

A novel behaviour change learning activity for pharmacy undergraduate students

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Abstract

Objectives: To engage students in a 'behaviour change' learning activity, applying health psychology theory to pharmacy practice in order to help students appreciate the challenges of behaviour change.

Methods: Year 2 pharmacy students selected one behaviour to change and kept a diary for one-week before making changes. Students then received a health psychology lecture on behaviour change models. They instigated their behaviour change and continued to document this in the diary over a further one-week. Diaries were collected after the two-week activity for thematic analysis.

Results: Of the 99 students, 61 (62%) submitted their completed diary, of whom 55 (90%) successfully implemented their behaviour change. These were categorised into four areas: diet, exercise, liquid consumption, and other. The remaining 10% provided reasons for not changing. Ten students (16%) described their behaviour using a psychological theory.

Conclusions: Students engaged well with this novel learning activity, indicated by a high percentage diary completion. They demonstrated a clear appreciation of behaviour change within a real life context and its perceived relevance to pharmacy practice.

Keywords: Behaviour Change, Health Psychology, Health Promotion, Health Behaviours, Novel Teaching Methods, Pharmacy Education.

Introduction

Human behaviour is a strong determinant of health related outcomes and pharmacists are well placed to provide a public health role, particularly those who work in a community setting (Agomo, 2012). It is important that undergraduate education prepares pharmacists for any future roles in providing advice about changing lifestyle behaviours (e.g. smoking cessation, reducing alcohol intake, maintaining a healthy diet, increase in exercise) and for promoting health through self-care (e.g. uptake for screening, monitoring of chronic conditions) (Department of Health, 2005). For pharmacy practitioners to be effective in their role as health educators they need to understand the psychology which underpins human behaviour and appreciate the complexity of behaviour change.

For many years, undergraduate pharmacy programmes in the United Kingdom (UK) have recognised the need to include health psychology and the underpinning principles of behaviour change in to the curriculum. Indeed, the General Pharmaceutical Council (GPhC)

includes health psychology and behavioural medicine within the indicative syllabus of pharmacy undergraduate students (GPhC, 2011). However, teaching healthcare undergraduate students about different psychological theories and models of behaviour change can be challenging (Nairn *et al.*, 1995; McGoldrick, Pine & Mossey, 1998; Peters *et al.*, 2003; Keyworth *et al.*, 2013). This is often due to students' limited prior experience of any conscious lifestyle or behaviour change, although this can be equally true of teaching behaviour change skills to qualified health professionals (Perkins, 1999; Taylor, 2010; Chisholm *et al.*, 2012; Steed *et al.*, 2017; Turner-Wilson, Mills & Rees, 2017). Furthermore, students enrolling on a pharmacy degree may not always see the relevance of health psychology to their discipline.

Identifying the most effective methods for teaching pharmacy students about health behaviours and for developing their communication skills for this purpose is, therefore important. This also applies to all healthcare professionals who are involved in supporting people to

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adopt healthier lifestyle behaviours or modify their current health-risk behaviours. The 'behaviour change project' in New Zealand (Nairn, Coverdale & Elkind, 1995) describes an effective method of teaching these principles to medical students by asking them to change a self-identified aspect of their own behaviour. This approach was found to be both enjoyable from the students' perspective and useful for learning about their own behaviour as well as the processes of behaviour change.

Other methods for teaching the principles of behaviour change to medical (Peters *et al.*, 2006; White *et al.*, 2007; Bell *et al.*, 2008; Peters *et al.*, 2013; Chisholm *et al.*, 2014; Muscato *et al.*, 2018), dental (McGoldrick, 1998) and nursing (Alpar *et al.*, 2008; Keyworth *et al.*, 2013; Turner-Wilson, Mills & Rees, 2017) undergraduates and hospital doctors (Perkins, 1999) have been reported. These utilise teaching methods such as: students identifying their triggers to eating sugary snacks (McGoldrick *et al.*, 1998); health promotion for junior doctors (Perkins, 1999) based on the Prochaska & DiClemente (1986) 'Cycle of Change Model'; problem-based nutrition education (Peters *et al.*, 2006); motivational interviewing role play (White *et al.*, 2007; Bell *et al.*, 2008); analysis of students' behaviour change talk for weight management (Peters *et al.*, 2013); a behaviour change communication tool (Chisholm *et al.*, 2014); standardised patient cases, student-led activities focussing on healthy living and student wellbeing, community service and medical student self-care (Muscato *et al.*, 2018).

However, only limited published work was found in the pharmacy education literature which mainly originates from the United States of America (USA). DeGeeter *et al.*, (2016) highlighted a lack of pharmacy students' confidence in providing tailored, patient-centred lifestyle behaviour change advice and this view was also supported in a survey of pharmacy educators across two schools of pharmacy (Taylor *et al.*, 2016). The authors state that pharmacy students need further training in recognising their personal health status as well as providing effective patient counselling on therapeutic lifestyle changes.

This paper describes the design and delivery of a novel approach to teaching the principles of behaviour change to undergraduate pharmacy students in one school of pharmacy. This subject was traditionally taught in lecture format under the heading of 'health psychology' with the broad aim to 'Describe the role of health psychology in understanding the patient's health-related behaviour'. The learning outcomes set in order to achieve this aim were:

- To list the different health-related behaviours influencing recovery from illness
- To detail a number of psychological models to understand patient behaviour
- To identify factors which are facilitators or barriers to behaviour change
- To apply these models to aspects of health promotion, behaviour change, pharmacy practice and public health

This study aimed to engage pharmacy students in a behaviour change learning activity to support their learning and to capture their reflections on the novel teaching method. The purpose was not to focus on the type or sustainability of the change made by the student, but on their appreciation of the challenges of making such a change.

Three key objectives were set in order to achieve this aim. These were to:

1. Engage pharmacy students in a two-week 'behaviour change' learning activity in order to increase their understanding of the challenges of making lifestyle behaviour changes;
2. Establish the proportion of students who completed the self-report diary and capture the patterns of behaviour before and after implementing the change;
3. Explore students' reflections on this novel teaching methodology and the extent to which it helps students apply health psychology theory to pharmacy practice and understand its role in health promotion.

Method

Overview of learning activity design and data collection

All second year pharmacy undergraduate students (n=99) in one university in Wales were invited to engage with a behaviour change activity. The students were provided with a standardised behaviour change diary, devised by the authors, in order to support their recording of events. Students were given the opportunity to select their own behaviour to change in order to allow them to tailor it to their own needs. Students were introduced to the study in a teaching session led by one of the authors (RED) and the diary was provided. At this point students were asked to read the supporting material provided and an example diary was supplied in order to thoroughly explain the study process (Figure 1). Students were given the opportunity during the session to ask questions regarding any aspect of the exercise.

For the first week of the study (pre-behaviour change) students were asked to record their activity for one specific behaviour before making the identified change (see Figure 2). This was recorded on a daily basis for each part of the day (morning, afternoon and evening). A total daily frequency of the activity was recorded per day. In addition, students were asked to record their reflections on this activity and how they would achieve the change they desired.

At the end of this first week students received a lecture on health psychology theory and behaviour change models, including their relevance and application to pharmacy practice. This was delivered by one of the authors (DHJ). Students were asked to then make the change to their lifestyle that they had identified a week earlier. During the final week of the study (post-behaviour change) students were asked to record the activity on a daily basis in the same manner as the pre-behaviour change week (Figure 3). At this stage, students

were also asked to consider whether their behaviour change relates to a health psychology theory.

The diaries were collected during a further unrelated teaching session at the end of the post-behaviour change week or handed back to the author when convenient.

Figure 1: An example of a completed behaviour change diary, provided to students to help support them in completing their own, personalised, diary

PH2110 (Clinical & Professional Pharmacy) Dr Delyth H James/ Dr Rhian Deslandes – 2016/17
 Student Name: **A Clever Student**

Think of ONE behaviour about yourself that you would like to change over the next few weeks. Examples may be eating more fruit and vegetables, going to the gym more, reducing chocolate consumption, spending less time on social media sites, using your smartphone or tablet less.

I want to change: *I want to make sure that I stick to the healthy eating advice of making sure that I eat at least 5 portions of fruit and vegetables per day.*

Before making the change, keep a log of the number of times/minutes you spend on this behaviour for one week.

	Day -7 (Monday)	Day -6 (Tuesday)	Day -5 (Wednesday)	Day -4 (Thursday)	Day -3 (Friday)	Day -2 (Saturday)	Day -1 (Sunday)
Morning	Orange juice for breakfast Portion blueberries with cereal Banana for mid-morning snack	Apple juice for breakfast Banana for mid-morning snack	Orange juice	Orange juice for breakfast Portion blueberries with cereal Banana for mid-morning snack	Orange juice for breakfast Portion blueberries with cereal	Toast with coffee (no fruit)	Chocolate croissants with coffee (no fruit)
Afternoon	Vegetable soup for lunch	Cucumber in sandwich	Tomato soup for lunch	Crisps for lunch Apple	Portion of carrot sticks with sandwich	Cheese and ham sandwich (no tomato)	Carrots, swede, parsnips and cauliflower for Sunday lunch
Evening	Portion of peas with evening meal	Vegetable pizza (but probably not sufficient to count as a portion)	None (pasta with sauce for tea)	Green beans with evening meal	Fish and chips (no veg)	Chicken curry (with mushrooms)	None
Total	5	3	2	5	3	1	4

Thank you. Once you have completed this pre-change log, use the next few pages to start planning and to log how many times/minutes you spend on the behaviour in the week of making the change.

PH2110 (Clinical & Professional Pharmacy) Dr Delyth H James/ Dr Rhian Deslandes – 2016/17
 Date started: **Tuesday 28th February 2017**

	Day 1 - Monday	Day 2 - Tuesday	Day 3 - Wednesday	Day 4 - Thursday	Day 5 - Friday	Day 6 - Saturday	Day 7 - Sunday
Morning	Orange juice for breakfast Portion blueberries with cereal Banana for mid-morning snack	Apple juice for breakfast Portion blueberries with cereal Banana for mid-morning snack	Orange juice Toast with banana	Apple juice Cereal with strawberries Banana	Orange juice	French toast with blueberries, strawberries and bananas	Fruit juice
Afternoon	Vegetable soup for lunch Apple	Ham sandwich (with cucumber and carrot sticks)	Tomato soup Apple	Sandwich with tomatoes Apple	Toasted sandwich with tomatoes	Ham salad (lettuce, cucumbers, tomatoes, beetroot, celery)	Sunday lunch with 4 vegetables
Evening	Portion of peas with evening meal	Vegetable pizza with large salad	Green beans (with pasta)	Carrots and broccoli with evening meal	Fish and chips with peas	None	Melon for tea
Total	5	5-6	5	7	3	8	6

Comments:
My plan seems to have worked as I now have hit the target of eating 5 or more portions of fruit or vegetables on 6 out of the 7 days (compared to 2 days last week). On some days, I even exceeded my target. I still need to work on Fridays, as this seems to be the day that I struggle to achieve my goal. Making sure that I allow time for breakfast on a Friday will help to address this.

Figure 2: Diary before making the behaviour change

PH2110 (Clinical & Professional Pharmacy) Dr Delyth H James/ Dr Rhian Deslandes – 2016/17
 Student Name: _____ Date started: **28th February 2017**

Think of ONE behaviour about yourself that you would like to change over the next few weeks. Examples may be eating more fruit and veg, going to the gym more, reducing chocolate consumption, spending less time on social media sites, using your smartphone or tablet less.

I want to change: _____

Before making the change, keep a log of the number of times/minutes you spend on this behaviour for one week.

	Day -7	Day -6	Day -5	Day -4	Day -3	Day -2	Day -1
Morning							
Afternoon							
Evening							
Total							

Thank you. Once you have completed this pre-change log, use the next page to start planning and to log how many times/minutes you spend on the behaviour in the week of making the change.

Ethics

All students were informed, in writing, as part of the diary that the information provided would be analysed and presented in future publications. They were asked to inform a member of the research team if they did not wish for their diary to be included. No objections were received. Completed diaries were anonymised and confidentiality assured at all times. Ethics approval for the study was granted by the University School Research Ethics Committee.

Data analysis

A database was created using Microsoft Excel to record the behaviour that was to be modified, whether this behaviour had indeed changed, the students’ plans on how to address the change, their general reflections and whether their change directly related to a health psychology theory.

A behaviour change was deemed to have taken place if the student’s behaviour in the second week was different to that in the first week, for over half of the week (*i.e.* equivalent to four or more days out of seven), such as an increase in the count of fruit and vegetables portions. Therefore, any partial change in lifestyle was categorised positively, even if this was not sustained for the entire week. Reporting a change for the equivalent of three or less days was categorised negatively, resulting in categorical dichotomous data - Yes or No. The type of change identified was categorised into a main theme, for example, diet or exercise and quantitatively described. The plans on how to make the change and the associated reflections were documented verbatim on the database. These were thematically analysed and common themes identified (Braun & Clarke, 2006).

Results

Out of the 99 students in the cohort 72% were female, their age ranged from 19-25 years and all were classed as ‘home’ students. In total, 61 students completed the activity (62%). Of these 55 (90%) had successfully implemented the proposed change to their behaviour.

Table I: Categories of identified behaviours (n=61)

Theme	Frequency	Example
Diet	20	Eating more fruit and vegetables. Eating fewer fatty foods Consume fewer sugary snacks and drinks per day
Exercise	21	Increase frequency of gym visits Reach government target of amount of exercise
Liquid consumption	14	Drink more water Reduce consumption of caffeine Reduce alcohol intake
Other	6	Reduce time on the smartphone Stop biting nails Review lecture notes more frequently

Type of behaviour identified to change

The identified changes were broadly categorised into four main categories. These are presented in Table I.

Students provided plans for how they intended to change, reflections on progress, and challenges faced. Reasons were given by some of the six (10%) students who did not implement the change. These included prioritising other activities, due to a lack of time, or that the student struggled with the demands of the challenge. For example,

"The week started well for me - I got in my first run early in the afternoon in between work so I did the full 30 minutes I was aiming for. The second run however I could only squeeze in after lectures when I was already tired, so I was a lot more tired and didn't jog for as long. I became more lax and prioritised other things ahead of my jogging - I can see from this how difficult patients might find it to motivate themselves to take medicines especially if they have a busy schedule". (Participant 30)

Illness was also cited as a barrier to change for a student who had chosen increasing exercise as the target behaviour:

"Day 1 & 2 are quite successful as I was aware I had to try to be more active, but declined as the week went on. It was a bad behaviour to choose as I had a cold and bad chest which affected my energy levels". (Participant 34)

Ten (16%) of the 61 students who completed the activity noted the theory which they believed best described their behaviour. These are listed below alongside the students' comments:

Health belief model (n=4)

"I believe that doing more exercise will make me healthier; this encourages me to do more" (Participant 42)

"Considering the perceived threat of dehydration – I am susceptible to dehydration because I do not drink enough water". (Participant 45)

"I weighed the benefits and disadvantages of this behaviour change to motivate me to change this behaviour". (Participant 57)

"I thought about the benefits of the action I wanted to change". (Participant 61)

Trans-theoretical model (n=2)

"I contemplated that more exercise would improve my skills and benefit my overall health. I then implemented this change and intend to keep it up by attending dance lessons and practising at home". (Participant 37)

"Particularly the pre-contemplation and preparation stage". (Participant 60)

Theory of planned behaviour (n=2)

"I think I executed the theory of planned behaviour as I planned to make a change and changed my attitude towards exercising in a more positive way". (Participant 33)

"This could be due to the subjective norm as many of my peers seem to rely on caffeine too. I have perceived it as the norm and thus reducing my caffeine intake is made more difficult". (Participant 53)

Health locus of control (n=1)

"My locus of control lies with powerful others, such as my parents around me telling me to drink water or eat breakfast". (Participant 43)

Capability, Opportunity, Motivation - Behaviour COM-B model (n=1)

"I had very little opportunity or time to complete the change and as such (due to other activities) prioritised other activities. I think this reflects the health psychology theory COM-B". (Participant 36)

Plans to change behaviour

Students expressed how they planned to change their behaviour. These were very specific about the type of behaviour identified. For those who wished to amend their diet and eat healthier this mainly revolved around forward planning of their meals and shopping activities. For many, this involved an increased awareness of the food they were consuming and switching to a healthier alternative. Three students who had focussed on their breakfast more specifically mentioned waking earlier to allow more time to plan and prepare an appropriate meal:

"I will take fruit as an alternative health snack instead of the crisps or cereal bars I usually eat" (Participant 5)

"My snacks, instead of crisps or chocolate, I will try and eat fruit. I will also try to include veg in my meals instead of having meat with chips or rice". (Participant 7)

"I will wake up half an hour earlier so that I have time to make and eat breakfast before I go to lectures". (Participant 19)

Those students who identified exercise as a key behaviour planned to manage their time more efficiently to allow them the opportunity to exercise. For some this meant waking earlier to undertake the exercise earlier in the day before they became too tired. For others, this

meant identifying an alternative, more suitable, activity such as walking instead of catching the bus. For three students they believed that exercising with friends would be a motivating factor to encourage them to make the change:

"I need a plan so I get more exercise. Try to focus on evenings as more likely to be free then". (Participant 24)

"Work out with friends. It's more fun and then there's a sense you're both obliged to do it and don't want to be the one who drops out". (Participant 25)

Students who wished to consume more water engaged with the activity by planning what drink to carry with them and planning when they would indeed consume more liquid, such as with each meal, and how this would be encouraged (e.g. using a larger glass):

"I will always have a glass of water / a bottle of water with me". (Participant 44)

"Will make sure I have a glass of water with each meal". (Participant 47)

"[I will change] the size of the glass I used to hold a drink when I eat my meals. Using a pint glass will encourage me to drink more". (Participant 51)

Students who wished to reduce their caffeine intake focussed on substituting caffeinated drinks with those with a lower or no caffeine content whereas those who mentioned alcohol intake focussed more on limiting the amount of times they went out or setting a financial limit:

"I will substitute tea for non-caffeinated drinks such as water, squash and green tea so that I remain hydrated throughout the day". (Participant 54)

Analysis of student reflections

Students were encouraged to reflect on the extent, if any, of changes they had made and the manner in which they had done so. Further analysis of these data identified specific barriers and motivators to the successful implementation of change.

Barriers to implementing change

Within this section, barriers to making a change were identified and students acknowledged how challenging the exercise was. Common themes presented in the data were difficulty in managing time, and how making a change was more challenging than first perceived:

"I struggled with the challenge - perhaps I didn't buy enough fruits, but I wasn't eating much more than usual. I don't know if eating more of them will make me feel any better in myself and perhaps that's why I struggled to do it". (Participant 2)

"I found that staying away from chocolate bars and biscuits was harder than I expected". (Participant 13)

Motivators for implementing change

In contrast, some students commented on how the exercise had provided them with an insight into their current behaviours and motivated them to make the change. The plans they had made had also encouraged them to modify their practice and had been very successful:

"By recording the habit before making my change I could really see how little fruit and veg I ate. This motivated me to really try to eat more in the next week". (Participant 4)

"The plan that I set myself for the week beginning 5th of October seems to have worked. For the last week I have managed to eat over five portions of fruit or vegetables for the six out of seven days". (Participant 5)

"By knowing what I had and recording it. I am able to see where I can improve". (Participant 8)

"This task was very useful for me as once I had decided to change something and put my mind to it then I had the motivation to carry out the change". (Participant 12)

"I also found by eating a proper breakfast I have been able to stay awake for my lectures! I have also had enough energy at the end of the day to do some extra reading. I wasn't able to do this before! Very pleased". (Participant 21)

"Since documenting how often I go to the gym, I realised how powerful the mind is in changing behaviours. I am a naturally competitive person so being able to compare and see visible improvements really motivated me to change". (Participant 34)

Students reflected on the exercise data collection tool and how the process of consciously recording an activity had made them aware of their own beliefs and of the relevance of this exercise in practice. Providing support to a patient who is making a change to their behaviour is imperative for a successful outcome.

"Knowing I had to fill in a sheet made me more conscientious about doing more exercise. I realised my beliefs influenced my behaviour as before I only counted intense exercise but this time realised walking can count as long as I benefit from it, so walked more". (Participant 24)

"I found I could do things best if I had someone with me as support. As pharmacists we would need to support our patients and encourage them so they feel more engaged with what they're doing". (Participant 25)

Discussion

Students engaged well with this learning activity showing a high percentage of diary completion. The main focus was to raise awareness of the challenges of behaviour change and its relevance to pharmacy practice. Nearly two-thirds of students completed the full two-week activity and the majority of these had achieved their proposed behaviour change goal. For those who did not submit the paperwork, it was not known whether or not they engaged with the activity at all or stopped at some point during the two weeks. It was explained to students that the degree of success of behaviour change should not prohibit them from submitting the paperwork, since understanding why the behaviour change was not achieved and appreciating the barriers and facilitators they came across, also provides very useful learning and points for further reflection. Students who did engage, reported gaining a better appreciation of the relevance of health psychology to their future practice as pharmacists and a better awareness of the challenges faced by patients when being advised to change a health-related behaviour. It helped to bring the psychological models to life by seeing the link between these and their own behaviours, as well as patients' health-behaviours. Students were able to identify the barriers and facilitators to behaviour change for themselves, thus achieving this particular learning outcome in a more student-centred way. Moreover, of the few students who did not implement the change, some may have partially achieved this, making some lifestyle change on the first few days which was not sustained. It could be argued, that these students had still made some effort to change and valued learning had taken place.

The purpose of teaching these behaviour change principles to pharmacy students was not to produce a level of competence equal to chartered psychologists, but to have enough familiarity to advise patients in an informed manner when they qualify as pharmacists. This concurs with the goals set out in the paper by Nairn *et al.* (1995) when teaching principles of behaviour change to medical students, where 90% developed some competency in applying the principles of behaviour change to their own behaviour. Peters *et al.* (2006) found that medical students appreciated learning about their own health factors when a nutrition theme was introduced into the curriculum, and that personalising the information increased the value of the learning experience. Alpar and colleagues (2008) also found that adding content to a nursing curriculum to improve and monitor student health behaviours helped to change their own lifestyle behaviours from the start of the degree to graduation. The expectation is that these experiences will benefit these students to empathise with patients and provide more effective guidance to them when changing behaviour.

In the present study, although students selected one specific behaviour, the resources identified and lessons learnt are transferrable to other health and non-health related behaviours whilst making the learning experience contextually relevant to students. For example, several students commented on the utilisation of reminder

techniques, the value of peer support and use of diaries. Students who submitted their forms showed that they were able to identify very specific behaviours to change, which is an important aspect of successful behaviour change. This may have been due to the fact that the example that was provided to students (*i.e.* eat five fruit and veg a day) was specific, in contrast to a more general behaviour (*i.e.* eat a healthy diet) which they were discouraged from doing. Some students reflected on the importance of goal setting prior to commencing the change and diary keeping as a self-monitoring technique in helping them to plan, commence and undertake the behaviour change over the two weeks. These are a well-recognised concept in health psychology (Michie *et al.*, 2009; 2011), yet not an area that is currently taught as part of this second year module. However, this highlights the benefits of introducing pharmacy students to the concept of goal setting at undergraduate level, which should be re-considered going forward.

This learning activity, builds on a 'mock-medicines activity' which is completed in Year 1 of the undergraduate pharmacy degree, where students are given 'sweets' labelled as medicines to take for a one-week period and asked to keep a diary of adherence to one of four different dosing regimes (Mantzourani, Potter-Floyd & James, 2016). This is when students are first introduced to the discipline of health psychology and its relevance to medicines adherence. The value of introducing these topics within a spiral curriculum, helps to develop a deeper learning of these important underpinning concepts. Furthermore, in order for students to adopt a deep approach to learning they need to engage with active participation in teaching and assessment. As a result, students will develop a better understanding of concepts, and relate these to existing knowledge by seeking meaning (Nicholls, 2002).

The results of this study should be understood in the light of some limitations. Although this activity was not being assessed, some students may have exaggerated the extent to which they achieved their behaviour. However, as previously mentioned, the success or sustainability of the behaviour change does not limit the valued learning that is gained from this experience. One-third of students did not submit the data capture forms, however, some students may have started to implement the behaviour change and then stopped, without completing the paperwork. An electronic format for data capture, such as a virtual learning environment (VLE), may address this and should be considered for future student cohorts. The submission of the self-completion diaries for assessment could also be a way of minimising the number of students who do not engage with the activity in the future.

Another possible limitation is the use of self-completion diaries, since the process of consciously recording behaviours made students more aware of their own behaviours which introduces the Hawthorne effect (Savage, 1996). These data could be utilised in other modules or in subsequent years of the course to teach research methods, data analysis and interpretation, plus the possible limitations of collecting data in this way.

Only 10% of those who completed the task had been able to relate their experiences to the theoretical models taught during the lecture, and the authors are considering different ways in which this might be strengthened.

The three faculty staff who designed and delivered this behaviour change learning activity have benefited from reflecting on the process and some key lessons were learnt from doing so. First, it is essential that there is a clear explanation and description of the learning activity for students to engage and understand what is required of them. Otherwise, there is a risk that the paperwork may appear quite complex and lengthy. The key to success is therefore, to provide students with the opportunity to read through material and ask questions. Second, it is necessary to schedule the collection of diaries (e.g. during a workshop or lecture) in order to maximise the response rate. The learning activity has now been adapted to include a quantitative rating of how enjoyable students found it and how easy it was for students to make the behaviour change (using a 5-point Likert scale, Strongly Agree to Strongly Disagree). Also, use of more focused questioning has been introduced to capture i) any perceived barriers faced when trying to make the change; ii) any facilitators to making the behaviour change; iii) which health psychology theory is most related to their behaviour change and why; iv) how the learning might help them in their future career as a pharmacist; and v) any further reflections or general comments on the task.

There are a variety of possible avenues for further extension of this work, including a longitudinal follow-up to investigate how long students maintained their behaviour change. It was not possible to know whether thematic saturation had been achieved with these data, although all student reflective diaries were included in the analysis, not a sample. Repeating this learning activity with other cohorts of pharmacy students in the same School of Pharmacy as well as in other schools of pharmacy in the UK would be beneficial in order to explore any new emerging themes. Furthermore, the authors plan to deliver this novel learning activity with other healthcare students and in international higher education settings where the motivators or barriers to behaviour change may be different due to cultural reasons.

Further research adopting qualitative methodologies would be useful to explore students' evaluation of the value of the behaviour change learning activity in more depth. There are many possibilities of extending the use of this novel teaching methodology to students of other health care professions and this work is in progress with a number of allied health professions involved in undergraduate inter-professional education.

Finally, it is not known whether or not this learning will have an impact on future practising pharmacists. Recent studies have found that public perception of the community pharmacist's role in public health is poorly understood (Williamson, Wynn & Livingstone, 1992; Kember, Hodson & James, 2017). Developing these key skills early on may go some way to enhancing the credibility of pharmacists' ability to undertake these roles in the future.

Conclusions

Overall, this novel learning activity was considered to be a success since it helped pharmacy students appreciate the relevance of health psychology to their future practice as pharmacists. Two-thirds of students gained real-life experience of attempting to change their behaviour, thus gaining a better appreciation of the challenges faced by patients when being advised to change a health-related behaviour. Some students developed a deeper understanding of how psychological theory is related to practice.

This approach to education helps to develop students' empathy with the challenges faced by public and patients when trying to adopt healthier lifestyle behaviours or incorporate new behaviours for self-care.

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