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ScienceDirect

Health Professions Education 6 (2020) 162–169

www.elsevier.com/locate/hpe

Mindfulness Training: Success in Reducing First Year Health Professional Students' Study and Exam Related Stress

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Available online 21 April 2020

Abstract

Purpose: Students enrolling in high stakes, undergraduate entry, professional programs like medicine, dentistry and pharmacy may struggle to effectively achieve the transition from high school. This often results in high levels of mental distress.
Method: The College of Medicine and Dentistry at James Cook University have implemented a health professional self-care program (HPSC) with an aim of helping students recognize stressors and develop coping strategies. The HPSC program has been running for three years in the first year of each of the three courses. The HPSC program was delivered as a series of eight sessions focusing on evidenced based theory with some time for practicing coping strategies. Five-point Likert scale surveys were administered prior to commencing the program and after completion.
Results: Across the College, students reported significantly improved abilities to reduce study and exam related stress and develop effective coping skills. These results were more pronounced in students that practiced techniques of mindfulness.
Discussion: The HPSC program changed student perceptions in being able to improve their own self-care and reduced study and exam related stress.

Keywords: Mindfulness; Health education; Tertiary students; Self-compassion; Well-being

1. Introduction

Numerous studies have demonstrated higher stress levels in university students compared to the general population.[1–4] There is strong evidence that high levels of psychological distress start within the first university year and usually continues throughout a student's degree.[5–7] This is of public health significance as psychological distress in known to cause substance use disorders, mood disorders, and suicidal tendencies and/or non-suicidal self-injury.[8–11]

There are many factors causal to psychological distress that impact university students' wellbeing. Sharp and Theilers (2018) reviewed thirty years of published literature examining these factors and identified themes of sociodemographic and situational, academic performance related, and personality and psychological attributes. The sociodemographic and situational factors included finance, age, gender, religion, sexuality, mental status, parental education, living arrangements, work requirements, or family care. Academic performance related factors included performance-based study-specific features such as

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Peer review under responsibility of AMEEMR: the Association for Medical Education in the Eastern Mediterranean Region

https://doi.org/10.1016/j.hpe.2020.04.001

independent time management, study skills, dealing with academic requirements, the pressure of regular performance evaluations, and long-term career planning. Personality and psychological factors included lack of confidence, lower levels of self-esteem, lack of capacity to respond to stressful situations, and lower dispositional hope associated with depression, generalised anxiety, hostility and social anxiety.

Globally, there are particularly high levels of mental distress in both health students and health professionals, including high rates of contemplative and completed suicides.[12–16] Due to this, there is an acknowledged need to increase the health and wellbeing of health students and professionals[13,14,17]; in particular, the prevention and treatment of mental health problems in students.[18]

At James Cook University (JCU), the College of Medicine and Dentistry (College) has three undergraduate courses. The Bachelor of Medicine, Bachelor of Surgery (medicine) is for six years, the Bachelor of Dentistry (dentistry) is five years, and Bachelor of Pharmacy (pharmacy) is four years. Each course puts into practice its social accountability mandate by incorporating into the curriculum those aspects of health professional education known to positively impact local health workforce and community outcomes; in particular, for disadvantaged and/or underserved communities. Each course focusses on teaching students about rural and remote healthcare, and in the senior years, students have placements in rural hospitals and community settings and Aboriginal and Torres Strait Islander communities. Student selection into the College is a combination of academic performance and entry interviews and students are predominantly secondary education school-leavers from around Australia. A small proportion of mature age students and a much greater proportion of international students (10–15%) are also represented every year.

The College proactively assists students who identify with a mental health issue. Each course has several Academic Advisors who can and do assist with referrals to services of crisis support, counselling, medical, and academic performance. The College recognises that these students need to be supported with both sociodemographic and situational factors, as well academic performance factors. Part of the service provided by Academic Advisors, is the encouragement of students to build connections in different year levels for academic support, friendship, and placement location mentoring. However, even with the support of Academic Advisors, there are still many challenges regarding supporting students with significant personality and psychological attributes that impact students' lives and academic progress.

Thus, in 2016, a 'mindfulness' program – now called the Health Professional Self-Care Program (HPSC) – was piloted to provide support for all first-year medical and dentistry students. This eight-week program to teach mindfulness was aimed at decreasing the distress commonly seen in first-year students by developing their coping mechanisms and teaching them stress-relieving techniques. Since 2017, the program has been expanded across the College to involve pharmacy first-year students.

This study evaluates the College's mindfulness program for first-year medicine, dentistry, and pharmacy students with respect to its effectiveness in improving student wellbeing, reducing study-related stress, reducing exam related stress, encouraging students to build their own wellbeing coping resources that they can use as both a student and graduate, and reducing the stigma around seeking mental health support.

2. Methods

2.1. Description of 'mindfulness' and the 'health professional self-care program'

Mindfulness has been defined as, "the self-regulation of attention (awareness) so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment".[19]

There is a demonstrated history of successful mindfulness curriculum interventions in other health courses in Australia and globally. The mindfulness training literature for university courses (mainly medicine) shows it can lead to better patient communication and student mental health outcomes. It can also include reductions in stress, burnout, and depression, as well as increases in students' coping skills and greater wellbeing.[20–25]

There is no one agreed 'formula' for providing self-care programs to students, and there are many different meditation and mindfulness practices and frameworks to help people become more aware of their immediate experience. The College's 'Health Professional Self-Care Program' provides a basis for students to develop greater self-awareness and self-care tools to help them handle common challenging situations, emotions and thoughts. Over the course of eight, 1-hour face-to-face teaching sessions, the program blends academic theory of the science of mindfulness and self-care and the relevance to students and health

professional education and practice, with practical exercises to help students develop and embed lifelong self-care practices and strategies. The 2017, 2018 and 2019 course contained the following elements:

1. Introducing the structure and benefits of developing a mindfulness practice
2. Strategies for handling stress and anxiety
3. Developing greater focus and situational awareness
4. Understanding autopilot thinking, cognitive biases and common thinking traps
5. Techniques to develop emotional intelligence capabilities
6. Positive psychology techniques, with a focus upon appreciative enquiry and strengths awareness, to help develop a growth mindset
7. Creating a personal wellbeing plan
8. Compassion in health sciences training

In 2016, the pilot year, a registered psychologist trained in mindfulness-based stress reduction developed and delivered the program. Since 2017, a mindfulness lecturer trained in positive psychology, emotional intelligence coaching, yoga and physical wellbeing has continued the program evolution and delivery. The mindfulness program underwent significant course revisions before the start of 2017, to reflect the expertise of the new program lecturer, and in response to student and faculty feedback. The aim of the revision was to build on the foundational pilot program. The major changes from 2016 to 2017 and beyond were to increase the number of practical exercises from fields such as positive psychology and mindfulness; place greater emphasis on neuroscience and exploration of the evidence base for mindfulness; add compassion training in healthcare; and a personal wellbeing plan.

Because the curriculum is for university students in health sciences, there is a balance of both practical exercises and an exploration of the neuroscience and psychology research underpinning the wellbeing framework. In order to appeal to as wide a range of students as possible there has been a deliberate distancing from the “soft”, “fuzzy” or “spiritual” aspects of mindfulness. However, the origins of mindfulness and common frameworks are strongly acknowledged.[26]

Since 2017, several elements from the Sutras of Patanjali framework[26] have been incorporated into the program. The practical mindfulness techniques within the course include the following:

- Stress management techniques; deep diaphragmatic breathing, regulating breathing patterns by counting breaths, using self-nurture techniques such as placing hands on the neck or the stomach etc.
- Single pointed focus techniques; breath awareness (for example practicing returning a wandering attention to a single point of breath focus), decluttering and reducing distraction
- Open awareness techniques; techniques to help people cultivate a curious, self-compassionate, dispassionate, curious presence to the stream of thoughts and interactions they experience
- Body scanning techniques; techniques to help people observe sensations arising in their bodies in a sequential and self-compassionate manner

The delivery format of sessions for dentistry and pharmacy for 2017–2018 was different to medicine. Dentistry and pharmacy had smaller groups with each cohort split into two, with a maximum of approximately 40 per group. This means that the program provider taught each of the eight weeks twice with a different set of students. However, in medicine, with a large cohort of approximately 200 students per yearly intake, the teaching occurs for all students once per session in a large lecture theatre. The students receive the first four teaching sessions only four weeks into first year classes, and then students receive the second four teaching sessions in the second half of the year. Furthermore, students access previous recorded learnings and additional resources at any time via an online learning platform.

2.2. Participants and data collection

Participants (See Table 1) were all first-year JCU medicine, dentistry, and pharmacy students. Data was collected annually from 2016 to 2018 and thus represents survey results from first year cohorts across three different courses. To ensure consistency of data collection across the courses, the same surveys were administered to students across each course at the same time by an independent researcher. Pre-surveys were collected in an introductory session prior to any mindfulness program teaching, and the post-survey collected at the end of the last teaching session. The program initially started within the courses of medicine and dentistry, with pharmacy joining the program in 2017. Ethics approval (H6270) was obtained through the JCU Human Ethics Committee.

Table 1
College and course demographics across age, gender, year surveyed and when surveyed.

Variable	College n (%)	Medicine n (%)	Dentistry n (%)	Pharmacy n (%)
Age in years				
Under 19	730 (65.4)	452 (67.9)	179 (61.9)	99 (61.5)
Over 19	382 (34.2)	213 (32.1)	108 (37.4)	66 (38.5)
Gender				
Male	423 (37.9)	259 (38.9)	100 (34.6)	64 (39.8)
Female	686 (61.5)	403 (60.5)	186 (64.4)	97 (60.2)
Survey year				
2016	121 (10.8)	88 (13.2)	33 (11.4)	–
2017	486 (43.5)	319 (47.9)	86 (29.8)	81 (50.3)
2018	509 (45.6)	259 (38.9)	170 (58.8)	80 (49.7)
Survey type				
Pre	583 (52.2)	362 (54.4)	137 (47.4)	84 (52.2)
Post	533 (47.8)	304 (45.6)	152 (52.6)	77 (47.8)
Total	1116	666	289	161

2.3. Survey development

A post-program survey for the pilot 2016 year was developed to evaluate the program goals, with questions including demographics (health course, gender, age), mindfulness techniques students already use, and 5-point Likert scale questions (strongly disagree to strongly agree) to measure general stress levels, study related stress levels, personal coping techniques developed, resiliency, personal relaxation techniques, as well as health behavior change questions related to self-care and general wellbeing. From 2017, a pre-program survey was administered asking students questions regarding mindfulness techniques they use in their day-to-day life, and 5-point Likert scale questions to measure their ability to identify their general stress, study related stress, coping skills, and skills related to life-long resiliency. While the pre- and post-surveys asked the same questions, the stems were slightly different; that is, the pre-survey said 'I believe I can … ' and the post-survey said 'the mindfulness program helped me to … '.

2.4. Data analysis

Data from the three health courses were analysed using the statistical package for social science, SPSS Release 20 for Windows (IBM Corp, Armonk, NY, USA - SPSS, https://www.ibm.com/products/spss-statistics). For analysis of preversus post-program survey data around changes in student stress, study related stress, life-long resiliency, the 5-point Likert scales were collapsed into three categories of 'disagree', 'neutral' and 'agree' for chi-square tests for trend (Tables 2 and 3). For analysis of preversus post-program survey data for strength of associations between gender with self-care techniques, coping skills, relaxation techniques and online media usage, Likert scale responses were assigned a numeric value (strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, strongly agree = 5) for Independent t-tests (Table 4). Results were deemed statistically significant if $p < 0.05$.

3. Results

Most first-year students were aged <19 (65%) and female (61%) (Table 1).

3.1. Use of mindfulness techniques

Across the College, there was a statistically significant improvement in student responses to the question "*do you use mindfulness techniques in your day-to-day life*", from 40% (n = 233) of participants reporting

Table 2
College differences post-program mindfulness techniques usage across health behavior change questions, 2016 to 2018 cohorts.

The mindfulness program helped me to:	n	Students not using mindfulness techniques in day-to-day life			Students using mindfulness techniques in day-to-day life			p-value
		Disagree n (%)	Neutral n (%)	Agree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	
Understand how to take better care of myself	525	35 (16)	77 (36)	102 (48)	11 (3.5)	56 (18)	244 (79)	<.001
Actually take better care of myself	523	51 (24)	109 (51)	54 (25)	21 (7%)	101 (33)	187 (61)	<.001
Believe I can improve my own wellbeing	522	27 (13)	58 (27)	128 (60)	7 (2.3)	40 (13)	262 (85)	<.001
Actually improve my own wellbeing	523	38 (18)	104 (49)	72 (34)	12 (3.9)	102 (33)	195 (63)	<.001

Table 3
Post-program associations between gender versus stress and coping skills across the College, 2016 to 2018 cohorts.

The mindfulness program helped me to:	Male (n = 192)	Female (n = 332)	p-values
Self-Care			
Understand how to take better care of myself	2.63	2.51	.004
Actually take better care of myself	2.39	2.30	.776
Be aware of the impact that continual connection with online media has on self-care	2.63	2.52	<.001
Coping			
Develop coping skills to appropriately handle stressful situations	2.61	2.50	.002
Develop relaxation techniques to reduce stress	2.77	2.67	<.001

'Yes' pre-program compared to 60% (n = 320) post-program ($p < 0.001$).

Table 2 shows that students using mindfulness techniques in day-to-day life post-program compared to students not using mindfulness techniques in day-to-day life were significantly more likely to report agreeing with the statements: 'understand how to change my own behavior' (increase of 31%); 'actually take better care of myself' (increase of 36%); 'believe I can improve my own wellbeing' (increase of 25%); and, 'actually improve my own wellbeing' (29%), $p < 0.001$ respectively.

3.2. Gender: self-care and coping

There was no significant associations with gender across any questions in regards to stress or coping pre-program.

Table 3 shows, post-program, the male students of the College were more likely than female students to agree with the statements: 'understand how to take better care of myself' ($p = 0.004$); 'Be aware of the impact that continual connection with online media has on self-care' ($p < 0.001$); 'Develop coping skills to appropriately handle stressful situations' ($p = 0.002$); and, 'Develop relaxation techniques to reduce stress'.

3.3. Stress, resilience and coping

Post-program, more than 80% of the 422 student participants across the College from 2016 to 2018 said 'Yes' to the question 'the mindfulness program had helped me to reduce the stigma around seeking healthcare in relation to mental health'.

Table 4 shows post-program, students of the College agreed that 'the mindfulness program helped me to:

Table 4
Differences in pre and post program stress and coping skills across the College and within courses for years 2017 and 2018.

	Pre			Post			College p-value	Medicine p-value	Dentistry p-value	Pharmacy p-value
	College Disagree n (%)	College Neutral n (%)	College Agree n (%)	College Disagree n (%)	College Neutral n(%)	College Agree n (%)				
Identify when I am in stress	24 (4)	48 (8)	509 (88)	36 (9)	108 (26)	268 (65)	<.001	<.001	.030	.017
Reduce study related stress	172 (30)	193 (33)	214 (37)	55 (14)	124 (30)	230 (56)	<.001	.003	<.001	.002
Reduce exam related stress	201 (35)	173 (31)	195 (34)	61 (15)	118 (29)	229 (56)	<.001	<.001	<.001	.002
Develop skills to build life-long resiliency	94 (16)	240 (42)	243 (42)	37 (9)	119 (29)	251 (62)	<.001	.062	<.001	.002
Develop effective coping skills	103 (18)	218 (38)	256 (44)	35 (9)	111 (27)	264 (64)	<.001	.009	<.001	.001

'reduce study-related stress' ($p < 0.001$) and 'reduce exam related stress' ($p < 0.001$); and 'develop effective coping skills' ($p = <.001$). Dentistry and pharmacy students agreed that the mindfulness program helped them to 'develop skills to build life-long resiliency' ($p < 0.001$ and $p = 0.002$, respectively); whereas medicine students showed only borderline ($p = 0.062$) increases.

4. Discussion

To date, it appears that this is the first study to demonstrate that a first-year university self-care program, incorporated into the formal College curriculum of three health courses, can change student perceptions of being able to improve their own self-care, reduce study and exam related stress, and develop life-long resiliency and effective coping skills. These results suggest a real potential for health behavior improvement in the students. Specifically, significant self-reported changes in student preventive health behaviours associated with seeking healthcare and using mindfulness techniques daily, as well as increased resilience and ability to cope with exam stress. Additionally, notable gender statistical differences have emerged in this study showing male students increasing their knowledge of self-care and coping skills, which have not previously been reported.

Before the implementation of the College self-care program, the College had anecdotal evidence that some students did not wish to seek healthcare in relation to mental health because they had career progression concerns of being reported to the Australian Health Practitioner Regulation Agency (AHPRA).[27] Section 5 of the AHPRA Guidelines for Mandatory Notification, is specific to notification about impaired students. A mandatory notification occurs if a student is in a clinical setting, has a physical or mental illness, and there is a belief the student is a risk to patients. The study findings show post-program, more than 80% of the 422 student participants across the College from 2016 to 2018 agreed that the mindfulness program had helped them to reduce the stigma around seeking healthcare in relation to mental health.

In addition, by the end of the academic year, almost two-thirds (60%) of College students were using mindfulness techniques regularly in their day-to-day life. The study also shows that students using mindfulness techniques are significantly more likely to understand how to take better care of themselves and believe they can improve their own wellbeing. Even in those students not using mindfulness techniques in their day-to-day life, almost a half reported the program has helped them take better care of themselves, and almost two thirds reported the program has helped them to believe they can improve their own wellbeing. These findings imply that for the proportion of students who are practicing mindfulness techniques on a day-to-day basis, the program has encouraged them to internalize their beliefs in themselves and to foster/maintain wellbeing, rather than being mechanistically or procedurally taught to foster/maintain wellbeing. These results are a testament to the mindfulness component of the program.

The current study also investigated whether the mindfulness training outcomes of self-care and coping differed between genders. Regarding self-care, the College results suggest that male students benefitted more from learning about how to take care of themselves and the impact that social media has on self-care than female students. In Australia, young women are the most prolific users of social media with an average of 2 hours more per week than men.[28] However, these results may be at least partly due to the culture of half of Australian young men playing online games compared to a third of young women.[29] In addition, the results suggest that male students also appear to benefit more in learning how to develop adaptive coping skills for stressful situations and practical relaxation techniques to reduce stress than female students. These research findings that male students are benefitting more than females in mindfulness training outcomes are not consistent with previous studies on university-level mindfulness training.[30]

Among the College students who completed both pre-post self-care program surveys, there was a significant reduction post program in students' ability to self-identify when they are in stress, with about a quarter of the students moving into 'neutral' in their ability to self-identify. These findings may imply that the concept of self-identifying when in stress, has been revealed (via the program) to be a much more complex set of psychological, behavioral and physiological factors than previously understood by the students. Thus, the students are either more realistic about their ability to self-identify, or they feel less able to evaluate all the influencing factors of stress. In addition, students who completed both pre-post self-care program surveys significantly increased, post-program, the amount of

student who agreed they could reduce their study related stress, as well as reduce their exam related stress. As the national trend shows that 50% of first year students who consider discontinuing or deferring do so due to the fear of failing,[31] these College wide student results in both study and exam related stress are encouraging.

Further, data from the pre and post self-care program surveys, indicates an increase in the number of students who perceive they have developed both effective coping skills and skills to build life-long resiliency. For medicine students, there was no significant change in resiliency; however, for pharmacy and dentistry students there was a significant increase in developing skills to build life-long resiliency. The term resilience has many meanings and has a theoretical basis in psychological, sociological, ethical, and moral perspectives with many definitions.[32] The main objective of the self-care program relating to building resiliency is to support the student's future psychological wellbeing and teach them how to learn from and find meaning in psychological threats. For the medicine students, it is speculated that the reduction in both study and exam related stress and increase in coping skills has achieved this.

5. Limitations

The key limitation of the study is the potential for selection bias due to the pre-post survey response rate (approximately 50%). However, the distribution of first-year student participants (65% aged <19 and 61% female) is very similar to the overall College student cohort demographics reducing the potential for selection bias. In addition, the pre-post surveys evaluating the changes in students' beliefs, attitudes and behaviors were developed by the College researchers and not tested for reliability or validity, as they were developed for education quality control, with the results being used to continually review the program and its expected outcomes.

6. Conclusions

The results indicate that a well thought out Health Professional Self-Care program can assist students in identifying stressors and equipping them with appropriate coping strategies. Key indicators of success with health students are employing an appropriately skilled lecturer/facilitator and highlighting the scientific evidence underlying the successful implementation of these coping strategies.

7. Lessons learned

Key lessons learned during development and implementation of the CMD first year Health Professional Self-Care program:

- Mindfulness providers should be experienced, with both psychology and mindfulness framework (such as yoga or vipassana) qualifications and have worked with vulnerable people, plus have a personal daily mindfulness practice in which to draw from when teaching the students
- Where possible try to limit numbers of participants in each group to less than 50. This can enable a more experiential and interactive session to flow and be more responsive to the students' questions and needs. This may mean that the same lesson is taught a number of times to different students; however, the benefit to student learning and outcomes outweighs the barriers.
- For health students, who have strong backgrounds in science, ensure the program has a strong evidence base in neuroscience and psychology research to remove any student's beliefs of mindfulness intervention programs being soft, fuzzy or spiritual.
- Develop a good balance between academic structure and teaching versus practical mindfulness techniques and exercises. The weekly 1-hour sessions are a balance of 10–15 min of learning followed by 3–5 min of mindfulness technique practice.
- Be mindful of timetable scheduling. If possible, ensure that each session is no more than 1 hour and scheduled towards the start of the day and not in same space as they receive lectures.

Funding

In the pilot year of this program, this research received a not-for-profit Teaching and Learning Development Grant from James Cook University, Australia.

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