# Reducing burnout and anxiety among doctors: Randomized controlled trial

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## Highlights

- 51.6% of doctors were emotionally exhausted.
- 13.2% of doctors had severe anxiety symptoms.
- The intervention taught doctors that distress is a normal, human reaction.
- A randomized controlled trial showed that the intervention significantly reduced anxiety and two types of burnout among doctors.

## Abstract

Prevalence studies show high levels of burnout, anxiety, fatigue and other symptoms of distress among medical doctors. However, there are very few randomized controlled trials testing interventions against these problems. This randomized controlled trial (NCT02838290; ClinicalTrials.gov, 2016) tested interventions teaching 227 doctors about the psychology of burnout, stress, coping with patient death, and managing distress, as well as giving them information about prevalence rates among doctors. Primary outcomes included burnout, anxiety, insomnia, grief, alcohol/drug use, binge eating, physical symptoms, and psychiatric morbidity. The outcomes were tested before and after the interventions with a 7-day time-lag. The intervention significantly decreased doctors' levels of burnout (e.g. emotional exhaustion and depersonalization) and anxiety. Doctors in the control group had no significant changes in these signs of distress. The intervention did not significantly reduce other health and habit-related outcomes potentially because these need a longer time-lag than 7 days. Interventions teaching doctors about the psychology of work-related distress reduce burnout and anxiety by helping doctors realize that distress is a normal, human reaction to external stressors, common in medicine, and solvable by learning about psychological coping strategies.


***Key words***: Binge-eating; insomnia; intervention; physical symptoms; stress.

## 1. Introduction

Common occupational hazards embedded in medicine as a profession put doctors at risk of distress. This includes breaking bad news to patients about their diagnosis or prognosis, seeing patients in pain or distress, coping with dying patients, and making difficult clinical decisions while weighing up risks of death or harm (Pereira et al., 2011; Shanafelt et al., 2005). Other common occupational hazards in medicine are frequent fears of making the wrong clinical decision and being the subject of a highly stressful investigation or strike-off (Gerrity et al., 1990), assaults (BMA, 2014; Shabazz et al., 2016), bullying (Carter et al., 2013), sleep deprivation, being on call outside work time, working long hours, coping with staff shortages and heavy patient case loads (Keller et al., 2013; Shirom et al., 2010; Wallace and Lemaire, 2007; Wen et al., 2016; Williams et al., 2002). These occupational hazards can put doctors at risk of burnout, anxiety, depression, stress, sleep problems with a psychological etiology, and other types of mental distress. A recent systematic review of 30 studies showed that 31-54% of UK doctors have burnout, and 17-52% of doctors have psychiatric morbidity (Imo, 2017). A different systematic review (Goodwin et al., 2013) compared doctors with other workers and showed that, whereas the prevalence rate of psychiatric morbidity is 30% among workers, studies reveal prevalence rates of 27-46% among consultants, 48-52% among general practitioners, and 32-37% among junior doctors. The systematic review (Goodwin et al., 2013) found few studies showing lower psychiatric morbidity prevalence rates among doctors compared to 30% among the working population, e.g. 29% among doctors in intensive care medicine, 26-28% among oncologists (a more recent systematic review likewise showed a prevalence of 27% among oncologists, Medisauskaite and Kamau, 2017). Individual studies also suggest that doctors have a higher risk of distress than the general population, such as in terms of the prevalence of psychiatric

disorders which is 27% among doctors versus 18% in the general population (Wall et al., 1997). Most of the occupational hazards embedded within medicine as a profession cannot be avoided by doctors therefore psychological interventions are vital.

It is important to prevent distress among doctors because a recent systematic review found that some types of distress (e.g. burnout) increase the rate of medical errors and incidents that put patients at risk (Panagioti et al., 2018) because distress impairs cognitive functioning and clinical decision-making (Leblanc, 2009). We argue that interventions should challenge the culture in medicine of telling doctors to 'get a grip' or unhelpfully saying to them '*I went through it in my time; why shouldn't you?*' (Dudley, 1990). Doctors are under pressure to put on a brave face even in difficult circumstances (Fältholm, 2007; Fox et al., 2009) because, unfortunately, some doctors stigmatize mental distress and see it as a sign of weakness (Granek et al., 2012; Lizano and Mor Barak, 2015). We believe that this culture puts doctors at risk of blaming themselves for suffering from burnout, stress, anxiety or other signs of distress by thinking that the very fact that they are distressed is 'abnormal' or a sign of 'professional weakness' (Granek et al., 2012; Lizano and Mor Barak, 2015). We argue that interventions should help doctors stop stigmatizing distress and start seeing it as something that is a normal, human reaction to external stressors, common in medicine as a profession, and something that is neither their fault nor abnormal. We thus tested an intervention that teach doctors about the psychology of distress, how job stressors cause burnout or stress, and prevalence rates among doctors that help doctors realize that distress is actually quite common, and normal, among doctors. We also argue that interventions should help doctors understand signs of burnout, stress, and other types of distress in themselves so that they do not bottle up distress by isolating themselves (Sorensen and Iedema, 2009) or by resorting to negative coping behaviors such as binge-eating to feel better, or misusing alcohol or legal drugs to self-medicate (Ahola et al., 2006; Leiter et al., 2012). We thus tested an intervention

that teaches doctors how to spot signs of mental distress in themselves, including burnout, stress, and different stages of grief, and how to manage distress.

We developed and tested the intervention that comprised of four learning modules expounding on text written by the Royal College of Psychiatrists (Sunil, 2017). We expounded on the text by adding current prevalence statistics about the rates of distress among doctors (Baldisseri, 2007; Granek et al., 2012; Moores et al., 2007; Redinbaugh et al., 2003; Taylor et al., 2005), theoretical models from the published literature helping doctors understand the psychology of distress, such as how job demands lead to distress (Bakker et al., 2005; Bakker and Demerouti, 2007; Cox and Griffiths, 2010), and we developed content on evidence-based coping methods from the published literature teaching doctors about coping with patients' death (Redinbaugh et al., 2003; Shanafelt et al., 2005). We then conducted a randomized controlled trial assessing the impact of the intervention on a wide variety of psychological and health outcomes, e.g. doctors' levels of anxiety, psychiatric morbidity, alcohol/drug use, binge-eating, burnout, grief from patient death, physical symptoms of ill health, and insomnia. Previous interventions (e.g. Bourbonnais et al., 2006) have not trained doctors about the psychology of distress or coping, they have not tested doctors from the UK (Regehr et al., 2014) or doctors from various specialties and grades (Bragard et al., 2010; Butow et al., 2008) and they are limited in having evaluated only a limited selection of outcomes. By testing the intervention that teach doctors about the psychology of distress, and by examining a wide variety of psychological and health outcomes, this is the first randomized controlled trial of its kind.

# 2. Methods

## 2.1. Pre-trial Pilot Study

We developed and piloted an intervention consisting of four modules. Module 1 taught doctors about stress, Module 2 taught doctors about burnout, Module 3 taught doctor about coping with patient death, and Module 4 taught doctors about methods of managing distress. Some content in Modules 1, 2 and 4 was adapted from text written by Royal College of Psychiatrists (with permission; Sunil, 2017) as described in the introduction and within the trial method below. We then piloted the draft intervention modules and outcome measures online using *Qualtrics* software so that consultations with doctors would inform subsequent changes to the content of the modules, and outcome measures. The pilot study sampled 15 medical doctors from various specialties and they provided responses to open ended questions about the relevance and usefulness of the modules and outcome measures.

Generally, the feedback was positive; for example, when asked to give feedback on which information was useful, one doctor said:

> *'All of it! It was good to realise that my job, which I am currently finding extremely stressful, is already recognised as one of the most stressful jobs that exists. It was also interesting to identify, from the models, that the things that make medicine so stressful are the combination of lack of job control and the high demands of the job. I am taking comfort from the fact that it is unlikely to be my fault that I am so stressed. It is the nature of the job and the job environment.'* (Female, core medical trainee)

The doctors' feedback about the length or structure of the modules led to us reducing the number of modules by combining Module 1 and 2, changing the placement of reflection exercises about the modules, and adding information about sources of support for doctors in distress. The doctors' feedback also led us to reduce the number of outcome measures to remove duplicate measures, and we also amended the wording of demographic questions (e.g. about working patterns).

## 2.2. Randomized-Controlled Trial

The study protocol was registered before the study began at the US National Institute of Health (Identifier: NCT02838290; ClinicalTrials.gov, 2016).

### *2.2.1. Study design*

This was a randomized controlled trial comprising of two independent variables: time and trial group. Time was manipulated within-subjects such that all doctors completed identical outcome measures at time-1 (the baseline) and at time-2 (after 7 days). The trial group was manipulated between-subjects such that doctors were randomly and blindly assigned to one of 5 trial groups. For brevity, the results compare doctors in the intervention trial group 4 (in which doctors took all modules) with the control group (in which doctors took no module). Supplementary material 1 presents the results of all trial group comparisons.

### *2.2.2. Procedure*

Doctors were invited to take part in the trial through e-mails and newsletter announcements sent on our behalf by 9 randomly selected NHS trusts, 9 royal colleges of

medicine, and the British Medical Association (BMA) from July to November 2016. The trial received institutional ethics approval covering all data sources, and NHS local approval covering NHS trusts that agreed to invite their doctors to take part in the trial. Invitation emails or newsletter announcements gave doctors who wanted to take part in the trial a *Qualtrics* weblink. All doctors who clicked on the weblink were led to a page asking them for informed consent. Blindly to the researchers, *Qualtrics* software randomly assigned doctors to one of 5 trial groups:

- *Trial group 1*: Doctors randomly assigned to take Module 1 were taught about the psychology of stress and burnout, and the impact of work on stress or burnout. Module 1 covered the General Adaptation Syndrome (Selye, 1965), the Maslach burnout theory (Maslach and Jackson, 1981), the Job Demands-Resources model (Bakker and Demerouti, 2007), and it also gave doctors information about prevalence rates among doctors and other healthcare professionals (Baldisseri, 2007; British Medical Association, 2015; Taylor et al., 2005). This was followed by a quiz and an open-ended reflection exercise asking doctors to consider what they had learnt from the module and how they would use it.
- *Trial group 2*: Doctors randomly assigned to take Module 2 were taught about dealing with a patient's death and the Kubler Ross stages of grief (Kübler-Ross, 1997), a theoretical perspective on how health care professionals experience loss when patients die and information about ways of coping with a patient's death (Papadatou, 2000). This was followed by a quiz and an open-ended reflection exercise.
- *Trial group 3*: Doctors randomly assigned to take Module 3 were taught about how to manage distress. This module taught doctors about how to develop resilience, cognitive emotional regulation, relationships, work-family balance, time for hobbies and recreation (Carver et al., 1989; Fuß et al., 2008; Garnefski and Kraaij, 2007;

Graham et al., 2001; Huggard Huggard, & Zhao, 2016; Netemeyer et al., 1996; Ramirez et al., 1995). This was followed by a quiz and an open-ended reflection exercise.

- *Trial group 4*: Doctors randomly assigned to take Module 4 completed all of the aforementioned 3 modules.
- *Trial group 5*: Doctors randomly assigned to the control condition were not assigned to any module(s), quiz or reflection exercise.

After being assigned to a trial group, doctors in trial groups 1 to 4 completed the intervention procedure described above after completing outcome measures. Doctors assigned to the control group (that is, trial group 5) only completed the outcome measures. After 7 days, doctors completed the outcome measures again, after receiving invitations. They were then thanked and debriefed. At the end of the study, doctors in the control group were told about the intervention and given the opportunity to complete the intervention if they wanted to.

### *2.2.3. Outcome measures*

The survey required doctors to respond to a number of demographic questions and a series of outcome measures sourced from established, published questionnaires with good psychometric properties, e.g. reliability and validity. For brevity, this article presents results about the following outcome measures and the remaining results are presented within Supplementary material 2:

1. *Burnout.* The Maslach Burnout Inventory – Human Services Survey (Maslach and Jackson, 1981) (never-0 to everyday-6) was used to measure three burnout dimensions: emotional exhaustion (9 items), depersonalization (5 items) and personal accomplishment (8 items). Cronbach $\alpha$ 0.764 - 0.903;

2. *Anxiety.* The General Anxiety Disorder-7 (Spitzer et al., 2006) is a seven items scale scored from 0 (not at all) to 3 (nearly every day). Cronbach $\alpha$ 0.923;
3. *Psychiatric morbidity.* The 12 items General Health Questionnaire (Goldberg and Hillier, 1979) with a scoring from 0 (better than usual/not at all) to 3 (much less than usual/much less capable) was used to assess psychological distress. Cronbach $\alpha$ 0.925;
4. *Grief.* The Texas Revised Inventory of Grief (Faschingbauer et al., 1987) consists of 13 items (strongly disagree-0 to strongly agree-4). Cronbach $\alpha$ 0.879;
5. *Alcohol dependence*. This was measures with the five items Patient Health Questionnaire (no-0; yes-1) (Spitzer et al., 2000). Substance abuse was identified if any of five items were answered 'yes';
6. *Alcohol use.* Drinking habits were assessed with three items from The Alcohol Use Disorder Identification Scale (AUDIT) (Babor et al., 2001) about frequency of drinking, number of drinks on typical day of drinking and drinking 6 or more drinks on one occasion (scored from 0 to 4);
7. *Legal/illegal drug use*. Drug use items (20) created using Commonly Abused Drugs Charts (National Institute on Drug Abuse 2016) and UK drug misuse declaration (Office for National Statistics, 2015);
8. *Insomnia.* The seven items Insomnia Severity Index (Bastien et al., 2001) was used to measure insomnia (no insomnia-0 to severe insomnia-4). Cronbach $\alpha$ 0.906;
9. *Binge-eating*. Five items from the Binge Eating Scale from the Eating Disorder Diagnostic Scale (Stice et al., 2000) assessed if participants were having binge-eating features (no-0; yes-1). Cronbach $\alpha$ 0.888;
10. *Physical symptoms.* The Physical Symptom Inventory (Spector and Jex, 1998) is a 12 items scale scored from 1 (not at all) to 5 (every day). Cronbach $\alpha$ 0.773.

### *2.2.4. Sample*

This trial is interested in evaluating the impact of the intervention among doctors who currently practice medicine, have regular contact with patients, and complete both time-1 and time-2 of the trial. 427 doctors from 9 randomly selected NHS England trusts, 9 Royal Colleges and members of the BMA research panel took part in this study of which 227 doctors met the criteria for inclusion within the trial results. The participant flow diagram (figure 1) explains the reason for exclusion. A baseline analysis of all 427 doctors is reported in a separate article (Medisauskaite and Kamau, 2019). For brevity, the results below report comparisons between 39 doctors in trial group 4 (all modules) and 52 doctors in the control group (no modules) and Supplementary material 1 reports comparisons among all trial groups.

[INSERT FIGURE 1]

The appropriate sample size was calculated using G*Power software: repeated measures, within-between subject interaction (*α error prob* = .05; *power* .95; 2 groups; measured at 2 time points; .5 correlation between repeated measures; medium effect size *F* of .25) (Faul et al., 2007). Calculated actual power was .95 for sample of 54 participants, 27 participants in each group.

### *2.2.5. Statistical analysis*

Statistical Package for Social Science (SPSS-23) was used for data analysis. No extreme outliers were observed in any of the outcomes. Mixed methods ANOVAs with Pilai's Trace determining significant multivariate effects and *F*-tests determined significant univariate effects at $p < .05$. The repeated Wilcoxon signed-rank test and McNemar Chi-

square statistics evaluated within-group differences in ordinal/nominal outcome measures. For non-parametric measures, the group differences between time-1 and time-2 were calculated using *Kruskal-Wallis*/ *Chi-square* tests. See Supplementary material 1, table 3, for the analysis of all four intervention groups.

## 3. Results

There were 39 doctors in trial group 4 and 52 doctors in the control group. Approximately half of these doctors (46.2%; 42) are women, 54.9% (50) work in hospitals and 72.5% (66) work >41 hours a week. Table 1 shows that there were no significant differences between the two trial groups at baseline, ($p > .05$; see table 1).

[INSERT TABLE 1]

Table 2 shows the prevalence of severe levels of distress among the doctors in the two trial groups. At baseline, 35.2% to 51.6% of doctors have high levels of burnout (defined as emotional exhaustion, depersonalization or low personal accomplishment), 28.6% of doctors have psychiatric morbidity, 13.2% have severe anxiety, 9.1% of doctors are alcohol dependent, 35.4% report hazardous drinking (e.g. drinking more than 6 drinks on one occasion), 54.4% of doctors used some type of drugs (almost all of which are legal) and 20.3% of doctors reported binge-eat features (e.g. eating alone because of feeling embarrassed by how much they are eating).

[INSERT TABLE 2]

There were significant main effects of time on burnout (measured as emotional exhaustion), anxiety, grief, and drug use, $Fs \leq 3.73$, $ps \geq .06$, $\eta s^2 \leq .05$, but not other outcomes, $p > .05$ (all main effects are presented in Supplementary material 3). Table 3 shows that from baseline to time-2 there were significant reductions in burnout (emotional exhaustion), burnout (depersonalization) and anxiety among doctors who completed all modules about the psychology of distress. Among doctors in the control group there were no significant reductions in these forms of distress but an increase in a type of burnout measured as personal accomplishment. There were no significant main effects of trial group on the outcomes, $Fs \leq 1.11$, $ps \geq .30$, $\eta s^2 = .01$, which is unsurprising because tests of main effects alone examine average differences between trial groups, rather than average changes from baseline to time-2 between trial groups. There was no interaction of time with trial group on outcomes except burnout measured as depersonalization, $Fs \leq 2.27$, $ps \geq .14$, $\eta s^2 \leq .03$, but no crossing or non-crossing interactions were anticipated because doctors in the control group were expected to exhibit no change in distress rather than an increase in the severity of distress. There was no significant main effect of time ($p = .63$), group effect at two time points (time-1 $\chi^2 = 0.12$, $p = .73$; time-2 $\chi^2 = 0.09$, $p = .77$), time and group interaction ($\chi^2 = 1.40$, $p = .50$), or a time effect for the separate groups ($ps \geq .05$) in alcohol dependence. Separate analyses of different types of drugs are presented within Supplementary material 1.

[INSERT TABLE 3]

## 4. Discussion

The study shed new light on the prevalence of severe anxiety among doctors (13.2%), alcohol dependence (9.1%), occasional hazardous drinking (35.4%), drug use (54.4%, of

which most are legal drugs) and binge-eating (20.3%). The study also supported a recent systematic review (Imo, 2017) by showing that the prevalence of burnout among doctors is 35.2% to 51.6% and the prevalence of psychiatric morbidity is 28.6%. The study found that doctors who took part in an intervention involving being taught about the psychology of distress experienced significant reductions in anxiety, and 2 out of 3 types of burnout (emotional exhaustion and depersonalization). Doctors in the control group, who were not taught about the psychology of distress, experienced no significant changes in these forms of burnout or anxiety, and an increase in a type of burnout called low personal accomplishment. The intervention is thus useful in reducing these types of distress among doctors.

This supports other intervention studies showing lower levels of burnout and anxiety among doctors after various interventions (see systematic reviews and meta-analysis, Regehr et al., 2014; West et al., 2016). The current intervention is unique in being the first intervention to help doctors stop seeing psychological distress as something that is atypical among doctors, or a source of stigma. By teaching doctors about the prevalence of distress in the profession, it helps them realize that distress is a normal, human reaction, which can explain the significant reductions in burnout and anxiety because the psychological strategy of normalizing occupational distress (realizing that one is not alone and that many other doctors are also stressed, burned-out, etc.) is an important method helping doctors to avoid self-blame. Self-blame is associated with destructive coping strategies (Boyraz and Waits, 2018). The intervention consisted of learning modules that presented doctors with information about stress: the prevalence of doctors typically experiencing signs of occupational distress, theoretical models explaining distress and evidence-based coping techniques. The intervention also included a self-assessment section at the end of each module and an opportunity for doctors to reflect on what the module meant to them. The learning modules were thus designed to instigate a psychological process called ‘insight

learning' (Ash et al., 2012) whereby new knowledge gives a person insight or an 'aha!' moment about their past experiences (e.g. experiences of occupational distress) and the new knowledge provides them with a mental framework with which to categorize or deal with future similar experiences (e.g. to cope with future distress). The intervention was designed to transform doctors' insight learning into generalizable knowledge about how they can use the intervention in coping with distress or causes of distress in their working lives, thus activating the experiential learning theory notion of abstract conceptualization (learning new knowledge) (Kolb et al., 1986) and reflective observations allowing doctors to think about how they will put the knowledge into practice in coping with burnout, anxiety and other forms of distress.

The results showed that doctors who received no intervention not only showed no significant reduction in distress, but actually experienced an increase in one type of burnout (low personal accomplishment), which has the potential to have spill-over effects on patient-related outcomes such as doctors feeling disillusioned with their area of medicine and potentially switching specialties. This extends previous intervention research about personal accomplishment (Dyrbye et al., 2016; Krasner et al., 2009) and related concepts such as happiness and satisfaction with life (Bolier et al., 2013).

### 4.1. What changes were not observed after the intervention and why?

There was no significant reduction in psychiatric morbidity, grief, ill health symptoms, insomnia, alcohol/drug use and eating habits, potentially because physiological signs of distress and habit-related methods of coping with distress require a much longer observation period than 7 days. Likewise, changes in grief could require a much longer observation period because of very low patient mortality rates within a 7-day period. The intervention better targets psychological signs of distress by teaching doctors about relevant theories and

evidence, helping them spot the signs (e.g. what is burnout?) and in so doing giving them a revised mental framework from which to cope with future incidences of psychological distress in themselves. Therefore, it is not surprising that psychological distress changed after 7 days. However, considering the more complex connection between psychological distress and physiological signs of distress (e.g. ill health), future research should follow-up doctors after 7 days, and again after at 1 month, 6 months or longer.

### 4.2. Limitations and future directions

Future research should replicate the randomized controlled trial over 7 days, and also over a longer period (e.g. 1 month and 6 months), to evaluate whether teaching doctors about the psychology of distress reduces burnout and anxiety in the long term. Habit-related behaviors and physiological signs of distress probably need a much longer period of observation than 7 days therefore future research should measure alcohol dependence, ill health symptoms, binge-eating, grief from patient death, and drug use over 6 months or more. In addition, future research should compare the effect of the intervention to an active control group of doctors who engage in an activity for the same amount of time as the doctors completing the intervention. In applying the current findings we recommend that uture applications of this intervention allow doctors unlimited access to the intervention so that it can help them change long-held habits (e.g. regular alcohol or drug use). Additionally, because patient mortality rates in most medical specialties are very low, future research should add exposure to patient death as a predictor variable alongside the presence or absence of the intervention.

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*Ethical approval*

The BEI School Ethics Committee at Birkbeck, University of London, approved the study in May 2016. Participants voluntarily consented to take part in this study.

*Other disclosures*

After the randomized controlled trial (RCT) was completed the authors and Focus Games transformed the intervention into an app that is currently being trialled in several NHS hospitals for use by doctors and other clinicians. The authors, Focus Games and the NHS Practitioner Health Programme also developed a board game for healthcare professionals. The RCT was not funded or determined by Focus Games or any organization involved with the app/board game. The RCT was conducted for PhD research and it took place a year before Focus Games got in touch with the authors.

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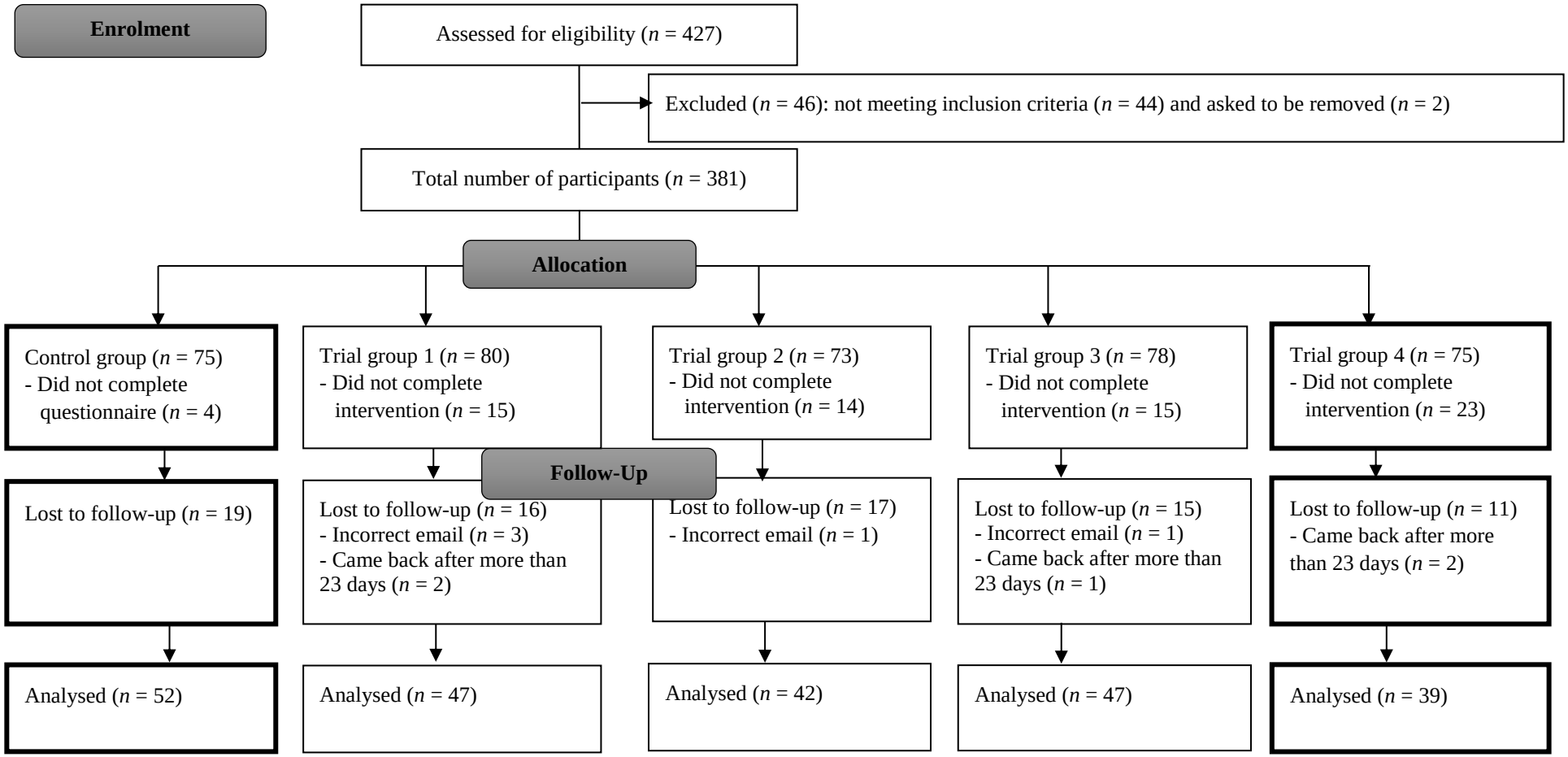



**Figure 1**. Participants flow diagram based on CONSORT: Trial group 1 – stress/burnout module. Trial group 2 – dealing with a patient's death module. Trial group 3 – managing distress module. Trial group 4 – module covering all topics. The analysis of the control group and experimental groups with Trial group 4 is presented in the main text (comparison of all groups is in Supplementary material 1)

*Table 1*. Comparison of sociodemographic characteristics and outcome measures between doctors in intervention and control groups

| | ***M* (*SD*) or % (*n*)** | | | |
|---|---|---|---|---|
| | **Total** | **Intervention** | **Control** | **Statistics[1]** |
| Gender (*female*) | 46.2% (42) | 35.9% (14) | 53.8% (28) | $\chi^2$ (1) = 2.89; *p* = .09 |
| Years working in medicine | 24.26 (11.25) | 23.90 (11.18) | 24.54 (11.39) | *t*(89)=0.27; *p* = .79 |
| Practice (*hospital*) | 54.9% (50) | 56.4% (22) | 53.8% (28) | $\chi^2$ (1) = 0.06; *p* = .81 |
| Working hours per week (*41 or more*) | 72.5% (66) | 74.4% (29) | 71.2% (37) | $\chi^2$ (1) = 0.12; *p* = .74 |
| Emotional exhaustion | 3.23 (1.4) | 3.26 (1.41) | 3.2 (1.4) | *t*(89)=-0.2; *p* = .85 |
| Depersonalization | 1.81 (1.38) | 1.98 (1.49) | 1.68 (1.29) | *t*(89)=-1.05; *p* = .30 |
| Personal accomplishment | 4.41 (0.83) | 4.42 (0.83) | 4.41 (0.84) | *t*(89)=-0.06; *p* = .95 |
| Anxiety | 0.88 (0.78) | 0.96 (0.81) | 0.88 (0.74) | *t*(89)=-0.02; *p* = .99 |
| Psychiatric morbidity | 2.16 (0.59) | 2.14 (0.57) | 2.17 (0.61) | *t*(89)=0.27; *p* = .79 |
| Grief | 1.68 (0.63) | 1.67 (0.6) | 1.74 (0.66) | *t*(89)=0.96; *p* = .34 |
| Insomnia | 1.1 (0.83) | 1 (0.84) | 1.17 (0.83) | *t*(80)=0.95; *p* = .35 |
| Physical symptoms | 1.8 (0.54) | 1.75 (0.52) | 1.83 (0.56) | *t*(89)=1.66; *p* = .51 |
| Alcohol use habits | 6.94 (2.09) | 7.24 (2.29) | 6.69 (1.9) | *t*(89)=-1.2; *p* = .24 |
| Alcohol dependence | 9.1% (8) | 7.5% (3) | 10.6% (5) | $\chi^2$ (1) = 0.12; *p* = .74 |
| Binge-eating features | 1.12 (1.66) | 1.29 (1.72) | 1.02 (1.64) | *t*(72)=-0.66; *p* = .51 |
| Drug use | 0.74 (0.82) | 0.71 (0.87) | 0.77 (0.78) | *t*(88)=0.34; *p* = .74 |

*Note*. [1]Comparison of intervention and control groups using *t-test* or *Chi-Squared* statistics

*Table 2*. Prevalence of distress per trial group and the change from baseline to time-2

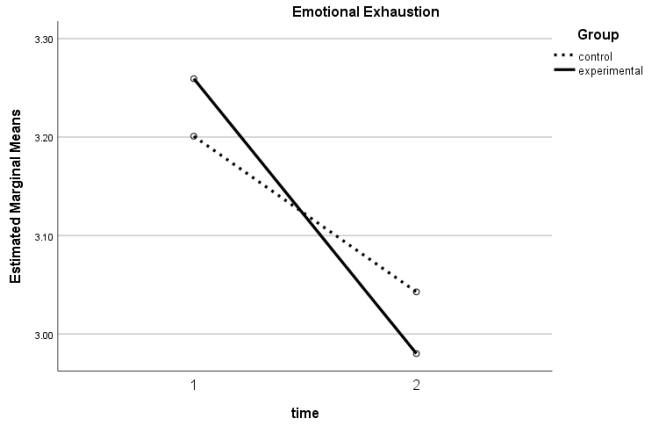
| **Prevalence of distress** | **Doctors in both groups** | **Doctors in trial group 4** | | **Doctors in control group** | |
|---|---|---|---|---|---|
| | **Baseline** | **Baseline** | **Time-2** | **Baseline** | **Time-2** |
| Emotional exhaustion[1] | 51.6% (47) | 53.8% (21) | 48.7% (19) | 50% (26) | 51.9% (27) |
| Depersonalization[1] | 36.3% (33) | 43.6% (17) | 35.9% (14) | 30.8% (16) | 34.6% (18) |
| Low personal accomplishment[1] | 35.2% (32) | 35.9% (14) | 38.5% (15) | 34.6% (18) | 42.3% (22) |
| Severe insomnia[2] | 2.2% (2) | 2.6% (1) | 2.6% (1) | 2% (1) | 2% (1) |
| Psychiatric morbidity[3] | 28.6% (26) | 30.8% (12) | 33.3% (13) | 26.9% (14) | 30.8% (16) |
| Severe anxiety[4] | 13.2% (12) | 15.4% (6) | 10.3% (4) | 11.5% (6) | 7.7% (4) |
| Grief[5] | 37.8% (31) | 36.1% (13) | 27.8% (10) | 34.8% (16) | 28.3% (13) |
| Physical symptoms[6] | 29.7% (27) | 17.9% (7) | 15.4% (6) | 39.2% (20) | 45.1% (23) |
| Drug use[7] | 54.4% (49) | 50% (19) | 44.7% (17) | 58.8% (30) | 51% (26) |
| Hazardous drinking[8] | 35.4% (29) | 44.4% (16) | 41.7% (15) | 29.5% (13) | 27.3% (12) |
| Alcohol dependence[7] | 9.1% (8) | 7.5% (3) | 7.5% (3) | 10.6% (5) | 6.4% (3) |
| Binge-eating habits[9] | 20.3% (15) | 23.1% (6) | 30.8% (8) | 20% (8) | 20% (8) |

*Note*. [1]High emotional exhaustion - ≥27; high depersonalization - ≥10; low personal accomplishment - ≤33; [2]Severe insomnia ≥22; [3]Psychiatric morbidity ≥4; [4]Severe anxiety≥15; [5]Symptom present - Scale divided into 3 parts (high scores present a presence of the symptom) ≥1.85; [6]Symptom present - Scale divided into 3 parts (high scores present a presence of the symptom) ≥2; [7]Symptom present ≥1; [8]Symptom present – drinking habits scale was divided into 3 parts (high scores present a presence of the symptom) ≥8; [9]Symptom present ≥3.

*Table 3*. Means, SDs and group differences among primary parametric outcome measures

| | **Doctors in the control group** | | | **Doctors in trial group 4** | | |
|---|---|---|---|---|---|---|
| **Outcome measure** | **Baseline *M* (*SD*)** | **Time-2 *M* (*SD*)** | **Mean differences between two time points (*F*, *p*, $\eta^2$)** | **Baseline *M* (*SD*)** | **Time-2 *M* (*SD*)** | **Mean differences between two time points (*F*, *p*, $\eta^2$)** |
| **Emotional exhaustion** | 3.2 (1.4) | 3.04 (1.42) | 0.16 (*F* = 2.98, *p* = .09, $\eta^2$ = .02) | **3.26 (1.41)** | **2.98 (1.44)** | **0.28 (*F* = 6.96, *p* = .01, $\eta^2$ = .04)** |
| **Depersonalization** | 1.68 (1.29) | 1.72 (1.35) | -0.04 (*F* = 0.11, *p* = .74, $\eta^2$ < .01) | **1.98 (1.49)** | **1.68 (1.41)** | **0.31 (*F* = 5.98, *p* = .02, $\eta^2$ = .06)** |
| **Low personal accomplishment** | **4.41 (0.82)** | **4.27 (0.85)** | **0.14 (*F* = 3.99, *p* = .05, $\eta^2$ = .04)** | 4.42 (0.83) | 4.38 (0.91) | 0.04 (*F* = 3.99, *p* = .22, $\eta^2$ < .01) |
| **Anxiety** | 0.88 (0.74) | 0.81 (0.74) | 0.07 (*F* = 1.47, *p* = .23, $\eta^2$ = .02) | **0.96 (0.81)** | **0.73 (0.72)** | **0.15 (*F* = 5.12, *p* = .03, $\eta^2$ = .05)** |
| **Psychiatric morbidity** | 2.17 (0.61) | 2.21 (0.64) | -0.03 (*F* = 0.42, *p* = .52, $\eta^2$ = .01) | 2.14 (0.57) | 2.16 (0.57) | -0.02 (*F* = 0.08, *p* = .78, $\eta^2$ < .01) |
| **Grief** | 1.74 (0.66) | 1.64 (0.62) | 0.10 (*F* = 2.19, *p* = .14, $\eta^2$ = .03) | 1.6 (0.6) | 1.51 (0.57) | 0.09 (*F* = 1.61, *p* = .21, $\eta^2$ = .02) |
| **Insomnia** | 1.18 (0.84) | 1.11 (0.87) | 0.06 (*F* = 1.07, *p* = .31, $\eta^2$ = .01) | 1 (0.84) | 1.02 (0.96) | -0.02 (*F* = 0.07, *p* = .79, $\eta^2$ < .01) |
| **Physical symptoms** | 1.84 (0.56) | 1.85 (0.65) | -0.01 (*F* = 0.09, *p* = .76, $\eta^2$ < .01) | 1.75 (0.51) | 1.69 (0.61) | 0.06 (*F* = 1.68, *p* = .20, $\eta^2$ = .02) |
| **Alcohol use habits** | 6.71 (1.92) | 6.99 (1.95) | 0.05 (*F* = 0.12, *p* = .73, $\eta^2$ < .01) | 7.33 (2.26) | 7.39 (2.38) | -0.06 (*F* = 0.15, *p* = .70, $\eta^2$ < .01) |
| **Binge-eating features** | 1.1 (1.69) | 1.1 (1.74) | <0.01 (*F* < 0.01, *p* = 1, $\eta^2$ < .01) | 1.38 (1.75) | 1.54 (1.86) | -0.15 (*F* = 0.83, *p* = .37, $\eta^2$ = .01) |
| **Drug use** | 0.78 (0.78) | 0.69 (0.81) | 0.10 (*F* = 1.18, *p* = .28, $\eta^2$ = .01) | 0.71 (0.87) | 0.53 (0.69) | 0.18 (*F* = 3.10, *p* = .08, $\eta^2$ = .03) |

A)

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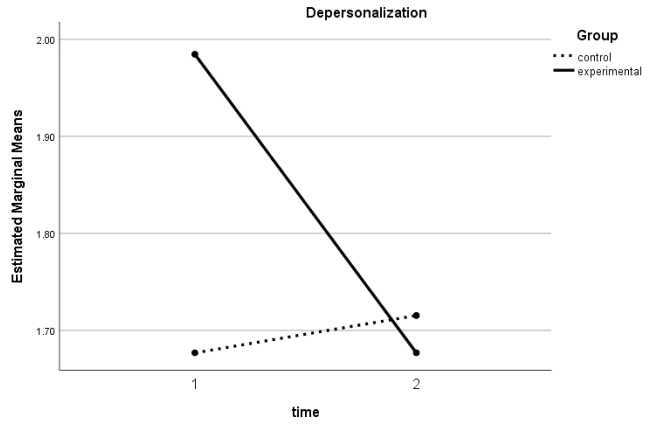


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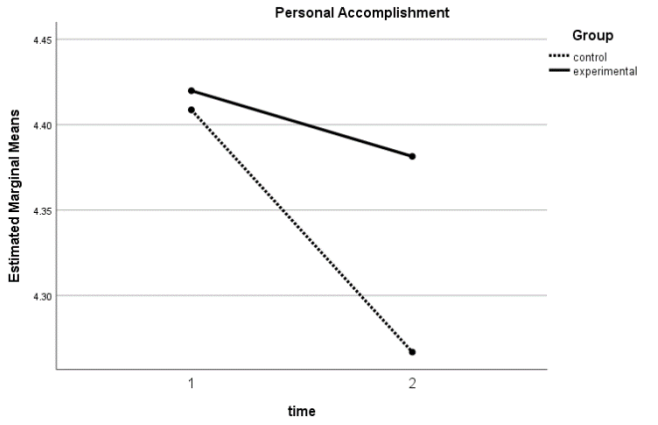


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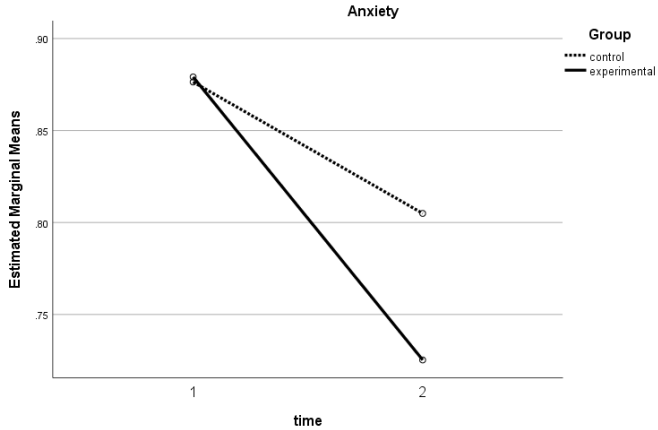


*Figure 2*. Time-1 and time-2 comparison between control and experimental groups of: A) Emotional exhaustion; B) Depersonalization; C) Personal accomplishment; D) Anxiety.