead>
<tr>
<th>Perceived behavioural control</th>
<th>How effective do you think you would be in promoting regular physical activity to patients?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>How confident would you feel in promoting regular physical activity to patients?</td>
</tr>
<tr>
<td></td>
<td>How much control would you believe you have in promoting regular physical activity for patients?</td>
</tr>
<tr>
<td>Attitudes (opposing adjectives)</td>
<td>Do you believe physical activity promotion to patients to be:</td>
</tr>
<tr>
<td></td>
<td>● favourable/unfavourable</td>
</tr>
<tr>
<td></td>
<td>● worthless/valuable</td>
</tr>
<tr>
<td></td>
<td>● interesting/boring</td>
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<tr>
<td></td>
<td>● beneficial/harmful</td>
</tr>
<tr>
<td></td>
<td>● pleasant/unpleasant</td>
</tr>
<tr>
<td></td>
<td>● wise/foolish</td>
</tr>
<tr>
<td>Subjective norm</td>
<td>Once qualified, my colleagues will expect me to promote regular physical activity to my patients</td>
</tr>
<tr>
<td>Intention</td>
<td>I intend to promote regular physical activity for my patients when I qualify</td>
</tr>
</tbody>
</table>

Allowing for 20% dropout32 we estimated 160 students needed to be enrolled (four cohorts of 40).

Data analysis

Analysis was carried out using SPSS v.18. All students were assigned an anonymous code for data manipulation and randomisation was not revealed until data analysis was completed. Mean daily step counts were compared from week one to week two; questionnaire data were compared from baseline to week four and from baseline to week nine. Within-group changes were analysed with paired samples t-test for normally distributed variables and Wilcoxon signed ranked tests for non-normally distributed and non-parametric variables. Between-group comparisons were made using student’s t-test. Analysis was on an intention-to-treat basis.

Focus groups

At the end of each 4-week placement, a sample of all participants was invited to take part in a focus group lasting approximately 45 minutes. Methodology was informed by Kitzinger.33 A topic guide was developed from a pilot study involving eight students who wore a pedometer for two weeks and discussed their experiences regarding PA measurement and views on health promotion. Primary questions explored the students’ experiences of wearing a pedometer, goal-setting, intentions to promote PA in future practice and experience of health promotion teaching. Convenience sampling was used pragmatically to
ensure sufficient numbers were recruited for the focus groups within the time constraints of the students and staff. The groups were moderated by GG and PC, one leading the discussion and the other recording non-verbal observations; audio recordings were subsequently transcribed verbatim. Transcriptions were reviewed and analysed by two researchers independently (GG, PC). Initial codes were identified for short segments of data; linkages between codes were identified and linked codes were grouped together to develop themes. It was agreed that data saturation had been achieved after four focus groups. These initial themes were discussed with the research team on three occasions and were refined with methodology adapted from Braun and Clarke.  

RESULTS

Out of 172 students attending during the study period, 136 (79%) were enrolled (Figure 1). All 23 (13%) exclusions were due to absence on the day of enrolment; 13 (8%) declined to participate. The mean age was 22.2 years, with no significant demographic differences or differences in baseline step counts between the groups (Table 2). No data were recorded for non-participants.

At the end of the second week of step count measurement there was a higher dropout rate in the intervention group compared with controls (19% (13/70) vs 5% (3/66), $P = 0.01$ $\chi^2$) with the main reasons given as ‘forgot to wear’ or ‘lost’ the pedometer. There were no significant differences in baseline characteristics between participants and dropouts.

Physical activity

The mean change in daily step counts from week one to week two was significantly greater in the intervention group compared to controls (Table 3). The difference between the groups in mean change was statistically significant (+1310 steps/day, 95% CI 555–2085, $P = 0.001$ t-test).

Intentions to promote activity

There was no difference in the proportion of each group who completed questionnaires at nine weeks (95% of controls (67/70), 91% of the intervention group (63/66), Fisher’s exact $P=0.61$). The internal consistencies of responses relating to attitudes and perceived behavioural control (PBC) were acceptable (Cronbach’s alpha 0.8 and 0.7, respectively).

![Figure 1](image-url)
Baseline measurements on the seven-point Likert scale showed generally positive mean scores regarding attitudes (6.1), subjective norms (5.8) and intentions (6.1) but more neutral scores regarding PBC (4.7). There were no significant differences between the two groups in any of these four domains.

Within-group change

Scores for perceived behavioural control (regarding PA promotion) were normally distributed whereas there was a positive skew in scores for attitude, subjective norm and intentions. There were significant increases in both groups in PBC from baseline to both time points (Table 4), although this score was lower at week nine than at week four for both groups. No other significant changes were found apart from a small change (~0.17) in 'attitude' score for the intervention group between baseline and week nine: although of statistical significance, this was not considered to be of sufficient extent to have practical significance.

Between-group change

Table 5 shows that a trend for a greater increase in perceived behavioural control in the intervention group compared to the controls at week four had diminished by week nine ($P = 0.42$). A significantly greater increase in subjective norm scores for the intervention group at week four ($P = 0.034$) was not observed at week nine ($P = 0.9$).

Focus groups

Twenty-six students (13 control; 13 intervention) took part in four mixed focus groups, each with five to seven participants. There were no differences between focus group and other study participants in BMI, age, gender or baseline step counts.

Themes

Five main themes were identified: walking and exercise, barriers to PA, doctors as role models,
Walking and exercise

The students were surprised that their pedometer step counts showed a low level of activity during their primary care placement and described an appreciation of how little activity desk workers actually do. Both control and intervention group participants acknowledged a new understanding that walking was actually exercising and that short bouts of walking could accumulate into a high daily total.

Walking out to get lunch was my big one. I’d sit and look at this thing … and it’d be sitting really low and I’d come back after lunch and it would be higher … it was a good thing to be doing to go out and walk, just down to the shop. (Fc: FG1)

I thought the only time you burned calories was when you were training but if you’re doing something like just by walking to the shops … you’re gradually burning calories throughout the day, it makes it more realistic that you can burn it off and do all that because some people don’t have the time. (Mi: FG1)

Barriers to physical activity

Intervention students’ comments indicated an understanding of barriers that might exist for patients trying to increase their activity levels. They likened their limitations on free time due to studying in the evening to patients’ limitations due to home responsibilities and felt this empathy would improve their counselling practice.

I became aware of the barriers … where you’ll be studying at night time and you wouldn’t have time to do any exercise and you’re working all day, so … you understand some of the patients, the way they can’t exercise as much as you would like them to. (Mi: FG3)

Doctors as role models

Students commented that doctors that were good at promoting healthy behaviours often openly exhibited these behaviours and agreed that this was an important factor for effective health promotion.
I just don’t think you can promote that message if you haven’t tried it yourself ... you need to have a feel for that before you can effectively promote health. (Mi: FG4)

Confidence in counselling

Specifically the intervention students reported that they would be much better placed to give practical advice to patients about increasing walking activities and to tailor this advice. There was an appreciation of the confidence attained through their personal experience.

... if I was talking to a patient about that I could at least talk about it from personal experience. (Fi: FG2)

Practical ideas to give a patient in terms of health promotion. Not necessarily giving them a pedometer but just all the wee quirky ideas you thought of to increase your steps, you might be able to tell a patient and they might put a use to it. (Fi: FG3)

Primary care experience

As well as the direct experience of goal setting, students reported that the placement in primary care itself had given them experience in consulting with patients and improved their confidence. There was also a consensus that health promotion was not an important part of hospital teaching.

... you joined the (primary care) team and you felt oh well these patients know they’re coming to see me and I’m allowed to see them whereas in hospital I just always feel like I’m aware that I’m taking patients’ time. (Mc: FG2)

[In hospital] they’d sort of discharge you and expect your GP to do it [health promotion]. (Mi: FG4)

Yeah. It’s done sort of in the form of a ‘here’s a leaflet’. (Fc: FG4)

DISCUSSION

The goal-setting intervention was successful in leading to physical activity behaviour change for medical students (mean 1245 (SD 1817) steps/day increase, equivalent to approximately 10–15 minutes walking) but was not associated with any difference in their measured intentions to promote PA. However, qualitative findings indicated that the experience of setting step count goals heightened students’ awareness of barriers to increasing PA, the value of a physically active role model for effective PA promotion and the relevance of personal experience when counselling patients.

The study was set in a context of experiential learning. Teaching effective health promotion techniques can be difficult when undergraduate medical students lack life experiences that would enable them to appreciate the subtle nuances of tailoring advice to individual circumstances. The quantitative step count data assure us that the intervention group did increase their PA levels and this ‘concrete experience’ forms the first part of the experiential learning cycle.24 The qualitative data describe the subsequent parts of the cycle: the observation and reflection (I never realised how much exercise you do walking); the abstract conceptualisation (practical ideas to give a patient); and the active experimentation (walking out to get lunch) that occurred. Students’ comments indicated an understanding of the difficulties patients might face when attempting behaviour change. They developed practical ideas to increase their own PA levels and subsequently felt better prepared to counsel patients regarding PA.

The positive attitudes toward health promotion reported in previous work13 are concordant with our findings of participants’ positively skewed baseline scores regarding attitudes, subjective norms, and intentions to undertake PA promotion. Whilst small transient changes in intentions to promote PA, attitudes and subjective norm were noted within groups, the only significant difference between groups was that the mean subjective norm for the intervention group was higher than for controls at week four, possibly reflecting their greater focus on PA behaviour. However, this difference had resolved by week nine, so that any effect of the intervention on these domains appears to be transient.

The more neutral baseline scores regarding perceived behavioural control (PBC) over PA promotion is in keeping with the previous findings that health professionals felt they had not received relevant training.9–12 This domain of PBC was expected to have the greatest potential to be affected by health promotion training and indeed, both the control and intervention groups significantly improved their PBC scores at four weeks and at nine weeks. This increase in PBC may also be partly attributable to their experience of consulting with patients in primary care. The trend for higher PBC scores in the intervention group is in keeping with their reports of how personal experience of goal setting would enable them to counsel patients.

‘Real world’ experience has been described as a central tenet of experiential learning.35 Both groups of students shared the experience of PA measurement using pedometers and their comments showed how this enabled them to appreciate how walking contributed to levels of daily activity. The goal-setting intervention covered aspects of ‘learning by doing’ and ‘problem solving’ that are part of the experiential learning process. Group-based learning may improve the quality of reflections on experience and validate the participants’ conceptualisation36 but was limited within this study where students were isolated in their placements.

Role models have been found to play an important part in how medical trainees mature professionally.37
Students’ perceptions that doctors who were physically active were more effective in delivering health promotion messages are in keeping with observational studies of doctor–patient interaction and may influence their own future PA behaviour and effectiveness in promoting the health of their patients.

The students suggested that in their hospital-based clinical training, doctors did not demonstrate an interest in health promotion and students were not given the opportunity to interact with patients other than in history taking. This influenced their perceived importance of health promotion negatively. In a recent review of PA promotion training in UK medical schools, teaching was reported to occur within many different subject areas. More work is needed to determine the most effective setting for teaching this subject.

Acceptability of the intervention

There was a significantly higher dropout rate in the intervention group. This raises an interesting point about the willingness of health professionals to engage in PBC. Reasons for failing to complete the study were not formally explored: there were no differences in baseline questionnaire data between dropouts and participants. A special study module could be developed around this type of interactive education, but may only attract physically active students and may not improve PA counselling skills for all.

Strengths and limitations

This study used an appropriately powered randomised control design to test the effect of goal-setting on PA behaviour, measured objectively by step counts. The separation of students in individual practice placements helped avoid contamination of groups by students sharing information regarding goal-setting. The study took place over a one-year period, thus allowing for seasonal variation in impact and variation due to sequence of teaching of other subjects in the curriculum. However, the work was based in one medical school with a low population of graduate entrants and the results may not be generalisable to other schools.

The Theory of Planned Behaviour questionnaire was untested in this setting, examining a future behaviour (health promotion counselling) with which participants were relatively unfamiliar. However, we are not aware of an alternative validated method of assessing future counselling practices.

We acknowledge that there is potential bias in our qualitative data since students may have been reluctant to express negative opinions about pedometers and the goal-setting intervention to academic staff. In addition, students with more negative or indifferent attitudes may have chosen not to participate.

CONCLUSIONS

Competency in providing effective physical activity promotion is important for doctors. Participation in a goal-setting intervention was associated with a significant increase in medical students’ personal PA and, although not associated with a significant change in intention to promote PA in future practice, it had a positive influence on their perception of their ability to do so.

This study demonstrates that it is possible to encourage change in the personal health behaviours of doctors in training. The practical experience of behaviour change appears to enhance the teaching of the socially centred concept of health promotion. More research is needed to determine if changes in undergraduate training regarding health promotion lead to increased and more effective health promotion in later practice.

Ethical approval

The study was approved by the QUB Ethics Committee (Ref:09/18,1/10/09).

Conflicts of interest

None declared.

References


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