UNIVERSITI PUTRA MALAYSIA

EFFECTIVENESS OF A MINDFULNESS PROGRAM ON PSYCHOLOGICAL DISTRESS AMONG PRECLINICAL MEDICAL STUDENTS IN A PUBLIC UNIVERSITY IN MALAYSIA

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FPSK(P) 2018 32

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By

MAHER D FUAD FUAD

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

April 2018

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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Chair: Professor Dato' Lye Munn Sann, MBBS, DrPH
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Background: Psychological distress (PD) is common among medical students. Many studies used mindfulness based interventions (MBI) to reduce psychological distress and enhance coping mechanisms. However, the duration of the commitment required to attend these interventions led to many prospective participants to either withdraw or not participating in the programs. Many studies explored shorter versions of MBI and found it successful in reducing psychological distress.

Objectives: To determine the prevalence and risk factors of PD, depression, anxiety and stress (DAS) among preclinical medical students. Also, this study aimed to determine the effectiveness of The Mindfulness Program (TMP) on PD and DAS among preclinical medical students.

Methodology: This study had two phases. Phase 1 was a cross sectional study. Phase 2 was an experimental study. A total of 237 preclinical undergraduate medical students were screened in phase 1 of the study. 92 students with high scores of PD were recruited for phase 2 of the study. Subjects were randomly allocated to TMP and wait-listed control groups on a one to one ratio. Only one trainer implemented the intervention. Self-administered validated questionnaires were used to record data for the study. Participants filled the baseline questionnaires two weeks prior to end of semester exam. The post intervention questionnaires were filled 8 weeks after the intervention and two weeks prior to the end of semester exam. Primary and secondary outcomes of the study were PD and DAS.

Results: The prevalence of PD was 38.8%. The prevalence of stress, anxiety and depression were 37.1%, 51.9% and 24.1% respectively. Risk factors of PD included academic related stressors (Adjusted Odds Ratio (AOR)= 1.65, 95% C.I. = 1.01, 2.71, p= 0.047), drive and desire related stressors (DRS) (AOR=1.44, 95% C.I. = 1.02, 2.03, p=0.039) and group-activities related stressors (GARS) (AOR= 1.74, 95% C.I. = 1.12, 2.69, p= 0.014). Risk factors of depression included male preclinical medical students (AOR= 5.71, 95% C.I.=2.64, 12.36, p<0.001), living in rural areas (AOR= 3.38, 95% C.I. =1.48, 7.72, p=0.004), DRS (AOR= 1.51, 95% C.I. = 1.03, 2.20, p=0.035), GARS (AOR= 3.58, 95% C.I.=2.24, 5.72, p<0.001). Risk factors of anxiety included living in rural areas (AOR= 2.40, 95% C.I. =1.26, 4.59, p value = 0.008) and GARS (AOR= 2.56, 95% C.I. =1.80, 3.64, p<0.001). Risk factors of stress included living in rural areas (AOR= 2.41, 95% C.I.=1.07, 4.27, p=0.031), GARS (AOR= 2.60, 95% C.I.=1.72, 3.95, p<0.001) and teaching and learning related stressors (AOR= 1.79, 95% C.I. =1.16, 2.78, p=0.009). Intention to treat analyses using repeated measures analyses of covariance showed significant mean scores reduction of PD (p=0.002), stress (p<0.001), anxiety (p<0.001), and depression (p=0.001) among TMP group.

Conclusions: Preclinical medical students had a high prevalence of PD and DAS. Important risk factors were identified. TMP showed a significant reduction in mean scores of PD and DAS in the intervention group compared to the control wait-listed group.

Keywords: psychological distress, stress, anxiety, depression, mindfulness, preclinical medical students, Malaysia.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

KEBERKESANAN PROGRAM KESEDARAN KE ATAS TEKANAN PSIKOLOGI DI KALANGAN PELAJAR PERUBATAN PRA-KLINIKAL UNIVERSITI PUTRA MALAYSIA

Oleh

MAHER D FUAD FUAD

April 2018

Pengerusi: Profesor Dato' Lye Munn Sann, MBBS, DrPH
Fakulti: Perubatan dan Sains Kesihatan

Latarbelakang: Tekanan psikologi(PD) kerap berlaku di kalangan pelajar perubatan. Banyak kajian menggunakan kaedah kesedaran(MBI) untuk menurunkan tekanan psikologi serta meningkatkan mekanisma mengatasinya. Walaubagaimanapun, jangka masa yang diperlukan untuk memberikan komitmen bagi menyertai program intervensi ini menyebabkan kebanyakan calon peserta mengambil keputusan untuk mengundur diri atau tidak menyertai program tersebut. Terdapat banyak kajian lain yang menemui versi MBI yang lebih ringkas dan mendapati ianya terbukti berkesan dalam mengurangkan tekanan psikologi.

Objektif: Untuk menentukan kelaziman dan faktor risiko PD, kemurungan, kebimbangan dan tekanan (DAS) di kalangan pelajar perubatan pra-klinikal. Kajian ini juga bertujuan untuk menentukan keberkesanan program intervensi kesedaran sehari ke atas PD dan DAS di kalangan pelajar perubatan pra-klinikal.

Kaedah/ Metodologi: Kajian ini terdiri daripada 2 fasa. Fasa pertama adalah kajian keratan rentas. Fasa kedua adalah kajian eksperimen. Sejumlah 237 pelajar perubatan pra-klinikal disaring dalam fasa pertama kajian ini. Mereka dengan skor PD yang tinggi diambil untuk fasa kedua kajian ini. Subjek dipilih secara rawak ke intervensi TMP dan kumpulan kawalan dalam senarai tunggu dalam nisbah satu ke satu. Hanya seorang pelatih bertindak sebagai fasilitator kepada intervensi ini. Data diperolehi daripada borang soal-selidik yang sah yang diisi sendiri oleh subjek/ peserta. Peserta mengisi soal-selidik asas 2 minggu sebelum peperiksaan. Soal-selidik pos-intervensi diisi 8 minggu selepas intervensi dan 2 minggu sebelum peperiksaan. Hasil kajian primer dan sekunder adalah PD dan DAS.

Keputusan: Kelaziman/ Prevalen PD adalah 38.8%. Kelaziman/Prevalen tekanan, kebimbangan dan kemurungan adalah 37.1%, 51.9% dan 24.1% masing-masingnya. Faktor risiko PD termasuk tekanan yang berkaitan akademik **(**(Adjusted Odds Ratio (AOR)= 1.65, 95% C.I. = 1.01, 2.71, p= 0.047), tekanan berkaitan desakan dan keinginan (DRS) (AOR=1.44, 95% C.I. = 1.02, 2.03, p=0.039) dan tekanan berkaitan aktiviti berkumpulan (GARS) (AOR= 1.74, 95% C.I. = 1.12, 2.69, p= 0.014). Faktor risiko untuk kemurungan termasuk pelajar perubatan pra-klinikal lelaki (AOR= 5.71, 95% C.I.=2.64, 12.36, p<0.001), tinggal di kawasan luar bandar (AOR= 3.38, 95% C.I. =1.48, 7.72, p=0.004), DRS (AOR= 1.51, 95% C.I. = 1.03, 2.20, p=0.035), GARS (AOR= 3.58, 95% C.I.=2.24, 5.72, p<0.001). Faktor risiko kebimbangan termasuk tinggal di kawasan luar bandar (AOR= 2.40, 95% C.I. =1.26, 4.59, p value = 0.008) dan GARS (AOR= 2.56, 95% C.I. =1.80, 3.64, p<0.001). Faktor risiko tekanan termasuk tinggal di kawasan luar bandar (AOR= 2.41, 95% C.I.=1.07, 4.27, p=0.031), GARS (AOR= 2.60, 95% C.I.=1.72, 3.95, p<0.001) dan tekanan berkaitan pengajaran dan pembelajaran (AOR= 1.79, 95% C.I. =1.16, 2.78, p=0.009). Analisis hasrat untuk merawat menggunakan Analisis langkah-langkah berulang kepada kovarians *(ANCOVA)* menunjukkan penurunan ketara skor purata PD (p=0.002), tekanan (p<0.001), kebimbangan (p<0.001), dan kemurungan (p=0.001) dalam kumpulan TMP.

Kesimpulan: Pelajar perubatan pra-klinikal mempunyai prevalen PD dan DAS yang tinggi. Beberapa faktor risiko penting dikenalpasti. Program intervensi TMP menunjukkan penurunan ketara skor purata PD dan DAS di dalam kumpulan intervensi, berbanding kumpulan kawalan dalam senarai tunggu.

Kata kunci: tekanan psikologi, tekanan, kebimbangan, kemurungan, kesedaran, pelajar perubatan pra-klinikal, Malaysia.

ACKNOWLEDGEMENTS

As I reflect upon the journey towards completion of this thesis, I see the faces of my family, mentors, friends and colleagues who provided unwavering support. Thank you all.

First and foremost, I wish to express my deepest gratitude to my supervisor and mentor, **Prof. Dato' Dr. Lye Munn Sann**, for his unfailing and unwavering support and encouragement. Prof Lye's detailed comments and guidance made the topic more tangible, fascinating and decipherable for me.
My deepest appreciation and respect to my supervisory committee members: To **Associate Prof Dr. Normala Ibrahim** who has been a mentor and a teacher. To Dr. **Siti Irma Fadhilah**, who will always be remembered for her help and guidance.

Also, I would like to thank the trainer of the medical students, **Dr. Phang Cheng Kar**, whose expertise and straightforward explanations made conduction of my research a pleasant journey of continuous learning.

Many thanks and appreciations also go to my **family,** my friends **Dr. Maged Elnajeh** and **Dr. Mohammad Najah Mahdi.** Last but not least**,** I would like to express my deepest appreciations to all of the **pre-clinical medical students** of Universiti Putra Malaysia who have willingly participated in my study.

I certify that a Thesis Examination Committee has met on 12 April 2018 to conduct the final examination of Maher D Fuad Fuad on his thesis entitled "Effectiveness of a Mindfulness Program on Psychological Distress among Preclinical Medical Students in a Public University in Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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This is to confirm that:

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LIST OF ABBREVIATIONS

95% C.I.	95% Confidence Interval
ARS	Academic Related Stressors
AOR	Adjusted Odds Ratio
ACC	Anterior Cingulate Cortex
BM	Bahasa Malaysia
BDI	Beck's Depression Inventory
CBSM	Cognitive-Behavioural Stress Management
CSS	Cross-Sectional Study/Studies
OR	Crude Odds Ratio
DVs	Dependent Variables
DAS	Depression, Anxiety and Stress
DASS	Depression, Anxiety, Stress Scales
M.D.	Doctor of Medicine
DRS	Drive and Desire Related Stressors
EFA	Exploratory Factor Analysis
FMHS	Faculty of Medicine and Health Sciences
GHQ-12	General Health Questionnaire-12
GARS	Group-Activities Related Stressors
IRCT	Iranian Registry of Clinical Trials
IVs	Independent Variables
IBTM	Integrative Brain Model of Behaviour Change Through Mindfulness
ITT	Intention to Treat
IRS	Intrapersonal and Interpersonal Related Stressors
K-10	Kessler Scales
MQA	Malaysian Qualification Agency
MUET	Malaysian University English Test
MSSQ	Medical Students Stressors Questionnaire
MBCT	Mindfulness Based Cognitive Therapy
MBI	Mindfulness Based Interventions
MBSR	Mindfulness Based Stress Reduction
NHS	National Health Services
NAc	Nucleus Accumbens
NNT	Number Needed to Treat
mPFC	Prefrontal Cortex
PCA	Principal Component Analysis
PBL	Problem Based Learning
PD	Psychological Distress
RCT	Randomized Controlled Trial
RM-ANCOVA	Repeated Measures Analysis of Covariance
JKEUPM	Research Ethics Committee of The Universiti Putra Malaysia
SSKM-20	Saringan Status Kesihatan Mental-20
SDL	Self-Directed Learning Session
SRS	Social Related Stressors
Sd	Standard Deviation
SPSS	Statistical Package for The Social Sciences

TLRS	Teaching and Learning Related Stressors
TMP	The Mindfulness Program
TM	Transactional Model of Stress and Coping
UPM	Universiti Putra Malaysia
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Background

Psychological distress (PD) is one of the widely-used indicators of population mental health (Nielsen, Neergaard, Jensen, Bro, & Guldin, 2016). It was used as an indicator of the population mental health in public health, population surveys (Zabora, BrintzenhofeSzoc, Curbow, Hooker, & Piantadosi, 2001) and in epidemiological studies (Larcombe et al., 2016). Also, PD was used and an outcome in clinical trials and intervention studies (Wang, Chow, & Chan, 2017). Psychological distress is generally defined as a state of emotional suffering typically characterised by symptoms of depression; such as lost interest, sadness and hopelessness, and anxiety; such as restlessness and feeling tense (Doran, 2011; Mirowsky & Ross, 2002). Yet, when examining the scientific literature, the expression of PD was used for unspecific combinations of symptoms ranging from depression and general anxiety symptoms to personality traits, functional disabilities and behavioural problems (Drapeau, Marchand, & Beaulieu-Prévost, 2012). Some additional criteria to define PD were proposed but no consensus was reached. Specifically, the stress-distress model was introduced to explain PD (Horwitz, 2007). The model proposes an imbalance between exposure to stressful events and the ability of a person to cope was the mechanism for PD (Horwitz, 2007; Ridner, 2004). Horwitz (2007) and Ridner (2004) argued that PD disappears when the stressor is eliminated or individuals start to cope with the stressors effectively. However, this model, despite the supporting evidence, failed to explain the presence of PD in the absence of stress (Drapeau et al., 2012).

PD has been debated in the scientific literature. Some, consider it as an emotional disturbance affecting the social functioning and individuals daily living which merited numerous studies looking for its associated risk and relieving factors (Wheaton, 2007). Others, looked at PD as a criterion to diagnose some psychological disorders (such as obsessive-compulsive, post-traumatic stress disorders) and an indicator of the severity of symptoms in other disorders (such as major depression and generalized anxiety disorders) (Phillips, 2009; Watson, 2009). As such, PD would only be a medical issue if it coexisted with other symptoms that satisfy diagnostic criteria of a psychological disorder.

Psychological disorders are an increasing problem worldwide. (World Health Organization [WHO], 2012a). In 2016, psychological disorders accounted for 7% of the global burden of disease (Vigo, Thornicroft, & Atun, 2016). Global burden of disease is defined as premature death combined with years lived with disability (Funk, 2016). However, researchers argued that the global burden of

psychological disorders have been underestimated (Vigo et al., 2016). Many factors led to this underestimation. Firstly, the overlap between psychological and neurological disorders. Secondly, the separation of suicide and behaviours associated with self-injury in a separate category. Also, the exclusion of personality disorders in psychological disorders calculation. Finally, the contribution of psychological disorders to mortality rates from associated causes was inadequately considered (Vigo et al., 2016). Therefore, when taking into consideration the disability component of the burden of disease calculation, psychological disorders accounted for 11.23% of the global burden of disease placing it the second in ranking (Funk, 2016; Vigo et al., 2016).

In Malaysia, every 3 in 10 adults aged 16 years and above have some sorts of mental health problems (29.2%) (National Health and Morbidity Survey, 2015). The prevalence of mental health problems among adults increased from 10.7% in 1996, to 11.2% in 2006, to 29.2% in 2015 (National Health and Morbidity Survey, 2015). The prevalence in Kuala Lumpur is 39.8%. The prevalence in females was slightly higher than in males but the difference was not significant (30.8% vs 27.6%). Risk factors (adults): females, younger adults, other Bumiputras, and adults from low income families. By occupation, the prevalence was lowest among government/semi-government employees (2.6%). The overall prevalence of mental health problem among children was 12.1% (children = 5 to 15 years old). Risk factors (children): boys, younger age group and from rural areas (National Health and Morbidity Survey, 2015). Mental illness is expected to be the second biggest health problem affecting Malaysians after heart diseases by 2020 (National Health and Morbidity Survey, 2015).

Depression, anxiety and stress (SAD) are highly related to PD (Dyrbye, Thomas, & Shanafelt, 2006). Prevalences of DAS were reported to be very high among medical students in Malaysia and globally ranging between 20% up to 70% (Alvi, Assad, Ramzan, & Khan, 2010; Fuad et al., 2015; Inam, Saqib, & Alam, 2003; Yusoff, Rahim, Baba, Ismail, & Pa, 2013; Zaid, Chan, & Ho, 2007).

Currently, the global burden of PD cannot be estimated due to whether it should be classified as s single entity or treated as a continuum of psychological disorders (Payton, 2009). The prevalence of PD is difficult to pinpoint for many reasons. Firstly, many different scales were used in its assessment such as the General Health questionnaire (GHQ-12) (Goldberg & Williams, 2006), the Kessler scales (K10) (Kessler et al., 2002) depression, anxiety and stress scale (DASS-21) and Saringan Status Kesihatan Mental (SSKM-20) (Lim, Singh, Cheah, Seow, & Oei, 2011). Secondly, the time windows used in the documentation of symptoms (GHQ- last few weeks, and K-10- last 30 days and DASS- last 2 weeks). Also, the cut-points used to dichotomize the score of PD and categorize individuals into psychologically distressed or not (more than 15 in GHQ-12, more than 20 in K-10 and more than 14 in SSKM-20). Finally, the cultures in which the instruments were developed. For instance, some items in psychological scales may not be suitable for Asian population (Lim et al., 2011; Mukhtar & Oei, 2011). However, attempts were made to estimate the prevalence in the general population and found it to range between 5% and 27% (Benzeval

& Judge, 2001; Chittleborough, Winefield, Gill, Koster, & Taylor, 2011; Kuriyama et al., 2009) but it can be even higher in specific population groups exposed to certain risk factors such as university students (Stallman, 2010). According to Stallman (2010), the prevalence of PD was almost 20% with 67% reporting sub-syndromic symptoms.

The extremely high prevalence of PD in university students provides evidence for this being an at-risk population. “One of the predictors of PD among university students was low levels of mindfulness (Cash & Whittingham, 2010). This indicates the need for universal early interventions to prevent the development of severe mental illness in university students” (Stallman, 2010).

Mindfulness focuses on shifting attention to experiences occurring in the present moment by maintaining a moment-by-moment awareness of our thoughts, feelings, bodily sensations, and surrounding environment in a non-judgmental way (Kabat-Zinn, 2013).

1.2 Statement of the Problem

The ultimate objective of medical education is to produce physicians equipped with adequate knowledge, competency, and professionalism in order to care for the sick, develop medicine, and enhance public health. Medical schools use a comprehensive selection process to identify intelligent and altruistic individuals who are committed to these objectives and then spend the following years trying to prepare those individuals to achieve them (Dyrbye et al., 2006).

The medical education of the Malaysian system usually starts after high school or foundation in medical sciences (Malaysian Qualification Agency [MQA], 2013). This is different from the United states and the Canadian system where the candidates achieve a bachelor’s degree that includes, at least, basic training in biology, chemistry, and physics, as well as training in the humanities and may have experienced patients care either via employment or volunteer work before applying to medical school (Medical Study Guide, 2017). In addition to identifying individuals with the necessary criteria to be medical doctors, this process is used to identify individuals who are willing to pursue a career in medicine in response to the demands, challenges, and rewards of the profession. Once enrolled, students and schools make a mutual commitment for preparing students for a socially beneficial and personally fulfilling career (Association of American Medical Colleges & Liaison Committe on Medical Education, 2016).

Based on these criteria, it is conceivable that medical school would be a time of personal development, dream realization, and well-being despite its challenges. Unfortunately, researches showed that the current medical educational process may have an adverse negative effect on medical students’ mental health, with a higher proportion of PD among medical students compared to other programs of

study and to the general population (Dyrbye et al., 2006; Sherina & Kaneson, 2003; Sherina, Rampal, & Kaneson, 2004).

It has also been predicted that burnout, a measure of PD found among young doctors and physicians in practice and medical officer interns originated in medical school (Dyrbye et al., 2006; Shahruddin et al., 2016). Many factors such as academic load, work stress, financial issues, sleep deprivation, dealing with patients' suffering and deaths, and student abuse have been blamed for the decline in students' mental health (Yusoff & Rahim, 2010a). Research suggests that PD among students affect their academic performance (McConville, McAleer, & Hahne, 2017; Stewart, Lam, Betson, Wong, & Wong, 1999), predispose to academic dishonesty (Hojat et al., 1993; Miller, Murdock, & Grotewiel, 2017) and may contribute to alcohol and substance abuse (van Zyl et al., 2017). Students' PD have also been blamed in playing a role in the development of cynicism, an unwillingness to care for the chronically ill (Crandall, Volk, & Loemker, 1993; Worly et al., 2017), and low empathy (Hojat et al., 2004). Previous studies showed that the prevalence of PD among medical students during their training years in various countries and medical institutions ranges from 21%-56% (Dyrbye, Szydlo, Downing, Sloan, & Shanafelt, 2010).

Medical students compared to other programs of studies suffer even higher levels of PD compared to other programs of studies (Dahlin, Joneborg, & Runeson, 2005; Dyrbye et al., 2006). Medical programs, due to its structure, are very stressful with high prevalence of PD ranging from 40% to 60% (Fuad et al., 2015). This makes it a time of significant psychological burden for physicians-in training. Among medical students, many studies suggested that students in their preclinical years of study exhibited higher levels of PD compared to students in clinical years of their study (Bayram & Bilgel, 2008; Dyson & Renk, 2006; Singh, Lal, & Singh, 2011). Many others, reported higher prevalence of PD among clinical-years medical students (Fuad et al., 2016; Fuad et al., 2015; Yusoff, Rahim, & Yaacob, 2010b).

Currently, the available knowledge is insufficient to establish the causes and consequences of student PD (Brennan, McGrady, Lynch, & Whearty, 2010). In Universiti Putra Malaysia (UPM), according to the academic office, Medical students suffering from PD seek help from the counselling clinic and the academic office at the faculty of medicine and health sciences. However, no specific numbers were available on the utilization of these counselling services.

Several medical education institutions have emphasized on the importance of incorporating stress management and self-care skills to medical students' education (Redwood & Pollak, 2007; Rosenzweig, Reibel, Greeson, Brainard, & Hojat, 2003). Although more than 600 research papers addressed the importance of stress management programs in medical curricula (Redwood & Pollak, 2007), none of the programs provided a convincing evidence of their effectiveness (Shapiro, Shapiro, & Schwartz, 2000). For example, Redwood & Pollak (2007) reported the level of participation as a measure of success of their

program. Also, Brennan et al. (2010), reported students' satisfaction as a measure of success of their program. Apart from that, their specific applications to medical education have been largely unexplored (Shapiro et al., 2000). Recent researches used a better study designs and reported success using specific scales such as BAI (Barbosa et al., 2013), GHQ (Phang, Mukhtar, Ibrahim, Keng, & Sidik, 2015), and DASS (Kar, Mukhtar, Ibrahim, Shian-Ling, & Sidik, 2015). Barbosa et al. (2013) used non-randomized design with no comparison group. Phang et al. (2015) and Kar et al. (2015) follow-up measures were after one week and six months but it did not control for the effect of examinations period. Research showed that students PD and DAS levels fluctuate before and after examinations period making it difficult to determine whether the effect was due to the intervention itself or because the exam period is over (Pradhan, Mendinca, & Kar, 2014; Singh et al., 2012).

Mindfulness-based stress reduction program (MBSR), is a stress reduction program developed by Dr Jon Kabat Zinn (Kabat-Zin, 1994; Kabat-Zinn, 1982, 2013; Kabat-Zinn & Chapman-Waldrop, 1988). It is an 8-week program that was proven very successful in reducing levels of PD and DAS (Anderson, Lau, Segal, & Bishop, 2007; Shapiro, Brown, & Biegel, 2007; Speca, Carlson, Goodey, & Angen, 2000). However, MBSR had one limitation. The time commitment of an 8-week long was a deterrent for potential candidate to participate it or a reason for dropping out (Carlson, Speca, Patel, & Goodey, 2003; Minor, Carlson, Mackenzie, Zernicke, & Jones, 2006). Many studies examined a shorter version of MBSR and found it to maintain its effectiveness and sometimes with higher effect sizes (Jain et al., 2007; Klatt, Buckworth, & Malarkey, 2009; Tacón, Caldera, & Ronaghan, 2004).

The above makes developing a shorter version of mindfulness intervention to reduce PD and DAS among medical students' population an important task for enhancing their attendance.

1.3 Significance of the Study

Based on previous literature, medical students' wellbeing and physicians in-training have been reported to deteriorate over time; from the pre-clinical stage (Bayram & Bilgel, 2008; Dyson & Renk, 2006; A. Singh et al., 2011) to clinical stage (Fuad et al., 2016; Yusoff et al., 2010b) to internship (Shahruddin et al., 2016) with the lowest point being found in the pre-exam periods (Hassed, De Lisle, Sullivan, & Pier, 2009).

It is worth noting that, the unwanted consequences of PD and DAS; such as low academic performance, academic dishonesty, alcohol and substance abuse and cynicism (Hojat et al., 2004; McConville et al., 2017; Miller et al., 2017; van Zyl et al., 2017; Worly et al., 2017), were related to some aspects of the medical training and they might hinder the noble ambitions and values of the medical

education which is to produce healthy and competent doctors to the serve society (Downie & Charlton, 1992; Dyrbye et al., 2006).

The significance of this study is in line with previous researches' recommendation to explore the effectiveness of a shorter version of MBSR. This study was the first to take into account the effect of examination stress when assessing the effectiveness of The Mindfulness Program (TMP) to ensure that any reduction in PD and DAS is attributed to program. In addition to that, the instruments used to measure the PD and the stressors were developed and validated in Malaysia (MSSQ and SSKM). Finally, this study will provide the necessary skills that help the students in their future academic education and training by introducing the TMP at the preclinical stage of the medical program.

1.4 Research Questions

1. What is the prevalence of PD and DAS among pre-clinical medical students?
2. What are the risk factors which lead to PD and DAS in pre-clinical medical students?
3. Is The Mindfulness Program (TMP) successful in decreasing PD and DAS when compared to wait-listed controls?

1.5 Research Objectives

1.5.1 General Objective:

To determine prevalence, risk factors of PD and to implement and evaluate the effectiveness of the TMP in reducing PD among pre-clinical medical students in Universiti Putra Malaysia (UPM).

1.5.2 Specific Objectives:

1. To describe the sociodemographic characteristics of UPM pre-clinical medical students.
2. To determine the prevalence of PD and DAS among pre-clinical medical students using SSKM-20 and DASS-21 respectively.
3. To determine the risk factors of PD and DAS among pre-clinical medical students
4. To implement TMP.
5. To evaluate the effectiveness of TMP on PD (Primary outcome) and DAS (secondary outcomes) after 8 weeks.
    a) Within-group effect.
    b) Between groups effect.
    c) Time-groups interaction.

1.6 Hypotheses

1. H_0: there is no association between academic related stressors and PD and DAS.
2. H_0: there is no association between teaching and learning related stressors and PD and DAS.
3. H_0: there is no association between intrapersonal and interpersonal related stressors and PD and DAS.
4. H_0: there is no association between social related stressors and PD and DAS.
5. H_0: there is no association between group-activities related stressors and PD and DAS.
6. H_0: there is no association between drive and desire related stressors and PD and DAS.
7. H_0: there is no mean scores reduction of PD and DAS after TMP.

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