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ORIGINAL PAPER

Enhancing the health of medical students: outcomes of an integrated mindfulness and lifestyle program

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Abstract Medical students experience various stresses and many poor health behaviours. Previous studies consistently show that student wellbeing is at its lowest pre-exam. Little core-curriculum is traditionally dedicated to providing self-care skills for medical students. This paper describes the development, implementation and outcomes of the Health Enhancement Program (HEP) at Monash University. It comprises mindfulness and ESSENCE lifestyle programs, is experientially-based, and integrates with biomedical sciences, clinical skills and assessment. This study measured the program's impact on medical student psychological distress and quality of life. A cohort study performed on the 2006 first-year intake measured effects of the HEP on various markers of wellbeing. Instruments used were the depression, anxiety and hostility subscales of the Symptom Checklist-90-R incorporating the Global Severity Index (GSI) and the WHO Quality of Life (WHOQOL) questionnaire. Pre-course data (T1) was gathered mid-semester and post-course data (T2) corresponded with pre-exam week. To examine differences between T1 and T2 repeated measures ANOVA was used for the GSI and two separate repeated measures MANOVAs were used to examine changes in the subscales of the SCL-90-R and the WHOQOL-BREF. Follow-up *t*-tests were conducted to examine differences between individual subscales. A total of 148 of an eligible 270 students returned data at T1 and T2

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giving a response rate of 55%. 90.5% of students reported personally applying the mindfulness practices. Improved student wellbeing was noted on all measures and reached statistical significance for the depression (mean T1 = 0.91, T2 = 0.78; $p = 0.01$) and hostility (0.62, 0.49; 0.03) subscales and the GSI (0.73, 0.64; 0.02) of the SCL-90, but not the anxiety subscale (0.62, 0.54; 0.11). Statistically significant results were also found for the psychological domain (62.42, 65.62; $p < 0.001$) but not the physical domain (69.11, 70.90; $p = 0.07$) of the WHOQOL. This study is the first to demonstrate an overall improvement in medical student wellbeing during the pre-exam period suggesting that the common decline in wellbeing is avoidable. Although the findings of this study indicate the potential for improving student wellbeing at the same time as meeting important learning objectives, the limitations in study design due to the current duration of follow-up and lack of a control group means that the data should be interpreted with caution. Future research should be directed at determining the contribution of individual program components, long-term outcomes, and impacts on future attitudes and clinical practice.

Keywords Medical students · Medical education · Stress management · Lifestyle · Mindfulness

Introduction

It is commonly observed that medical students and doctors experience high rates of psychological morbidity (Stewart et al. 1995; Dyrbye et al. 2006). Although medical students are similar to the general student population prior to commencement of their courses (Singh et al. 2004) stress becomes increasingly important after training begins (Guthrie et al. 1995) and compared with other academic disciplines medical students demonstrate more significant reductions in psychological wellbeing (Aketin et al. 2001). This pattern manifests from first year with stress, depression and burnout being common (Dyrbye et al. 2005). Anxiety is highest in pre-exam periods and depression escalates after commencement of medical training (Dyrbye et al. 2006).

Many factors predispose students to depression including ethnicity, study demands, gender (Dyrbye et al. 2006)—female students are more at risk—and performance-anxiety (Chandavarkar et al. 2007) with recent data from Duke University Medical School putting the prevalence of depression among undergraduates at close to 20% overall, and 25% for some ethnic sub-groups such as Hispanic students (Rosenthal and Okie 2005). This is higher than the general population with rates of 17–18% (Fergusson et al. 2005) and consistent with previous findings (Givens and Tija 2002). Commonly cited stressors include "talking to psychiatric patients", "effects on personal life", "presenting cases", "dealing with death and suffering" and relationship with clinical teachers (Firth 1986). In later clinical life depression among hospital residents has been linked to significantly more medical prescribing errors (Fahrenkopf et al. 2008).

Stress may be a contributing factor for unhealthy behaviours and co-morbidities. It is estimated that up to 45% of medical students abuse alcohol mostly through binge drinking. Use of illicit substances, mostly marijuana (Newbury-Birch et al. 2000) but also other illicit drugs, is common (Webb et al. 1998). Later, sleep deprivation and the ready availability of sedatives can predispose to abuse problems (Baldwin and Daugherty 2004), poor lifestyle and medical errors. Other aspects of student health and lifestyle, such as reduced physical activity and poor diet, also suffer with increasing workload (Ball and Bax

2002). Denial, common among graduate physicians, no doubt affects the environment into which medical students are indoctrinated (Sexton et al. 2000).

Predictably, burnout and psychiatric morbidity in new medical graduates is common. In a recent Australian study it was found that during internship the peak point-prevalence of burnout assessed with the Maslach Burnout Inventory was 75% 8 months into internship, and 73% met criteria for psychiatric morbidity on at least one occasion (Willcock et al. 2004). Not surprisingly, an inability to deal with personal stress negatively impacts upon the ability to deliver compassionate medical care (Rosenzweig et al. 2003).

Few comprehensive, integrated student wellbeing programs are built into core-curriculum (Moss and Smith 2006). A systematic review of the literature on stress management interventions for medical students (Shapiro et al. 2000) discussed two trials on optional mindfulness-based stress reduction (MBSR) programs. They found reduced self-reported state and trait anxiety, psychological distress and depression, and increased scores for empathy, control, and spiritual experiences and markers of physical health (Shapiro et al. 1998; Astin 1997). A more recent controlled trial demonstrated that students trained in MBSR scored significantly lower in mood disturbance than controls (Rosenzweig et al. 2003). Although these findings for medical student populations have been positive, reviews suggest that evidence is still equivocal regarding consistent effects of mindfulness-based interventions on anxiety and depression (Toneatto and Nguyen 2007). Self-selection is a potential factor affecting the outcome in these trials as students might volunteer for such programs if they are more sympathetic to mindfulness practice. To date the Monash program is the first mindfulness-based program to be integrated into core-curriculum and therefore there have been no prior studies with which to compare.

There is growing interest in the potential for mindfulness to enhance clinical performance. Some evidence suggests that mindfulness facilitates the development of empathy and compassion, better clinical decision-making (Epstein 1999), is associated with Emotional Intelligence (high self-awareness, self-regulation, motivation, empathy and social skills), improves immunity and has effects on neural plasticity (Davidson et al. 2003). Early training in self-care may provide a foundation for later clinical and professional skills (Epstein and Hassed 2008) and reduce the level of medical errors although these hypotheses are untested.

Mindfulness involves attention regulation and being in the present moment. It is based on the premise that while both pleasant and unpleasant experiences arise in daily life, the habit of judging or resisting those experiences heightens their impact. Thus acceptance is also a core element of mindfulness practice. Mindfulness meditation is the cornerstone of fostering mindfulness in day-to-day life. There are a variety of mindfulness-based interventions. The two best known are MBSR (Kabat-Zinn 2005) and Mindfulness-Based Cognitive Therapy (MBCT) (Segal et al. 2002). The program implemented at Monash was independently developed in the early 1990s and used at under-graduate and post-graduate levels since then. The ESSENCE lifestyle program, described later, has also been developed within the Monash curriculum.

Through the Health Enhancement Program (HEP) the new theme-based 5-year undergraduate medical curriculum at Monash University—begun in 2002—attempted to reinforce previous efforts to foster student wellbeing and enhancing holistic medical education (Hassed 2004). Subsequently, other medical schools have begun using the HEP and the Monash mindfulness program has been incorporated into the optional self-care workshops for Harvard medical students (Rosenthal and Okie 2005).

This paper reports on a pre–post-test study of the 2006 first year cohort of Monash medical students which measured the impact of the HEP upon medical student's

psychological distress and quality of life. This current study did not evaluate elements of the HEP such as student satisfaction and implementation. Unpublished evaluation data from a previous cohort found that on a 5-point scale the HEP was rated as "somewhat-3" to "extremely-5" enjoyable, useful, instructive, relevant and interesting by 90, 84, 82, 84 and 90%, respectively. Student attendance at tutorials was consistently over 90%.

Methods

Participants

Participants were 148 (85 female and 63 male) of an eligible cohort of 270 first-year undergraduate medical students from Monash University in the age range of 18–22 years (M = 18.77, SD = 1.10). Being classified as 'minors', 40 students under 18 years of age were excluded from the study. Participant nationality was diverse with 56.1% of students identifying themselves as Australian and 43.9% from various countries mostly in the Asia-Pacific region. Participation in this study was voluntary.

The intervention: the Health Enhancement Program (HEP)

The Health Enhancement Program is core-curriculum and a part of the Personal and Professional Development theme. It occurs in the second half of first semester of first year. (The HEP objectives are summarized in Table 1.) A description of the HEP is provided below.

There are eight lectures providing an overview of the HEP covering its relevance, the evidence-base linking mental and physical health, mind-body medicine, behaviour change strategies, mindfulness-based therapies, and the ESSENCE lifestyle program (Table 2). Lectures are supported by six 2-h tutorials and the 20 tutorial groups have 15–16 participants. Tutorial content includes 1 h on the Stress Release Program (SRP) and 1 h dedicated successively to other ESSENCE elements. Participants in each tutorial received the same intervention although they had different tutors. The 12 tutors were selected because of their personal commitment to the content and professional experience in small group teaching, behaviour change and mindfulness-based strategies. Tutors were trained (3-h tutor briefing and personal experience of HEP) and supervised in mindfulness-based therapies and were encouraged to maintain their own mindfulness practice. Face-to-face

Table 1 Objectives of the Health Enhancement Program

The objectives of the Health Enhancement Program are to foster behaviours, attitudes, skills and knowledge conducive to:
• Learning personal self-care strategies for managing stress and maintaining a healthy lifestyle
• Enhancing student's physical health
• Laying the foundations for clinical skills in stress and lifestyle management
• Integrating HEP content with biomedical, psychological and social sciences
• Understanding the mind-body relationship
• Developing a holistic approach to healthcare
• Developing a supportive environment among the student body
• Enhancing performance

Table 2 The ESSENCE lifestyle model

Education: the importance of knowledge and reflection
Stress management: the importance of mental health. Intervention covered in the mindfulness program
Spirituality: the role of meaning and/or spirituality on coping, health and illness
Exercise: the importance and application of physical activity
Nutrition: the role of healthy nutrition and the influences on eating patterns
Connectedness: the role of social support for wellbeing and healthcare
Environment: creating a healthy physical, emotional and social environment

teaching is supported with self-directed learning and all students are required to complete the program.

The Stress Release Program: a mindfulness-based stress management and cognitive therapy program

Since 1991 the SRP had been successfully implemented as a student elective with some limited core-curricula time. It had also been used in postgraduate training courses through the Royal Australian College of General Practitioners, and by distance learning through the Monash Diploma of Family Medicine. The SRP incorporates mindfulness practices and a series of related cognitive strategies (Table 3) which raise awareness of the processes underpinning stress, negative emotions and poor performance. Weekly 'homework' is given in the form of personally applying the mindfulness strategies. The following week the group discusses their experiences and insights. Class discussion is driven by the

Table 3 A brief summary of the Stress Release Program (SRP) (Hassed 2002): a mindfulness-based stress management and cognitive therapy program

Mindfulness meditation practice: Students are recommended to punctuate the day with two 5-min "full stops" and as many 15–30-s "commas" as needed. They can increase the duration and frequency of practice according to need and motivation

Mindfulness-based cognitive tasks: These tasks are set as homework each week and students discuss their insights and experiences the following week. In the modified Monash program Tasks 1, 2, 3 and 7 are set as the four weekly tasks

1. Perception: are events inherently stressful or stressful depending on how they are perceived?
2. Letting go and acceptance: do thoughts, feelings and events inevitably cause stress, or is it our relationship and attitude to them?
3. Presence of mind: what is the effect of being more in the present moment through a connectedness to the senses rather than preoccupied with the past and future?
4. Limitations: do we impose much stress and avoidant behaviour on ourselves with unexamined, unreasonable and limiting ideas about ourselves?
5. Listening: does much stress and depression originate in the unconscious mental chatter we listen to, and do we have a choice whether to listen to it or not?
6. Self-discipline: what is the cause and effect of not getting on with things when we need to, and not stopping when we need to?
7. Emotions: without suppressing emotions or criticizing their presence, can we be cultivate a wiser choice as to which ones to entertain and act upon?
8. Expanding self-interest: what is the effect of being more interested in and responsive to the needs of those in our daily environment?

questions, issues and insights of the students, not the tutor. Support materials include a student manual, course text (Hassed 2002) and a 2-CD set.

The ESSENCE lifestyle program

Each week an ESSENCE topic is explored by the group and, without self-criticism, students examine their own behaviours, motivations and attitudes promoting or obstructing a healthy lifestyle. The approach taken is to foster awareness, conscious choice, empathy, and behaviour-change strategies. These include the Prochaska and DiClemente's Stages of Change Algorithm (i.e. pre-contemplation to contemplation etc.) and the SAME model of goal-setting (Specific, Achievable, Measurable, Enjoyable). Students set their own agenda, rate of progress and goals in applying these strategies to themselves.

Throughout the HEP students keep a personal journal. Formative assessment tasks and readings reinforce integration of the experiential components with the biomedical sciences and clinical applications. Journals are handed in to the tutor who returns them with feedback and encouragement the following week. The approach to self-care and building clinical skills is pragmatic and relies heavily on the tutorial working as a support group. Students are not expected to accept or reject material or principles, but to test them in experience. The level of personal application remains entirely the choice of individual students. Experiential learning is seen as the most effective way to achieve deep learning, integration, empathy, and personal benefit. Mindfulness and healthy lifestyle change are encouraged but not coerced. Privacy is respected and students are never encouraged to say anything that they are not comfortable to share in tutorials or journals. If students identify themselves as having significant mental-health, behavioural, academic or drug problems they are referred to the student support counselling service as the program is designed to be preventive or an intervention for mild to moderate problems only.

Although the great majority of students report finding the HEP enjoyable and relevant, some find it philosophically challenging and not what they expected from a traditional course in biomedicine. Care is taken to deliver it in such a way that it is seen as integral to clinical medicine. Strategies to enhance this are:

1. An evidence-based lecture series including the scientific foundations of mind-body medicine, neuroscience, psychoneuroimmunology, and lifestyle-based interventions is provided to support the experiential tutorial content.
2. Core knowledge is integrated into weekly case-based learning to demonstrate clinical application.
3. Assessment is integrated with other components of the medical course.

Although personal application is optional, core content and skills are examinable. The journal and personal application are formatively assessed. Summative assessment of the student's ability to understand and apply core knowledge and skills ensures a basic level of competency and comprehension. All written exams and OSCE exams in the Monash course are integrated across themes. MCQ and short answer questions are included in written exams and an OSCE station based on HEP content arises in the end of year OSCE exam where, for example, a student is put in the position of having to help a role-playing patient implement behaviour change, to explain the relationship of stress and health, or discuss mindfulness-based stress management.

Materials

The Symptom Checklist-90-Revised[1] (SCL-90-R) (Derogatis 1994) comprises 90 items, rated on a 5-point Likert scale. It has nine subscales and of these, the Depression (DEP), Anxiety (ANX) and Hostility (HOS) subscales were included in this study based on the literature on psychological health in medical students and the psychological effects of mindfulness interventions. Together, these subscales provide a measure of overall psychological distress—the General Severity Index (GSI). The World Health Organisation Quality of Life (WHOQOL)-BREF[2] (Australian version) (Murphy et al. 2000) comprises 26 items rated on a 5-point Likert scale. Of the four subscales data from the Physical and Psychological subscales were the domains of interest.

Procedure

Participants were measured twice. Pre-intervention (Time-1) was mid-semester one, immediately prior to the HEP and after student's initial transition to university studies. Post-intervention (Time-2) was 6 weeks later at the end of semester which was also the pre-exam week. All participants completed paper-based questionnaires which were distributed, completed and collected at the commencement of the first tutorial (T1) and at the completion of the final tutorial (T2). They also constructed their own unique identity code to ensure that participants could be compared pre- and post-intervention whilst maintaining anonymity.

Data treatment and analysis

Data were analysed using SPSS Version 14. To examine differences in scores between T1 and T2 repeated measures analyses of variance were used. A repeated measures ANOVA was used to examine changes in scores on the GSI. Two separate repeated measures MANOVAs were used to examine changes in the subscales of the SCL-90-R and the WHOQOL-BREF. In the first, the depression, anxiety and hostility subscales of the SCL-90-R were entered as dependent variables and in the second the psychological and physical quality of life domains were entered as dependent variables. Where significant multivariate effects were found, follow-up *t*-tests were conducted to examine differences between individual subscales.[3]

[1] Internal consistency reliability is satisfactory, ranging from $\alpha = 0.77$ for Psychoticism to $\alpha = 0.90$ for Depression. Test–retest reliability coefficients are appropriate, ranging from $r = 0.78$ for Hostility to $r = 0.90$ for Phobic Anxiety. Validity has been supported by good convergence between similar constructs and good discrimination between dissimilar constructs in other well-established multidimensional measures of psychopathology such as the MMPI, MHQ, GHQ-28, and PSE.

[2] Internal consistency is adequate with Cronbach α's ranging from 0.6 to 0.9, except for social relationships. Test–retest reliability is good, ranging from $r = 0.83$ to $r = 0.86$ for each of the subscales. Construct validity is acceptable when compared with SF-36, AQoL, EQ5D, HUI3, and 15D. Discriminant validity is supported with highly significant differences in all four domains found between groups distinguished by health status.

[3] The conservative Mauchly's Test of Sphericity was violated for all analyses and therefore, significance of the tests were examined using Huynh-Feldt Epsilon correction. Evaluation of assumptions was undertaken to reduce skewness, reduce the number of outliers, and improve normality, linearity, and homoscedasticity of residuals. Transformations of variables which violated these assumptions were undertaken. Using Mahalanobis distance with $p < 0.001$, no cases were identified as multivariate outliers. Inspection of variance inflation factors indicated that multicollinearity was not an issue.

Results

Of the eligible student cohort of 270 students, 239 completed questionnaires at T1 and 162 at T2. Although 155 students completed questionnaires at both T1 and T2, outliers were detected in the data on mindfulness practice for seven of those students and were excluded, leaving a sample of 148.

Means and standard deviations were calculated for each of the psychological measures at T1 and T2. Table 4 displays these scores and the normative reference scores for adolescents. Notable observations from these mean scores are that, compared to normative data, at T1 mean depression scores were higher in the present sample, whereas hostility scores were lower. However, at T2 mean scores for both these variables had decreased and depression scores were comparable to normative scores, whilst the mean score for hostility was substantially reduced. At T2 all mean scores on the SCL-90-R were well below those found in the normative sample. Mean scores on the WHOQOL-BREF were much lower than those of the normative reference group at T1 and T2. Increases in the medical students' mean scores across these time points were observed.

The repeated measures ANOVA for GSI scores revealed a significant effect for time, $F(1,147) = 9.98$, $p = 0.00$, $\eta^2 = 0.06$, $\beta - 1 = 0.88$. Repeated measures MANOVA for the depression, anxiety and hostility subscales of the SCL-90, and the physical and psychological domains each showed significant effects for time with Huynh-Feldt Epsilon correction, $F(3.27,\ 480.41) = 18.78$, $p = 00$, $\eta^2 = 0.39$, $\beta - 1 = 1.00$; and $F(2.41, 354.86) = 22.24$, $p = 00$, $\eta^2 = 0.13$, $\beta - 1 = 1.00$, respectively.

A follow-up *t*-test revealed that the main effect for GSI scores was due to lower scores at T2 than T1. Similarly, follow-up *t*-tests showed significant improvements on the depression and hostility scales of the SCL-90, but the decrease in mean scores for anxiety was not statistically significant. Follow-up *t*-tests also revealed a significant improvement in mean scores on the psychological domain of the WHOQOL-BREF scale, and a trend towards improved physical health (a summary of the *t*-tests is displayed in Table 5).

Discussion

The current study suggests that the program has a beneficial effect on student physical and psychological wellbeing although the data needs to be interpreted with cautious optimism. The literature consistently reports that markers of medical student wellbeing deteriorate

Table 4 Means (*M*) and standard deviations (*SD*) for psychometric measures at T1 and T2 and normative data for adolescents

Variable	Time 1		Time 2		Normative data	
	M	*SD*	*M*	*SD*	*M*	*SD*
SCL-90						
Depression	0.91	0.79	0.78	0.68	0.80	
Anxiety	0.62	0.65	0.54	0.63	0.66	
Hostility	0.62	0.70	0.49	0.56	0.88	
GSI	0.73	0.57	0.64	0.56	0.76	
WHOQOL-BREF						
Psychological	62.42	15.43	65.62	16.11	71.40	17.50
Physical	69.11	12.81	70.90	14.52	85.40	10.90

Note: Normative data for QOL domains from Hawthorne, Herrman and Murphy (2006), based on a sample of $N = 47$, ages 20–29

Table 5 Summary of follow-up paired samples t-tests for psychometric measures across T1 and T2

Variable	*t*	df	Sig (two-tailed)
SCL-90			
Depression	2.49	147	0.01
Anxiety	1.63	147	0.11
Hostility	2.22	147	0.03
GSI	2.32	147	0.02
WHOQOL-BREF			
Psychological	−3.37	147	0.00
Physical	−1.82	147	0.07

with time with the lowest point being found in pre-exam periods. Therefore even if our data had shown that student wellbeing had stayed steady throughout the semester this would still have been an encouraging finding. To this date, no study has yet reported on a program delivered to a whole cohort as an integrated part of core-curriculum which demonstrates enhancement of medical student psychological and physical wellbeing at a time when it would be expected to be at its lowest.

The fact that we found improvements in wellbeing across the two time points is a positive and promising result, particularly in light of the fact that the students did not self-select to participate in the program although self-selection could be a factor affecting participation in the study.

The program is delivered to all students and so motivation, need and insight no doubt varies. The strength of the program—that it is delivered to the whole student cohort—is also a potential methodological weakness of the study in that we do not have a control group to compare to making it difficult to state definitively whether the intervention was causal with regard to changes in outcome variables. Comparisons can be made with the consistent picture built up in the literature but there is the possibility that confounding variables impacted upon the findings such as the selection processes, curriculum structure and delivery, and natural adjustment to university life. Not having a valid control group is a problem encountered whenever studying outcomes of any element of core-curriculum. Medical schools looking to introduce a program such as the HEP may wish to begin by performing a randomized controlled trial or wait-list half the cohort.

The lower response rate at T2 was attributed to the close proximity of exams as well as "evaluation-fatigue" considering the number of questionnaires students complete during routine curriculum evaluation.

Our data found that 16.9% of participants reported they had a mindfulness practice at T1 but that 90.5% practiced the mindfulness exercises at least once a week at T2 although many applied them episodically rather than as a regular discipline. Variable compliance in a program with a heavy emphasis on experiential learning may be affected by a range of factors such as learning style and avoidance. Further studies could examine the relationship between compliance, learning styles and outcomes. Although it might be assumed that those who applied the strategies more would benefit more, this cannot be ascertained with certainty from the present data. Similarly, the present data did not permit identification of the particular components of the HEP that might have been most useful or the ways in which these components might act synergistically. It is likely that the mindfulness component helps to facilitate other lifestyle changes, such as increasing exercise, which also impact upon mental and physical health. Stress management is often a catalyst for other improvements in lifestyle.

The data presented here may simply indicate an "afterglow effect" although, considering previous studies on medical student stress and wellbeing, there are reasons to expect that the week before exams is a time when wellbeing would be at its lowest. Seasonal effects would also count against a trend towards better mental health in the middle of the year, being winter in Australia. There may also be variation in outcomes across groups which were not measured reflecting individual group dynamics or differences in tutor performance. It is also unknown whether the findings would be similar in an older cohort of post-graduate students.

This study only followed students for a 6-week period and longer-term follow-up is planned. Conclusions about long-term benefits should be interpreted with caution. Reinforcement in later years of the course will be desirable at the point of exit of the medical course prior to internship. Measuring impact upon outcomes like suicide rates, higher among doctors than the general population (Lindeman et al. 1996), should also be an aim of future research.

Tutor selection is important especially in a program where tutors need specialized skills—such as mindfulness training—and they will be serving as role-models. Tutors are selected on the basis of being experienced with mindfulness-based therapies and behaviour-change strategies, and having a personal commitment to wellness. Their backgrounds include medical practitioners, psychologists and lifestyle counsellors. Tutor training, supervision and support are important elements in making a course such as HEP work and weekly pre-tutorial briefings and post-tutorial debriefings refine skills and deal with questions.

The HEP is aimed at providing students with a holistic model of healthcare and positive attitudes to illness prevention. Future research could be directed at measuring whether these aims are being realized.

The language used in the delivery is also integral to engaging and motivating students. For example, it is important to:

- Avoid jargon and use simple language and everyday examples to illustrate key principles.
- Make the material relevant to the student's personal needs.
- Be inclusive and respectful of cultural and religious diversity.
- Present material in a non-threatening way including humour.
- Avoid imposing material but invite inquiry and exploration.

Conclusion

Our data and experience suggest that self-care in the form of mindfulness-based stress management and lifestyle programs can improve student wellbeing, even during high stress periods. Further, it can help meet other important and integrated educational objectives. For such a program to be most effective the method of delivery and integration with clinical skills and biomedical knowledge are important lest such programs become marginalized in already busy curricula. It should doubtless be the aim of any medical course to have its students graduating healthier and more resilient than when they came into it especially considering the aims of the profession, the ethic of care it espouses, and the level of knowledge that students attain. There will always be challenges inherent in medical practice and so resilience, balance, peer-support, self-care, and knowing when to seek help are core competencies for modern medical graduates.

Practice points

1. Although medical students experience high rates of stress, depression and related co-morbidities medical education has tended to ignore training in self-care skills.
2. Self-care can be most successfully integrated into core curriculum if it is integrated with biomedical knowledge, clinical skills and assessment.
3. An experientially-based mindfulness-based stress management and lifestyle program can improve wellbeing of a medical student cohort even in the pre-exam period.
4. Increasing levels of stress and reductions in medical student wellbeing may not be an unavoidable part of the medical student experience.
5. Future research should focus on measuring longer-term outcomes, the relative importance of individual components of the program and whether such programs have effects on future clinical practice.

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