Does the intervention of mindfulness reduce levels of burnout and compassion fatigue and increase resilience in pre-registration students? A pilot study

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*Title Page (with author details)

Does the intervention of mindfulness reduce levels of burnout and compassion fatigue and increase resilience in pre-registration students? A pilot study

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***Abstract**

Abstract

Introduction: In the current clinical working environment it is important that therapeutic radiography students are fully prepared not just clinically but emotionally for a working professional life. Mindfulness has shown promise in the improvement of burnout, resilience and compassion fatigue in other professions; however, it has not been used with therapeutic radiography students.

Methods: Eight pre-registration therapeutic radiography students were recruited to undergo a five week mindfulness course; six students from the year below were recruited to act as a control arm (no mindfulness). Data was collected using a series of validated tools at baseline, week five, month three and 12 months after the start of the study:

1. The five-facet mindfulness short form questionnaire (FFMQ-SF) [1]
2. Maslach Burnout Inventory Student Survey (MBI-SS) [2]
3. Professional Quality of Life (ProQOL) 5 questionnaire [3]
4. Connor Davidson Resilience-short form scale (CD-RISC) [4]

Results: The MBI-SS scale demonstrated 29% of the sample experienced emotional exhaustion and 43% increased cynicism. The other tools showed a positive trend with the intervention; however, these were not statistically significant.

Conclusion: Although no statistically significant differences were demonstrated between the study arms, some interesting trends have been noted. The key finding was the identification of burnout experienced by almost a third of the study sample. This suggests that a new area of study is warranted to further investigate the factors contributing to burnout in the student population.

Keywords: Mindfulness, Burnout, Resilience, Compassion Fatigue, Radiotherapy Students

***Highlights (for review)**

- Development of self-care strategies should start when health care staff begin their training
- It is imperative that education institutions address the importance of the potential for burnout in students
- Burnout is an issue in student therapeutic radiographers

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Abstract

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Introduction

Mindfulness is the ability to pay attention to the present moment with awareness and without being judgemental [5]. The mindfulness intervention literature indicates it has many benefits not only on a personal level but also professionally and can be utilised as a self-care strategy. Prior research has supported the inclusion of a self-care intervention in healthcare students, including therapeutic radiography students [6, 7]. Furthermore, mindfulness training is recommended for undergraduate doctors [8] and in the training of NHS staff [9] to aid their ability to cope in the modern healthcare environment.

Literature review

Training and working in Healthcare exposes individuals to work based stressors [6].There is a limited amount of research evidence examining the impact of mindfulness for healthcare students[10] with evidence of a positive outcome with this intervention. Shapiro, Schwartz and Bonner (1998)[11] were the first to investigate the benefits of a mindfulness intervention in medical and pre-medical students. The results indicated an increase in empathy ($P<0.001$); supported by a study by Beitel, Ferrer and Cecero (2005)[12] that demonstrated a reduction in stress related issues (decrease in anxiety $P<0.001$ and depression $P<0.05$). Beddoe and O'Murphy (2004)[13] investigated the use of mindfulness for increasing empathy and decreasing stress in nursing students. The results identified that 75% of students found mindfulness techniques beneficial in reducing their stress levels, with a 40-50% increase in empathy scores after the intervention. These studies had a variety of aims; a range of professions participated and included a selection of validated assessment tools. Therefore, it is not clear what benefit mindfulness would have on therapeutic radiography students who have specific training demands. In addition, the majority of this research has been conducted in the US and Australasia, perhaps limiting their application to the UK context where training may be different.

One of the key roles of the therapeutic radiographer is care of the patient throughout the radiotherapy pathway. This can be intense and result in effects such as burnout, and compassion fatigue [14]. It is recognised that the ability to avoid burnout and compassion fatigue maybe influenced both by organisational support and individual resilience [6]. Furthermore, it is suggested that the development of self-care strategies should start when health care staff begin their training, allowing them to develop skills ready for practice. A variety of definitions for burnout, compassion fatigue and resilience exist in the published literature, for the purpose of this study the following definitions are adopted.

Burnout is referred to as: "a syndrome of emotional exhaustion, de-personalization and reduced personal accomplishment amongst individuals who work with people" [6]. A recent study into the therapeutic radiography workforce have highlighted that a substantial proportion of the workforce are suffering from burnout [15]. This is further supported by Hutton et al., (2014)[16], who also indicate the negative effect burnout can have on the student population training in the clinical setting. Both studies showed an average 38% burnout rate in qualified staff. The issue of burnout within the profession is a global issue with burnout identified in radiation therapists in the US [17], Canada [7], Australia [18] and New Zealand [19]. These studies focus on the prevalence of burnout in the profession and many recommend the development of interventions to support staff [15;16;17;19].

Compassion fatigue is closely correlated with burnout. Compassion fatigue is a term coined by Figley[20] "a state of exhaustion and dysfunction (biological, psychologically and socially) as a result of prolonged exposure to compassion stress". Gillies et al., (2014)[7] examined the prevalence and potential for developing both burnout and compassion fatigue in therapeutic radiographers. The results showed as compassion levels decreased burnout increased, highlighting the need to support clinical staff with their emotional well-being.

In contrast to burnout and compassion fatigue the definition of resilience in the literature is described in a less consistent way [7]. For the context of this study resilience can be described as hardiness and ability to cope in adversity [21].The study by Probst et al., (2014)[6] investigated the development of resilience in early career practitioners; identifying a multi-modal model for the factors that help or hinder the development of resilience including:

- Transitions such as moving from home to University
- Organisational and systemic issues, for example bureaucracy, and being treated fairly
- Personal qualities including confidence and positivity
- Professionality-agency, commitment, moral purpose and values
- Timing, for example pre-training, training, post qualification, experienced.

Addressing the issues with an intervention to improve an individual's coping strategies could have a positive impact on attrition not only in the profession, but if taught during training as recommended by Probst et al (2014)[6], this could improve retention in training programmes. Investigating the student's current ability to cope allows greater awareness of the issues to allow further development of the curriculum to enhance resilience to ensure longevity in a student's career.

Study Aims

This pilot study intended to explore how mindfulness, as a self-care strategy, may influence resilience, compassion fatigue and burnout in pre-registration students.

The aim of the study was to investigate the impact of the five week Living Mindfully 'Mindfulness Based Stress Reduction' (MBSR) programme on pre-registration students in one education establishment. The study aimed to answer the following research questions:

1. Does a mindfulness intervention lead to a reduction in burnout and compassion fatigue?
2. Can increased mindfulness enhance resilience?
3. Does the mindfulness intervention increase mindfulness in pre-registration students?

Method

A pre/post-test pilot study was used to investigate the relationship between the intervention of the five-week Living Mindfully MBSR programme and its effect on burnout, compassion fatigue and resilience in pre-registration therapeutic radiography students. The original programme is an eight-week course of weekly two and a half hour sessions covering a variety of meditation practices, reading and exercises [22]. For the purpose of this study the principle investigator utilised the recently researched five-week Living Mindfully MBSR programme which is based on the original Kabat-Zin course [23]. The programme was delivered by an experienced mindfulness teacher, **********.

Recruitment

Ethical approval for the study was obtained from **********. The students were informed of the study by an impartial lecturer during a planned teaching session. All the participants signed a consent form prior to commencement of the study. Convenience sampling was utilised with 14 participants in total, eight in the intervention group and six in the control group. The control group was taken from year one of the Post Graduate Diploma in Radiotherapy and Oncology in Practice and the intervention group taken from year two of the same programme.

All participants agreeing to participate were offered the opportunity to gain a digital badge for their CPD portfolio as recognition of their involvement in the study. Before the start of the intervention the mindfulness practitioner completed a pre-course orientation with each individual participant to ensure they were able to complete the training. All students were provided with contact details for student support should they have required it at any point.

Data collection

Data was collected using validated tools at four time points: week 0 (baseline), week five, three months and 12 months post-intervention. At the start of the study the students were asked to complete five questionnaires:

1. A demographic questionnaire (age, gender, date of birth and contact details)
2. The five facet mindfulness short form questionnaire (FFMQ-SF) (to measure mindfulness)[1]
3. The Maslach Burnout Inventory Student Survey (MBI-SS) (to measure burnout) [2]

4. The Professional Quality of Life (ProQOL) 5 questionnaire (to measure compassion fatigue) [3].
5. The Connor Davidson Resilience-short form scale (CD-RISC) (to measure resilience)[4]

Each of the measures 2-5 above were then repeated at each subsequent time point. It is acknowledged that there was a risk of participant fatigue with the number of tools. However, it was anticipated that the tools would take no longer than 15-20 minutes to complete in total.

Reliability and validity

The titles of the tools remained unchanged and are all validated for the areas under investigation.

The five facet mindfulness questionnaire short form (FFMQ-SF) assesses five areas of general mindful behaviour: observing, describing, acting with awareness, non-judging and non-reactivity. It is a reliable and valid tool with Cronbach alpha coefficients ranging from 0.75 for non-reactivity to 0.87 for describing [11]. Although previously used with patients, it is designed to measure the characteristics of mindfulness, which are relevant to the general population.

The Maslach Burnout Inventory (MBI-SS) is a validated and well utilised tool for measuring burnout. An adapted inventory has been developed specifically for students, and used in a previous study by Galan et al (2011) and Fang et al (2012). This inventory looks at the dimension of emotional exhaustion, cynicism and lack of personal efficacy [24]. Specifically investigating the MBI-SS internal consistency for the three subscales are above 0.71 (Cronbach alpha) [2].

Professional Quality of Life (ProQOL) 5 is another validated tool with three subcategories: Compassion satisfaction, burnout and compassion fatigue. This tool was utilised by Gillies et al in 2014 to measure compassion fatigue in Therapeutic Radiographers. The Cronbach alpha coefficients are 0.87 (compassion satisfaction), 0.72 (burnout) and 0.80 (compassion fatigue) [3].

The Connor-Davidson Resilience scale (CD-RISC) is a valid 10 item tool used to measure resilience. The internal consistency of this measure has a Cronbach alpha co-efficient of 0.85 [4].There are a number of validated tools available to measure resilience however from a methodological review by Windle, Bennett and Noyes (2011) [26], the CD-RISC was the only measure to highlight changes over a period of time in relation to an intervention and is simple and easy to complete.

Data analysis

Due to the small sample size for this pilot study primarily descriptive statistics were produced using SPSS® (Version 21). The study design allowed for comparison between the intervention group and the control group via each of the tools at each time point. Data was compared at each time point and both actual scores and improvement in scores assessed over the period of the study were identified.

Results

Demographics

Overall, a total of 14 participants consented to participate in the study. There were eight individuals in the mindfulness intervention group and six in the control group. Within the mindfulness group there was an equal ratio of males to females. For the control group there were four female and two male participants. The age range for the mindfulness group was 24-40 years old with a mean age of 30 years. The control group had an age range of 21-44 years old with a mean age of 26 years. All participants in the mindfulness intervention group completed the five-week programme.

Mindfulness

The tool looks at five facets of mindfulness; Non-react (ability to watch without reacting), observe (observe more in the moment), act aware (ability to not get distracted), describe (able to describe feels more efficiently) and non-judging (not criticising self), the higher the score the more mindful the individual [1]. The results for the mindfulness tool showed an increase in mindfulness across most of the facets in both the intervention and the control group (Table 1.). All of the scores for the

intervention group increased from baseline to twelve months, apart from non-judge which saw a small decrease from 3 months, however this was still an increase from the baseline level.

The scores at five weeks, which would have coincided with the end of the mindfulness course, still show an increase in mindfulness across the intervention group. At three months the scores for the intervention showed a continued increase in mindfulness for all but non-react and act aware; however these scores recovered and increased at the twelve month time point.

Resilience

The mean data from CD-RISC showed a steady increase in resilience in the intervention group. Although the control group also improved overall, there was a reduction between month three and month 12 (Table. 2). The greatest improvement between baseline and 12 months was seen by the intervention group, but the differences seen between the groups are not statistically significant.

Compassion satisfaction

The mindfulness intervention group showed an increase in compassion satisfaction throughout the twelve months with the control group showing a reduction, with a dip at three months (Table 3). The ProQOL tool categorises the totals as 23-41 average and 42 or more as high compassion satisfaction. However, one of the participants gained higher satisfaction scores at week five and month three and then they reduced back to baseline at twelve months.

The average compassion satisfaction scores for the control group dropped steadily over the period up to three months, for the intervention group the average scores steadily raised; differences seen between the group scores are not statistically significant.

Burnout

Emotional Exhaustion (Table 4a)

Exhaustion scores for the control group (n=6) at baseline were 15.1 (SD=7.99) and 9.8 (SD=4.52) for the intervention group (n=8). At the final measurement point on month 12 these were 10.0 (SD=6.4) for the control group (n=6) and 6.4 (SD= 2.61) for the intervention group (n=8). Interestingly, the intervention groups (n=8) score was the highest at the 3 month point with 8.25 (SD=4.7). The control (n=6) peak was at 5 weeks with 14.3 (SD=9.07).

Cynicism (Table 4b)

The cynicism scores show at baseline the control group (n=6) was 4.5(SD= 3.2) and the intervention group (n=8) with 5.75(SD= 5.12). The final data point showed the control group (n=6) 12.2(SD= 7.4) and the intervention group (n=8) 7.4(SD 5.77). The scores peaked for the intervention group (n=8) at the 3 month collection point 7.61 (SD= 6.5). The control group (n=6) peaked at 12 months.

Professional Efficacy (Table 4c)

The professional efficacy scores at baseline for the control group (n=6) was 29.5 (SD=1.97) and the intervention group (n=8) was 23.38 (SD 7.89). At the end of the study the scores for the control group (n=6) were 29.2 (SD= 5.5) and for the intervention group 29 (SD=6.6). This was the highest score point for the control group but a slightly better score for the intervention group.

Discussion

As this was a pilot study it was not expected to be able to demonstrate statistically significant differences between the control and the intervention arm. Specifically, the pilot focussed on

evaluating any potential trends to indicate whether a larger study is warranted. Hence the discussion will focus on the trends identified that are worthy of further study.

Mindfulness has been shown in other studies to increase resilience due to the positive effect mindfulness has on the emotions [27] However; the authors within this study have some thoughts on the use of CD-RISC for this specific sample group. Resilience is often seen as the ability to bounce back from adversity [6] and these are usually major events, like death of a family member or divorce in their family. For health care students it is the smaller events that can have a 'wearing down' effect on the individual which affects confidence and their resilience. Those events may be smaller but numerous, such as moving away from home, going into clinical practice for the first time or being constantly observed or under scrutiny when in clinical placement. A tool to measure resilience in this scenario needs to be able to take into consideration these smaller, but regular issues that occur within therapeutic radiographer training. Although the CD-RISC scale is well validated and reliable, the results in this study were often at the higher end of the scale, showing a good level of resilience from the outset. As part of the recruitment process for therapeutic radiography students the training institution aim to ensure that the individual has a resilient character from the outset and is something that is developed further throughout the course. Perhaps this student group has increased resilience greater than the general population and the scale did not differentiate enough, at the higher end of the scale, to show any differences. Another consideration is that the sample size was not sufficient to allow the tool to highlight any differences. Nevertheless, the tool did highlight a trend showing the increased resilience with the intervention group. This suggests that there is a need to support students to deal with the day-to-day challenges of training both clinically and academically by developing their resilience over the length of the course.

Considering again, the recruitment process and the character and personality traits of students who apply for healthcare courses, further study should be considered to investigate its impact on resilience and burnout. To further enhance researcher's knowledge of resilience in this population group.

A study by Probst et al., (2014) [6] highlighted a number of areas that affect resilience those being; confidence, stage of training, moral purpose and values, communication, knowledge and a level of perspective. Mindfulness helps to develop areas linked to those discussed by Probst et al., 2014 [6], by improving positive emotions. A study by Rogers, (2013)[27] showed experienced meditators had a greater positive emotional gain from meditation which then allowed them to use this positive emotion in other areas such as confidence and moral purpose. Mindfulness is a skill that is nurtured and developed. It is important to note that the end of the mindfulness programme coincides with the week five measurement point; any measurements after this would not have been when the intervention group had access to a mindfulness instructor from the project. All intervention participants would have been encouraged by the mindfulness instructor to continue practising mindfulness as this is part of the premise on why mindfulness works. This study did not look at participant compliance so it is important to note a decrease could have been linked with a lack of compliance.

The burnout scores were the most interesting results in this pilot study. They highlight a degree of burnout in both the control and the intervention group at baseline and throughout the period of study. Levels of burnout could be influenced during the time period by pressures of assessments and clinical placements. Reviewing the academic calendar against the measurement points highlights there were course work submissions at three and twelve months. It is also important to note that these time points are not when the mindfulness programme was delivered and so the participants who undertook the training may not have been using the skills they had learned. It is impossible to prove that mindfulness practice would have ameliorated burnout and the findings suggest that this particular issue should be investigated further, perhaps using a range of techniques. As burnout impacts directly on the ability to be compassionate [20] it is imperative that education institutions address the importance of the potential for burnout in students. The healthcare setting is a demanding environment and it is their duty to prepare them fully for that experience. Students who are suffering burnout early in training need to be identified to avoid potential issues when they are qualified practitioners. We know that burnout affects health, morals and the ability to perform well in

the workplace [6,15,16]. Committing to a mindfulness programme can be demanding and it is noted by other researchers [27] that engaging young students in mindfulness practice can be challenging. Perhaps it is timely to explore how this may be done using new technologies and investigating other self-care strategies to reduce burnout as a part of the course structure. A longitudinal study should be considered that would study the impact of self-help approaches in participants from pre-enrolment through to early career practitioners.

Limitations

This was a pilot study to investigate if further research is warranted in this area. The small sample size was not adequate to establish statistical significance although improvements in resilience were noted. For future studies it would be important to consider the student compliance with self-help practice after the face-to-face intervention was completed. From this study it is difficult to highlight whether a lack of a clear improvement in the intervention arm is due to mindfulness being of limited value or whether it is due to poor compliance.

An additional variable is the sample size. Due to the course having a small cohort both years were utilised for the study. Students could have been experiencing differing stressors between the year groups and so it is recommended that future work should aim to recruit a larger sample size from the same cohort.

Due to the target sample of this study, it is important to consider the recruitment and screening process used to recruit students on the course as this could have given higher scores. It should also be considered that students who participated in the study may have been more confident and resilient individuals. Since this was a voluntary project outside of the course those students who were less resilient may have been less likely to volunteer for additional workload. Although the study used well validated tools for data collection, alternatively, a mix method or qualitative approach may have been more beneficial for this subject.

Conclusion

Mindfulness is one self-care strategy that may be utilised to support healthcare students. This pilot study was unable to show convincing trends to support mindfulness as the sole strategy for student support due to a number of possible factors identified in the discussion and limitations. Therefore, it is important to consider further research into alternative methods that may enhance resilience and ameliorate burnout. The study highlighted that burnout is an issue in student therapeutic radiographers and should be monitored and assessed in relation to clinical placement experiences and continued assessment burdens. A range of possible strategies should be considered to support students to alleviate the potential for burnout.

Furthermore, a longitudinal study should be encouraged in this area to investigate the organisational, professional and personal issues that can affect a therapeutic radiography student's level of burnout, resilience and compassion fatigue. In doing so, additional strategies and methods of delivery should be investigated to ensure a healthy and resilient workforce.

References

(1) Bohlmeijer, E. Klooster, P, Fledderus, M, Veehof, M. and Baer, R. 2011. *Psychometric properties of the Five Facet Mindfulness Questionnaire in depressed adults and development of a short form. Assessment,* 18 (3). pp. 308-320

(2) Maslach, C, Jackson, S and Leiter, M. 2000. Maslach Burnout Inventory Manual. 3rd Ed. Mountain View. CA. Cited in Probst, H. Griffiths, S. Adams, R. and Hill, C.2012. Burnout in therapy radiographers in the UK. *The British Journal of Radiology.* **85**: e760-e765

(3) Stamm, B, H. 2010. The concise ProQOL Manual. 2nd edition. Pocatello. www.ProQOL.org last accessed 25th March 2015

(4) Campbell- Sills, L. and Stein, M, B. 2007. Psychometric analysis and refinement of the Connor-Davidson Resilience Scale (CD-RISC): Validation of a 10 item measure of resilience. *Journal of Traumatic Stress.* **20**: 6. 1019-1028

(5) Kabat-Zinn, J.1990. Full catastrophe living using the wisdom of your body and mind to face stress, pain and illness. Delta Trade paperbacks. New York.

(6) Probst, H. Boylan, M. Nelson, P. and Martin, R. 2014. Early career resilience interdisciplinary insights to support professional education of radiation therapists. *Journal of Medical Imaging and Radiation Sciences.* **45:** 390-398.

(7) Gillies, C. Bristow, B. Gallant, F. Osmar, K. Lange-Mechlen, I. and Tran, W. 2014. Results of a Canadian study examining the prevalence and potential for developing compassion fatigue and burnout in radiation therapists. *Journal of Radiotherapy in Practice.* **13:**383-392

(8) Mental Health Foundation. 2010. Mindfulness Report. London

(9) Mindfulness all party parliamentary group (MAPPG). 2015. Mindful Nation UK. May- December 2014 Interim report. London

(10) Dobkin, P. and Hutchinson, T. 2013. Teaching mindfulness in medical school: where are we now and where are we going. *Medical Education.* **47**:768-779

(11) Shapiro, S. Schwartz, G. and Bonner, G.1998. Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioural Medicine. 21(6)*

(12) Beitel, M. Ferrer, E. and Cecero, J. 2005. Psychological mindedness and awareness of self and others. *Journal of Clinical Psychology.* **61**:739-750

(13) Beddoe, A and O'Murphy, S.2004. Does mindfulness decrease stress and foster empathy among nursing students? *Journal of Nursing Education* **43**(7)305-312

(14) Newsome, S. Waldo, M. and Gruszka, C.2012. Mindfulness group work: Preventing stress and increasing self-compassion among helping professionals in training. *The journal for Specialists in Group Work.* **37** (4)297-311

(15) Probst, H. Griffiths, S. Adams, R. and Hill, C.2012. Burnout in therapy radiographers in the UK. *The British Journal of Radiology.* **85**: e760-e765

(16) Hutton, D. Beardmore, C. Patel, I. Massey, Wong, H. and Probst, H.2014. Audit of the job satisfaction levels of the UK radiography and physics workforce in UK radiotherapy centres 2012. *The British Journal of Radiology.* **83**:20130742

(17) Akroyd, D. Caison, A. and Adams, R. 2002. Burnout in radiation therapists: The predictive value of selected stressors. *International Journal of Radiation, Oncology, Biology and Physics.* **53** (3) 816-821

[18] Poulsen, M. Poulsen, A. Baumann, McQuitty, S.and Sharpley, C. 2014. A cross-sectional study of stressors and coping mechanisms used by radiation therapists and oncology nurses: Resilience in cancer care study. *Journal of Medical radiation Sciences.* **61** 225-232

[19] Jasperse, M. Herst, P. and Dungey, G. 2013. Evaluating stress, burnout and job satisfaction in New Zealand radiation oncology departments. *European Journal of Cancer Care.*

[20] Figley, C, R.1995. Compassion fatigue: secondary traumatic stress in those who treat the traumatized. Routledge, New York.

[21] Foureur, M. Besley, K. Burton, G. Yu, N. and Crisp, J. 2013 Enhancing the resilience of nurses and midwives: Pilot of a mindfulness-based program for increased health, sense of coherence and decreased depression, anxiety and stress. *Contemporary nurse.**45** (1)114-125.*

[22] Raab, K. 2014. Mindfulness, self-compassion and empathy among health care professionals: A review of the literature. *Journal of Health care Chaplaincy.* **20**:95-108

[23] Mitchell, M. and Heads, G. 2015. Staying well: A follow up for a 5-week mindfulness based stress reduction programme for a range of psychological issues. *Community mental Health.*

[24] Fang, D, Z. Young, C, B. Golshan, S. Moutier, C. And Zisook, S. 2012. Burnout in premedical undergraduate students. *Academic Psychiatry*. **36**.:1

[25] Galan, F. Sanmartin, A. Polo, J and Giner, L. 2011. Burnout risk in medical students in Spain using the Maslach Burnout Inventory-Student Survey. *International Archives of Occupational and Environmental Health* **84**: 453-459

[26] Windle, G, Bennett, K, M. and Noyes, J. 2011. A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes.***9**:8

[27] Rodgers, H, B. 2013. Mindfulness Meditation for Increasing Resilience in College Students. *Psychiatric Annals*. 43:12

Tables

FFMQ-SF	Group	Week 0 Mean (SD)	Week 5 Mean (SD)	Month 3 Mean (SD)	Month 12 Mean (SD)
Non-react	**Control**	15.2 (5.8)	16.3 (4.46)	15.67 (4.92)	17.6 (3.9)
	Intervention	15.8 (3.5)	17.0 (3.7)	16.14 (4.7)	16.6 (4.04)
Observe	**Control**	14.4 (2.4)	16.1 (3.6)	15.0 (2.8)	16.2 (3.0)
	Intervention	11.5 (4.1)	13.2 (2.43)	15.1 (2.6)	14.8 (2.3)
Act Aware	**Control**	17.6 (4.8)	16.6 (4.72)	16.2 (4.0)	17.0 (2.9)
	Intervention	14.5 (3.5)	16.2 (3.3)	15.9 (2.5)	17.4 (4.5)
Describe	**Control**	18.8 (3.7)	17.3 (3.78)	16.8 (3.6)	16.6 (7.23)
	Intervention	15.5 (4.6)	17.7 (2.1)	18.0 (2.5)	18.4 (2.41)
Non Judge	**Control**	12.4 (5.2)	15.1 (5.0)	15.51 (5.8)	15.4 (3.6)
	Intervention	18.6 (2.8)	19.2 (3.86)	20.3 (3.0)	19.8 (3.3)

Table 1: Mindfulness results using the five facet mindfulness short form (FFM-SF)

CD-RISC	Week 0 Mean (SD)	Week 5 Mean (SD)	Month 3 Mean (SD)	Month 12 Mean (SD)
Control	28.67 (4.27)	29.0 (5.51)	33.0 (5.43)	31.4 (8.29)
Intervention	27.13 (3.98)	29.75 (3.7)	31.5 (2.1)	31.6 (4.98)

Table 2; Resilience (Connor-Davidson resilience scale) results showing the mean and standard deviation from the data time points (the higher the score the more resilient)

ProQOL	Week 0 Median (SD)	Week 5 Median (SD)	Month 3 Median (SD)	Month 12 Median (SD)
Control	41.67 (6.66)	40.16 (4.36)	36.67 (10.6)	40.6 (4.5)
Intervention	39.25 (5.94)	41.63 (5.29)	42.86 (3.93)	43.0 (8.6)

Table 3; Results for Compassion satisfaction (ProQOL). A score of 22 or less (low), 23-41 (average) and 42 or more (high)

Week 0	Mean (SD)	%with high exhaustion	Week 5	Mean (SD)	%with high exhaustion
Control	15.1 (7.99) **moderate**	50%	**Control**	14.3 (9.07) **Moderate**	33.3%
Intervention	9.8 (4.52) **Low**	12.5%	**Intervention**	10.37 (3.99) **Low**	12.5%
3 months	**Mean (SD)**	**%with high exhaustion**	**12 months**	**Mean (SD)**	**%with high exhaustion**
Control	15.1 (8.1) **Moderate**	50%	**Control**	10.0 (6.4) **Low**	40%
Intervention	8.25 (4.7) **Low**	12.5%	**Intervention**	6.4 (2.61) **Low**	0%

Table 4a- Burnout- MBI- Student survey, week 0, 5, month 3 and 12, exhaustion Sub scale

Week 0	Mean (SD)	%with high exhaustion	Week 5	Mean (SD)	%with high exhaustion
Control	4.5 (3.2) **Low**	0%	**Control**	4.67 (3.07) **Low**	0%
Intervention	5.75 (5.12) **Low**	25%	**Intervention**	7.75 (4.1) **Moderate**	25%
3 months	**Mean (SD)**	**%with high exhaustion**	**12 months**	**Mean (SD)**	**%with high exhaustion**
Control	11.0 (6.2) **High**	50%	**Control**	12.2 (7.4) **High**	60%
Intervention	7.61 (6.5) **Moderate**	37.5%	**Intervention**	7.4 (5.77) **Moderate**	40%

Table 4b- Burnout- MBI- Student survey, week 0, 5, month 3 and 12, cynicism sub scale

Week 0	**Mean (SD)**	**%with high exhaustion**	**Week 5**	**Mean (SD)**	**%with high exhaustion**
Control	29.5 (1.97) **Moderate**	0%	**Control**	30.5 (1.38) **High**	0%
Intervention	23.38 (7.89) **Low**	62.5%	**Intervention**	26.25 (2.05) **Moderate**	12.5%
3 months	**Mean (SD)**	**%with high exhaustion**	**12 months**	**Mean (SD)**	**%with high exhaustion**
Control	27.5 (4.7) **Moderate**	16.6%	**Control**	29.2 (5.5) **Moderate**	20%
Intervention	27.6 (4.3) **Moderate**	12.5%	**Intervention**	29 (6.6) **Moderate**	20%

Table 4c- Burnout- MBI- Student survey, week 0, 5, month 3 and 12, Professional Efficacy sub scale

Word count 3603 minus abstract, references and figures