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Teaching behaviour change skills to undergraduate medical students

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ABSTRACT

This study investigates the effects of a three-week student project where students selected a health behaviour and implemented a self-management program to increase or decrease that behavior. Behaviours were (1) smoking reduction, (2) caffeine reduction, (3) reduction in consumption of saturated fats, (4) increasing physical activity and (5) increasing consumption of fruit and vegetables. 121 first year medical students conducted a seven day baseline assessment of the selected behavior. Students implemented a behavior change program over fourteen consecutive days based upon 2 hours of lecture material covering principles of operant learning, the Health Belief Model and the Theory of Planned Behavior. Students also completed pre and post questionnaires on identifying barriers to change and experiences of the project. Results indicated substantial changes in targeted behaviours. The most frequently used interventions were positive reinforcement (64%), goal setting (63%) and activity scheduling (47%). Students indicated positive attitudes to the project. Providing students with experience of application of behavior change principles on themselves offers one route to the establishing behaviour change as a clinical competency. However, disparities and lack of focus in existing social and behavioural science curricula may mitigate against the prioritization of this skill being established.

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INTRODUCTION

Perhaps the most frequently cited justification for the inclusion of Behavioural and Social Sciences (BSS) into the medical curriculum has been on the basis of the relationship between behavior and illness. A substantial body of research has accumulated over the past thirty years clearly highlighting the role of behavioural or lifestyle factors, in both the etiology and prognosis of diseases such as type two diabetes and coronary heart disease [1,2]. As a consequence, there have been repeated calls that physicians must be equipped with knowledge regarding the role of these behavioural factors such as that articulated by the General Medical Council in 2003 which indicated that tomorrow's doctors "should know about, understand and be able to apply and integrate the clinical, basic, behavioural and social sciences on which medical practice is based" [3]. This statement is highly pertinent as it encompasses three related but

distinct pedagogical goals. Firstly, medical practitioners must know about the relationship between behavior and illness. Secondly, they must be able to integrate this knowledge with that from other domains and thirdly they must be able to apply this knowledge through their ability to foster changes in those behaviors through appropriate interventions. In essence, this final goal is interpretable as an argument for establishing skills in behavior change as a clinical competency.

The role of high-fat dietary habits, sedentary living, smoking and excessive alcohol consumption are all behaviours that have been linked, albeit in complex ways, to indices of mortality and morbidity [4]. However, what remains unclear is how medical education programmes can provide students with a sufficient skill base to actually alter individual patient

behaviour. Teaching BBS is often not reflected at the level of actual practice with perhaps the exception of communication and interviewing skills [5]. Largely, BSS curricula are limited to traditional educational formats such as lectures and workshops [6]. If we do expect doctors to perform the role of behavior change agents, experience of the implementation of behavior change techniques would appear to be an important pre-requisite skill. This endeavor is however constrained by limited patient interaction in the pre-clinical years in conjunction with issues such as supervision. One possible solution to this however is for medical students to apply behavior change principles and interventions on themselves. In addition to the potential experiential benefits of application of behaviour change techniques, it also provides an opportunity to introduce issues such as behaviour measurement, monitoring behaviour, issues around maintenance of behavior, barriers to change, the relationship between attitude and behaviour change and adherence. To date, we are only aware of one study that examined the application of behaviour change techniques to medical students changing their own behavior [7]. In this study, students selected one behaviour and subsequently attempted to change that behaviour. While the study reported that students found the experience useful in terms of learning about the process of behaviour change, it did not report the degree of behavioral change that students managed to achieve. In addition, not all students reported on their experiences of the project suggesting some caution in the generalization of results obtained.

Assessing the efficacy of such projects on student learning is beset by a number of methodological issues such as comparison with a control group. For instance, when such projects are part of an existing curriculum and contribute to assessment, then the use of a control group is effectively nullified. A potential solution to this problem is the use of single case methodology whereby each participant effectively operates as their own control by the use of baseline recording. Though normally used in a single participant fashion, previous studies have combined single case data into a group format whereby it is possible to determine degree of change from baseline to intervention conditions across at both the individual and group level [8]. The current study adopts this strategy and attempts to evaluate the application of behaviour change techniques by medical students to a pre identified and self-selected health behaviour by comparing baseline data with intervention data.

MATERIAL AND METHOD

The Royal College of Surgeons in Ireland, Bahrain divides its course content into three sequential 18

month cycles. These are referred to as junior, intermediate and senior cycles. Behavioural sciences are taught to students in the first and second semester of the junior cycle and they receive 40 hours of instruction on various topics over that period largely in line with other curricula (e.g., learning theory, developmental psychology, social psychology, memory). One feature of Behavioural Science module is that early in the lecture sequence students receive basic instruction on models of behaviour change: Learning Theory, The Health Belief Model and Theory of Planned Behaviour. As part of the module, all students are required to complete a three week project on behavior change. A total of 121 students completed and submitted a behaviour change project work as part of the module. The weighting attached to the project was 15% of the total score and in the event of a student not submitting a project, the student automatically failed the module. All students received four lectures on the above models of behaviour change prior to the project commencement.

Students from the junior cycle were instructed to pick one of five health-related behaviours that they either want to increase or decrease. The selection of which of the five health related behaviours to change was at the students discretion. These behaviours were (1) increasing physical activity, (2) increasing fruit and vegetable consumption, (3) decreasing saturated fat intake, (4) decreasing smoking and (5) reducing caffeine intake. The format for the project was the use of single-case methodology with two phases: a baseline condition of seven days and an intervention condition of 14 days. Students were instructed to select a quantifiable method of recording the behavior and then record the daily rate of that behavior for a period of seven days in order to establish a baseline rate of the behavior. Students then completed a self-report questionnaire which required them to identify barriers to change and motivation for change that they encountered. Students were then instructed to develop and implement a behavior change plan had to be based upon psychological theory and knowledge derived from the lecture course content. In addition they were instructed to continue recording the selected behavior using the same method as in baseline. At the end of the two week intervention period, students completed a second self-report questionnaire which required them to identify the interventions they selected, the effectiveness of their intervention, the interventions they found most useful and least useful, the barriers to behavior change they experienced and whether they found the project useful overall in understanding the difficulties associated with changing health related behaviours. This self-report questionnaire required to students to generate responses to each of these issues rather than select pre-defined answers from a list.

Students were also requested to calculate the percentage change in the behavior between baseline and intervention. This was achieved by determining the average pro-rated level of the targeted behaviour in both baseline and intervention conditions and calculating the difference between the average rate of the behaviour in both conditions.

All instructions and project descriptions were electronically available on the University’s website and access to self-report questionnaires was only available for pre-determined specified periods of time therefore ensuring that data was collected at the same time. Data was analyzed using PASW-17.

RESULTS

The behaviors selected most frequently to change by students were increasing physical activity (53%), increasing fruit and vegetable intake (24%) and reducing smoking (14%; See Figure 1). Attitudes towards selected behaviours for change were overall very positive with students positively endorsing their chosen behaviours as necessary for good health, good for improving self-image, making on feel healthier, and providing feelings of well being and accomplishment. In respect of motivation at the outset of the project,

students were asked their reasons for changing their behavior. Results indicated that students wanted to change for better health (89%), for physical fitness (76%), to feel good about themselves (68%), for body image and self image (68%), to prevent particular diseases (66%) and to regulate weight (60%). Social factors did not appear to strong motivators with only 23% citing that their parents lived a healthy lifestyle and only 18% citing their friends lived a healthy lifestyle.

Barriers to change identified at the project outset identified lack of time as the most frequently endorsed barrier (51%) followed by not being able to stay motivated (48%; see Table 1).

Prior to the implementation of behaviour change plans, students were asked to rate their confidence and the amount of preparation they were going to put into behavior change on a 1-5 Likert scale. Students rated themselves as being very confident in being able to change their selected behaviour (4.3/5). Results indicated that students were quite successful in creating behavior change.

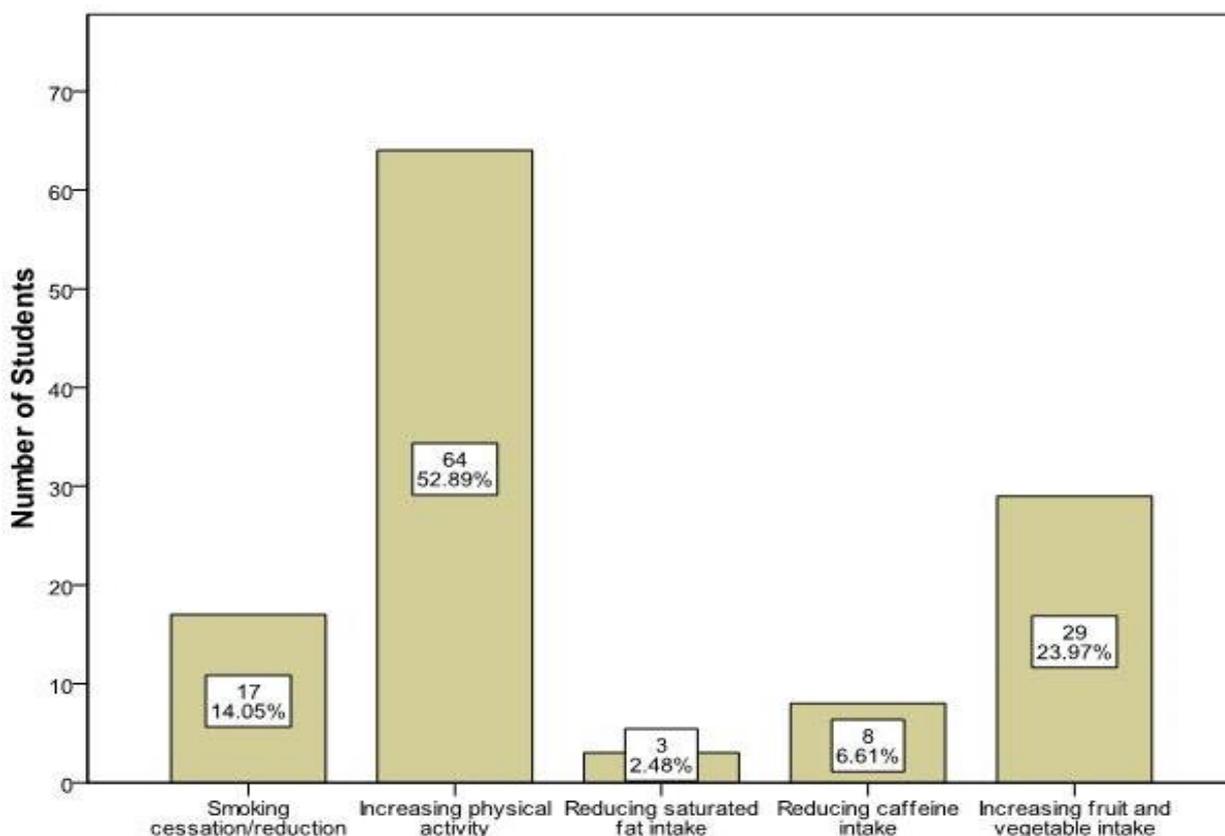


Figure 1. Behaviour Selected by Students

Table 1. Barriers to Change at Project Outset

Barriers to Change Identified By Students	Average Percentage	Actual Number of Students
Not enough time in my day/week	51%	60
I am interested but can't seem to stay motivated	48%	56
It's not easy to change	43%	50
I never complete the behavior change I intend to	42%	49
I enjoy relaxing more than noticing my health behaviour	34%	40
My friends live an unhealthy lifestyle	29%	34
I dislike changing my behavior	18%	21
I really do not know how to change my behavior	16%	19
My parents do not live a healthy lifestyle	13%	15
Not interested in changing my behavior	13%	15
My friends are not supportive	10%	12
I don't worry about my health	9%	10
Changing my behavior is too expensive	5%	6

Table 2. Degree of Change

Degree of Change	Frequency	Percentage
0-10%	5	4
10-30%	21	17.4
30-70%	29	24
70% +	65	54.6

In respect of increase behaviours, there was an overall increase of 170%. Physical activity (178% increase from baseline) and increasing fruit and vegetable intake (154% increase from baseline). Specific breakdowns were as follows: reducing smoking (-26% reduction from baseline), reducing fat saturated diet (-46% reduction from baseline), reducing caffeine intake (45% reduction from baseline). The majority of students (n=65) reported a very high percentage of behaviour change (as defined as an increase from baseline of 70% or higher; see Table 2).

Positive reinforcement, goal setting, activity scheduling and delayed reward were the most frequently used interventions. Students were also asked in relation to barriers identified at the end of the project period. Barriers significantly associated with difficulties in implementation of intervention plans were Time ($\rho=.492, p=.000$), Cost ($\rho=.358, p=.000$), Disliking behavior change ($\rho=-.172, p=.031$) and Not Finding Change Easy ($\rho=.003, p=-.248$). Gender, type of behavior selected and desire to change did not predict degree of behavior change over the duration of the project. In terms of behavior change, when the three 'decrease' behaviours were targeted, there was a reduction of 33% overall. Students also evaluated the project positively. The specific types of interventions selected are displayed in Table 3 below. Students felt the project had helped them recognize the difficulty of changing behavior (8.1/10); was useful in helping them understand behavior change (7.9) and would help them in helping patients change their behavior in the future (7.7/10). An aspect of the project frequently identified by students as useful was daily recording of the behavior. Over 90% of students reported that this component of the project useful in terms of monitoring behavior (114/121).

Table 3. Interventions Used in Project

Category Of Intervention	Frequency (n=121)	Percentage (of 121)
Immediate Reward	25	21
Delayed Reward	45	37
Antecedent Control	38	31
Positive Reinforcement	77	64
Negative Reinforcement	28	23
Positive Punishment	13	11
Negative Punishment	27	22
Health Belief Model	38	31
Social Comparison	31	26
Activity Scheduling	50	41
Relaxation Training	12	10
Goal Setting	76	63
Pharmacological Problem	3	2
Extra Reading on Topic	42	35

DISCUSSION

The current research set out to determine the effectiveness of a three week project where students attempt to alter their own health behavior. Additional goals included whether students would gain insight into the complexity of behaviour change and identifying variables associated with change and lack of change. However, from the outset it must be acknowledged that determining the true effectiveness of such a project can only be fully ascertained by determining whether medical practitioners can create and maintain effective behavior change in patients.

Table 4. Reflections on Creating Behaviour Change

Reflections	1=Totally Disagree 10=Completely Agree
The plan/intervention I developed did not work to change my behavior	4.4
Changing my behaviour was harder than I thought	7.5
My behavior change plan was too simplistic	5.6
My behavior change plan did not contain enough psychological theory/principles	5.1
I did not get enough practical examples on behavior change from the lectures	4.2
I did not really know how to apply psychology to change my behavior	4.3
It was really hard to be consistent everyday with the plan	7.7
I did not have enough time to prepare the behavior change plan properly	5.0
I was really motivated and interested in changing my behavior	7.2
I was too stressed to implement the plan well	5.4
I was interested in changing the behavior but could not stay motivated	5.4
I dislike changing my behavior	3.3
My friends lead an unhealthy lifestyle which made it hard to implement the plan	4.7
My family has an unhealthy lifestyle which made it hard to implement the plan	3.7
Changing my behavior was too expensive	2.2
I never complete the behavior change I intend to	5.0
I was too depressed to implement the plan properly	2.9
Changing my behavior took up too much time	4.7
I found it more difficult than I thought it would be to change my behaviour	7.2

Such an evaluation lies outside the scope of the current study. Yet, if medical students can experience the successful application of behavior change interventions to themselves, this may facilitate this longer term goal. Initial inspection of the data collected during the project does appear to suggest that students can monitor their own behavior and develop and effectively implement behavior change plans on themselves. Over fifty percent of students reported behaviour change levels in excess of seventy percent from baseline rates. Students predominantly stated that their experience of the project was largely a positive one and was useful in helping understanding the complexity of behaviour change and would be likely to help them in altering patient behaviour in the future.

Given the increasing role of behavioural factors in health, it is likely to become increasingly important that future medical practitioners are aware of and can implement effective behavior change interventions at the level of the individual patient. In the current study, students were exposed to two hours covering operant and classical conditioning, Theory of Reasoned Action, Trans-theoretical Model and Theory of Planned Behaviour. While the majority of behaviour change plans contained multiple components, the interventions most typically implemented were positive reinforcement, goal setting, and activity scheduling and delayed reward. These interventions are typically associated with the area of operant psychology and their relative preference over interventions drawn from the theory of planned behaviour and the theory of reasoned action may reflect that students found them easier to implement at the individual level. However, the time allocation of two hours to these complex topics only allows but the briefest of introductions to these models and simplistic presentation may work against more sophisticated understanding. To an extent, this line of thought is borne out by an examination of the actual content of the projects submitted which suggested a level of learning that may not in fact be helpful to a patient and may be so simplistic as to mitigate against effective change. For example, it was clear that some students were confused between aspects of learning theory related to reinforcement and punishment. For example, one student in attempting to reduce the frequency of smoking wrote that they would wash their teeth after smoking. This was described as negative reinforcement but it is likely the student meant positive punishment in the form of response cost. Errors such as these were not infrequent.

Though the levels of behaviour change reported were quite high overall, this should not be taken as evidence for the appropriateness nor of the effectiveness of the current lecture content. Behavioural sciences curricula

may actually suffer from a crisis of identify or more accurately, one of focus. Previous studies on content most highly rated in social and behavioural science curricula include the doctors responsibility to the patient, history taking, impact of class and socio-economic status on health care, medical interviewing, defining health and health care disparities, basic communication, and patient rights. These topics are of course very relevant to medical practice but inform the medical practitioner little with respect to altering patient behaviour. There is a strong argument for a serious debate regarding the content and structure of BSS courses. If altering patient behaviour is to be considered a core skill for medical practitioners then there is a strong argument for establishing that skill as a clinical competency and that simply cannot be achieved in the absence of experience of direct application of behaviour change principles without experience. The presumption that mere exposure to curricula will translate into effective practice is one that cannot be readily be supported.

Previous debates on the role of social and behavioural sciences and their integration into overall medical curricula have often lamented the role of formal and informal barriers that may operate in medical schools [9]. However, one must consider the role played by psychologists themselves in contributing to this barrier [10]. Specifically, if psychologists who teach behavioural science are serious about the role of psychology can play in altering patient behaviour they must equip medical students with the practical skills to do just that. Unfortunately, psychology is a very diverse field and many academic psychologists are not equipped by their own training with knowledge and direct experience of behaviour change. At a broader level, the debate needs to return to the content of social and behavioural science curricula. Yes a lot is known about social and economic factors in relation to health and this is valuable but a lot is also known about behaviour change which is not included on the curricula. Perhaps psychologists themselves need to evaluate their own material in terms of 'useful to know' and 'need to know'. Creating behaviour change in patients is and should be a priority goal. As such providing medical students with experience of the application of behaviour change principles and interventions should be a central focus of BSS. Of course this would result in a pruning of content but it may well be argued that the scope of existing curricula is simply too large or too broad in scope at the expense of usable skills. A general broad course may simply not be appropriate to medical students whereas creating change at the level of the patient-doctor interaction may be of far more relevance.

In terms of weaknesses of the current study, an important consideration is the relatively short duration of the project (i.e., three weeks). Whilst the project

appears to be successful in bringing about short term behaviour change, it cannot draw any inferences in relation to the maintenance of behaviour change over longer periods of time. The long term maintenance of health behaviours is in itself a very important issue confronting medical practitioners. Whilst the current project was not focused on this issue, the hope is that skills obtained by students were generalize to this issue in their future practice. A second clear issue concerns the accuracy of student recording of their own behaviour during both phases of the project. It is perfectly possible that some students merely fabricated data and wrote a project around non-existent data. However, the same criticism exists in respect of any written assignment and assessor experience in single case methodology and behaviour change may be the only effective way of countering this treat to student learning. Perhaps the most effective deterrent of all would be if the skills targeted in the project for development could be assessed in the context of actually changing patient behaviour at some subsequent point in their medical training. This is the ultimate goal for all curricula, that of vertical integration within the structure of medical training. Without this structural component to social and behavioural sciences, the material contained within that curriculum will most likely quickly fade into perceived irrelevance and obscurity. As such, future research could investigate the application of behaviour change techniques to other health issues such as compliance to medication regimes that students may encounter later in their training. Investigating student narratives of projects such as these may identify additional learning goals and ways to increase their perceived relevance of changing health behaviours.

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