

Effectiveness of Mindfulness Based Cognitive Therapy in Reducing Stress among Senior Medical Students: A Single Subject Experimental Study

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How to cite this paper: Butt, M. K. (2022). Effectiveness of Mindfulness Based Cognitive Therapy in Reducing Stress among Senior Medical Students: A Single Subject Experimental Study. *Open Journal of Social Sciences*, 10, 431-445.
<https://doi.org/10.4236/jss.2022.105027>

Received: April 26, 2022

Accepted: May 28, 2022

Published: May 31, 2022

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Abstract

The aim of this study was to investigate the effectiveness of Mindfulness Based Cognitive Therapy (MBCT) in reducing stress levels among medical students. A single subject experimental design with multiple baselines was implemented on the sample of 5 medical students. It was hypothesized that MBCT intervention will reduce stress and enhance mindfulness among all participants. In order to measure the levels of stress, the Medical Student Stress Questionnaire MSSQ was utilized. Likewise, to measure the levels of mindfulness, Mindfulness Attention Awareness Scale (MAAS) was used. The results of the study confirmed the hypothesis. All participants showed a decrease in their stress levels and an increase in their level of mindfulness. MBCT was found effective in managing stress among medical students.

Keywords

Mindfulness Based Cognitive Therapy, Mindfulness, Medical Students, Single Subject Design

1. Introduction

Stress is a basic feature of modern day life. No gender or age can escape the universality of stress in modern times. Though reasons or stimuli may differ every day, the subjective experience of being worried remains constant. Especially since the global pandemic hit 2 years back, people are reporting stress experiences on alarming levels. Stress affects the quality of life of almost everyone around us and causes hindrance in obtaining optimal performance and growth. Even though stress is a universal human experience and people from all walks of

life suffer from it in one way or the other, it is a proven fact that some populations are more vulnerable to stress than others (Mental Health Foundation, 2018).

Researches claim that younger population is at higher risk of suffering from stress. In the last year nearly half of the young adults in America (49%) claimed that stress has negatively affected their behavior (Results of the Mental Health Foundation's Study, 2018). Academic stress is one of the major sources of stress in teenagers and young adults. A local survey of Pakistan indicated that 84% of university students suffer from stress (Asif et al., 2020). Researches claim that among all academic careers, health and medical related studies have been found to be most stress generating. Alarmingly, Stress has been found to be exceptionally high among medical students all across the globe with a prevalence rate of 80% (Abebe et al., 2018). The stress rates in 4th and 5th year students were found to be more severe with 95% and 98% students reporting that they are under stress, respectively (Shaikh et al., 2004). In the final years of medical studies, students have to manage studies along with their hospital rotations. This increased workload and stress levels result in final year students having the highest level of stress among all students (Abdulghani et al., 2011).

In recent years, stress among senior medical students has increased many folds due to the COVID-19 global pandemic (Obschonka et al., 2022). Medical students claim that their studies have been badly affected by the pandemic (Harries et al., 2021). Similarly, almost one third of the medical students agree that their anxiety levels have increased since the pandemic begin (Torun & Torun, 2020). The factors contributing to increased levels of stress include shifting to online classes, discontinuing or minimizing clinical training, concerns about contracting COVID-19 from hospital settings, concerns about safety of the family, and financial issues etc. (O'Byrne et al., 2021). Moreover, educational and hospital guidelines during pandemic were not clear and abrupt shifts to online mode of learning caused confusion among senior medical students. Many students reported online modules and case discussions to be unsatisfactory as they cannot replace first-hand experience and learning students gain at hospitals (Stokes, 2020).

Recent global pandemic has increased the importance of establishing therapeutic treatment options for managing stress among medical trainees. Medical students are the future frontline fighters in humanity's fight against pandemics. Working around the clock in the global emergency is undoubtedly a heroic task which utilizes a person's mental and psychological resources to its maximum. This study highlights the narrative that we must train our future health providers in their student years and equip them with resources that are crucial to keep them calm during nerve wracking situations.

While studying different treatment options for stress, Mindfulness Based interventions seem to be gaining mass popularity in recent times (Burnette et al., 2022). With its promising results and high compliance rates, Mindfulness based therapies like Mindfulness Based Stress Reduction and Mindfulness Based Cog-

nitive Therapy (MBCT) are being applied to multiple settings and issues to test their effectiveness. After the revised manual of Mindfulness Based Cognitive Therapy (MBCT) came in 2013, it has already been tested for many mental conditions and on different populations; however its effectiveness in reducing stress among medical field students and trainees is yet to be established. Therefore, this study will focus on testing the effectiveness of MBCT in reducing the stress experienced by medical students.

2. Methods

2.1. Research Design

The current study is a “single subject experimental design”. The study follows multiple baseline design patterns in which multiple baselines are taken across subjects throughout the entire research. Baselines A1, A2, A3, and A4 were taken before introducing the treatment plan. Consequently, B1, B2, B3, B4, B5 and B6 were taken during the treatment phase.

2.2. Participants

Sample of the study consisted of 4th and 5th year medical students. Total 5 medical field students were selected as participants. All of the participants were last year MBBS students. The participants were studying at a private medical college in Islamabad. Out of all participants, 4 were female and 1 male ranging from ages 22 to 25.

2.3. Instruments

2.3.1. Depression Anxiety Stress Scale-21 (DASS-21)

The Depression, Anxiety, and Stress Scale (DASS) is a 4 point Likert scale ranging from 0 - 4. DASS-21 is a self-report measure used to tackle emotional and mental states of an individual. The scale has 3 subscales with separate items to measure levels of depression, anxiety and stress. A 2021 study on the psychometric properties of DASS 21 indicated that the scale has excellent validity and reliability with Cronbach’s alpha values of 0.91, 0.89 and 0.78 for the subscales of depressive, anxiety and stress, respectively (Coker et al., 2018).

2.3.2. Medical Student Stress Questionnaire (MSSQ)

The Medical Student Stress Scale (MSSQ) is a 5 point liker scale that was developed in 2010 to identify the occurrence and levels of stress among medical students. The scale has 6 major domains depending upon the types of stressor. The 6 major domains include: Academic related stressors (ARS), Group activities related stressors (GARS), Intrapersonal and interpersonal related stressors (IRS), Social related stressors (SRS), Drive and desire related stressors (DRS), and Teaching and learning-related stressors (TLRS) In the present study, Urdu translated version of the MSSQ scale was used. The MSSQ scale is highly reliable with Cronbach’s alpha value of 0.95.

2.3.3. Mindfulness Attention Awareness Scale (MAAS)

The Mindfulness Attention Awareness Scale (MAAS) is designed a 15 item 6 points Likert scale that is designed to measure mindfulness levels referred to as the conscious awareness of what is occurring in the current present (Brown & Ryan, 2003). The scale was adapted in Urdu in 2020 and its' Urdu version was used in the study. The scale has significant reliability and validity values with Cronbach's alpha value 0.92, making it an ideal scale for measuring mindfulness levels among individuals (Jayarajah et al., 2020).

2.4. Procedure

A research advertisement aimed at finding the effectiveness of Mindfulness Based Cognitive Therapy was circulated among the students of private medical colleges in Islamabad on online social platforms. Total 12 students contacted the researcher. Out of these 12, the students having highest levels of stress and no psychological comorbidities were selected. All of the participants completed the study.

After finalizing research participants, an introductory session was conducted with everyone separately. In the introductory session, the therapist introduced herself and the entire pattern of study was explained in detail. After explaining the study in detail, consent forms were signed by the participants. At the end of the session the participants filled two questionnaires, MSSQ and MAAS, to measure stress and mindfulness levels. Before ending the session, time and date for the next session was scheduled.

In the next 3 sessions, general discussion regarding the previous week was carried out by the participant and at the end MSSQ and MAAS were filled. From the 5th session, MBCT intervention was introduced. Furthermore, homework was assigned at the end of every session. All the homework was to be recorded on the homework record forms provided to the clients.

2.5. Session Plan

Session 1. The theme of session 1 was "Awareness and Automatic Pilot". In first intervention session, concept of mindfulness was explained to the clients through raisin exercise. Further, Mindfulness Based Cognitive Therapy was explained. In order to step out of automatic thinking, the therapist introduced the body scan technique. Homework assignments consisted of practicing body scan once daily (6 times) before the next session. Along with body scan one daily life activity was chosen by the client to perform mindfully and attentively every day. At the end of the session, handouts and homework forms were provided to the client and MSSQ and MAAS scales were administered.

Session 2. The theme of Second session was "Living in our heads". The client reviews (Segal et al., 2013), homework from the last session and conducted thoughts and feelings exercise. Pleasant event calendar was introduced in the session. 10 minutes breathing meditation was also practiced. Homework assignments included practicing breathing meditation once daily (6 times) before

the next session and filling out pleasant events calendar. At last material for session 2 was provided (Segal et al., 2013), and scales were administered.

Session 3. In this session the theme was “Gathering the scattered mind”. As mind is often busy in thinking about the past and contemplating about the future and often absent from the present moment, people do not feel connected to their current feelings and sensory experiences. To help participants notice their current state, the session begun with 5 minutes seeing exercise (Kappen et al., 2019). After that homework was reviewed. The therapist incorporated mindfulness in the participant’s daily routine by introducing 3 minutes breathing space technique (Brown & Ryan, 2003). Furthermore, in order to identify the daily events that affect mood, unpleasant event calendar was discussed. Homework consisted of practicing 3 minutes breathing space and body scan meditation once daily along with completing unpleasant events calendar (Segal et al., 2013). Handouts were also provided to deepen the knowledge of learnt techniques. Lastly, stress and mindfulness measures were taken.

Session 4. “Recognizing Aversion” was the theme of session 4 which means identifying the thoughts that take people into worry and negative state of mind. The session started with 5 minutes seeing exercise to step out of habitual automatic thinking. In order to facilitate the participant to be more present in the moment and be aware of how they react to the events around them, mindfulness techniques like 10 minutes breathing meditation and 20 minutes sitting meditation were used. The therapist helped participant to take a wider perspective and relate positively to the events. At the end handouts (Keng et al., 2011) of session 4 along with MSSQ and MAAS scales were provided.

Session 5. Session 5 taught the participant the concept of acceptance. It is very important to accept all the feelings, emotions, experiences and memories no matter how painful they are. Mostly people tend to reject and push away difficult experiences and do not allow themselves to process the emotions attached to a difficult experience, hence, they become exhausted. The theme of the session was “Allowing and letting be”. It taught the participant to relate to the unpleasant experiences differently and accept them. 40 minutes sitting meditation technique was used to connect the participant to the inner emotions and thoughts that allowed acceptance. Homework assigned consisted of practicing 40 minutes sitting meditation (3 times a week) and breathing space technique once daily. The session ended with measuring stress and mindfulness levels (Segal et al., 2013). Handouts of session 5 were also provided to the participant.

Session 6. The theme of session 6 was “Thoughts are not facts”. The participants were explained that all of their thoughts are not true and most of the negative thoughts are actually far away from actual facts. The therapist explained that people must learn to identify negative thoughts and let them pass without being stuck at them. Breathing and sitting meditation techniques were used to train participants to identify between thoughts and reality. At the end of the session, MSSQ and MAAS scales were applied to measure stress and mindfulness.

3. Results

This chapter consists of results after analyzing the effects of MBCT intervention on the participants. The study was a single subject multiple baseline design aimed to find out the effectiveness of Mindfulness Based Cognitive Therapy in reducing stress among medical students. Baselines consisted of measuring stress and mindfulness levels every week throughout the entire study. The results obtained were then plotted on the graphs to find out the changes in the levels of experienced stress and mindfulness after every session. Baseline measurements before MBCT intervention are denoted by A (A1, A2, A3, A4) whereas the intervention phase is represented by B (B1, B2, B3, B4). Further, reliabilities of the scales were calculated through SPSS21.

Table 1 shows demographic information of the participants.

Table 2 shows alpha reliability values of Medical student stress questionnaire and Mindfulness attention awareness scale. The results show the alpha reliability of MSSQ to be 0.91 and MAAS to be 0.94 which indicates good and significant reliability of the scales.

Participant 1

The graph (**Figure 1**) exhibits levels of stress experienced by participant every week throughout the study.

Table 1. Demographic information of the participants.

| Demographics | N | % | M |
|---------------------------------|---|-----|----|
| Age | | | 23 |
| Gender | | | |
| Male | 1 | 20 | |
| Female | 4 | 80 | |
| Prior experience of mindfulness | | | |
| Yes | 0 | 0 | |
| No | 5 | 100 | |
| Past psychiatric history | | | |
| Yes | 0 | 0 | |
| No | 5 | 100 | |
| Socio economic status | | | |
| Lower class | 0 | 0 | |
| Middle class | 2 | 40 | |
| Upper class | 3 | 60 | |

Table 2. Psychometric properties of scales.

| Scales | M | SD | Range | α |
|---------------------------------------|----|-------|---------|----------|
| Medical Student Stress Questionnaire | 49 | 12.02 | 2 - 3.6 | 0.917 |
| Mindfulness Attention Awareness Scale | 47 | 15.72 | 2 - 4 | 0.941 |

Figure 2 exhibits mindfulness experienced by the participant in each week of the study.

Participant 2

Figure 3 indicates level of stress faced by participant from first till the last week of the study.

Figure 4 shows weekly measure of mindfulness experienced by participant 2 throughout the study.

Participant 3

Figure 5 shows weekly stress experienced by participant 3 throughout the study.

Figure 6 shows weekly measure of mindfulness experienced by participant 3 throughout the study.

Participant 4

Figure 7 shows weekly stress experienced by participant 4 throughout the study.

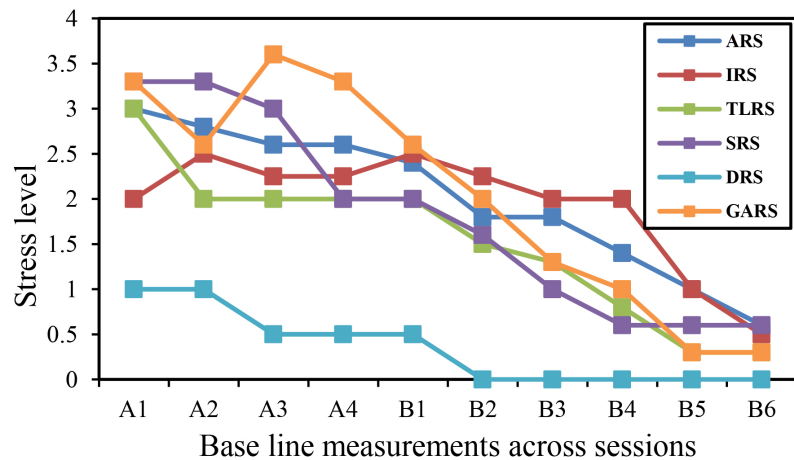


Figure 1. Changes in stress level experienced by participant 1 throughout the study. *ARS = Academic Related Stress; IRS = Interpersonal and Intrapersonal Related Stress; TLRs = Teaching and Learning Related Stress; SRS = Social Related Stress; DRS = Drive and Desire Related Stress; GARS = Group Activity Related Stress.

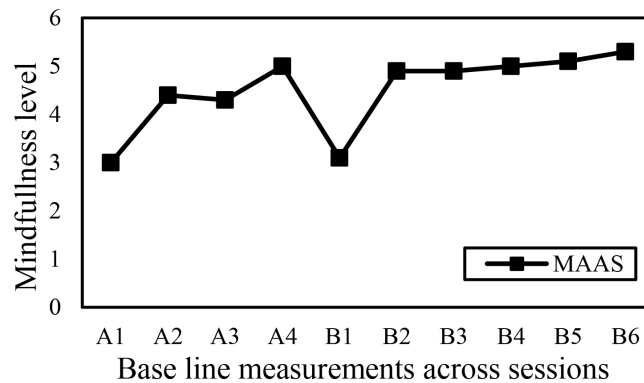


Figure 2. Changes in level of mindfulness throughout the study. *MAAS = Mindfulness Attention Awareness Scale.

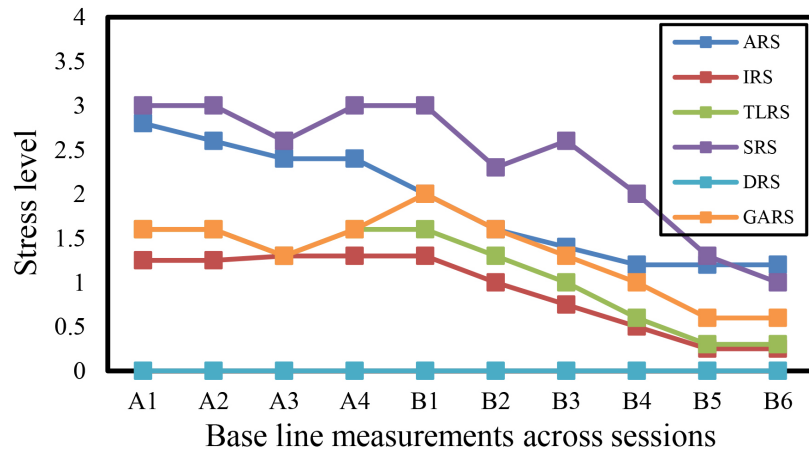


Figure 3. Changes in stress level experienced by participant 2 throughout the study. *ARS = Academic Related Stress; IRS = Interpersonal and Intrapersonal Related Stress; TLRS = Teaching and Learning Related Stress; SRS = Social Related Stress; DRS = Drive and Desire Related Stress; GARS = Group Activity Related Stress.

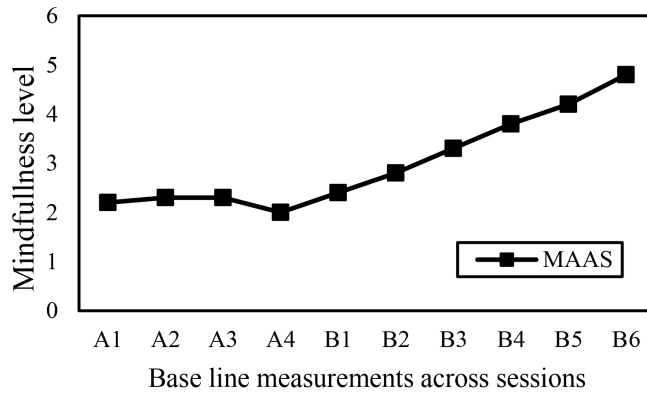


Figure 4. Changes in levels of mindfulness throughout the study. *MAAS = Mindfulness Attention Awareness Scale.

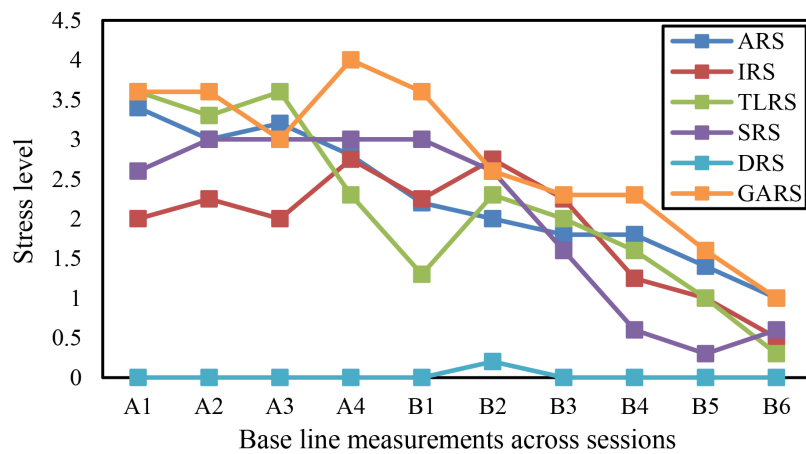


Figure 5. Changes in stress level experienced by participant 3 throughout the study. *ARS = Academic Related Stress; IRS = Interpersonal and Intrapersonal Related Stress; TLRS = Teaching and Learning Related Stress; SRS = Social Related Stress; DRS = Drive and Desire Related Stress; GARS = Group Activity Related Stress.

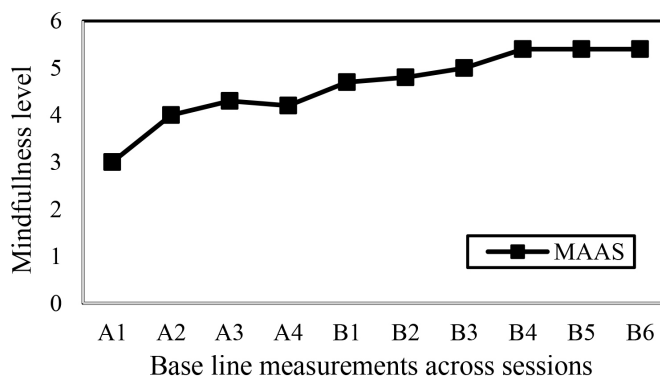


Figure 6. Changes in the levels of mindfulness throughout the study. *MAAS = Mindfulness Attention Awareness Scale.

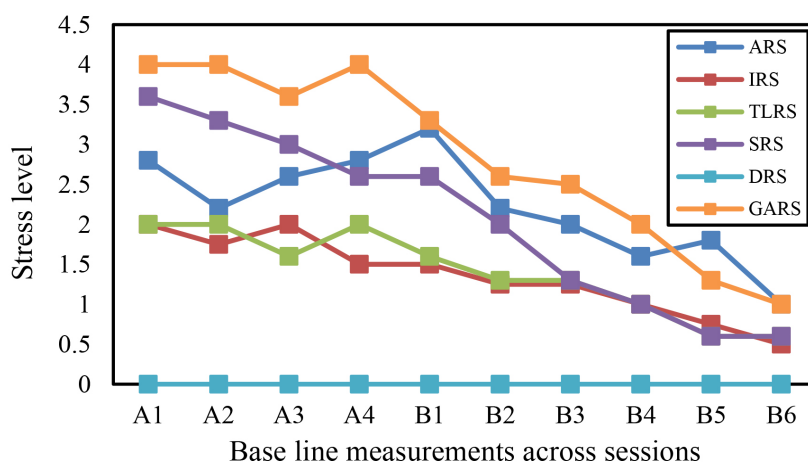


Figure 7. Changes in stress levels throughout the study. ARS = Academic Related Stress; IRS = Interpersonal and Intrapersonal Related Stress; TLRS = Teaching and Learning Related Stress; SRS = Social Related Stress; DRS = Drive and Desire Related Stress; GARS = Group Activity Related Stress.

Figure 8 shows weekly measure of mindfulness experienced by participant 4 throughout the study.

Participant 5

Figure 9 indicates stress experienced by participant 4 from first till the last week to the study.

Figure 10 shows weekly measure of mindfulness experienced by participant 5 throughout the study.

4. Discussion

The research was conducted to find out the effectiveness of Mindfulness Based Cognitive Therapy on the stress experienced by senior medical students. After medical staff was faced with a global pandemic, it became crucial to establish therapeutic techniques to aid them to lower down their stress. The results of the study prove the assumption that MBCT will reduce stress among the participants. **Figure 1**, **Figure 3**, **Figure 5**, **Figure 7**, and **Figure 9** show the decreasing

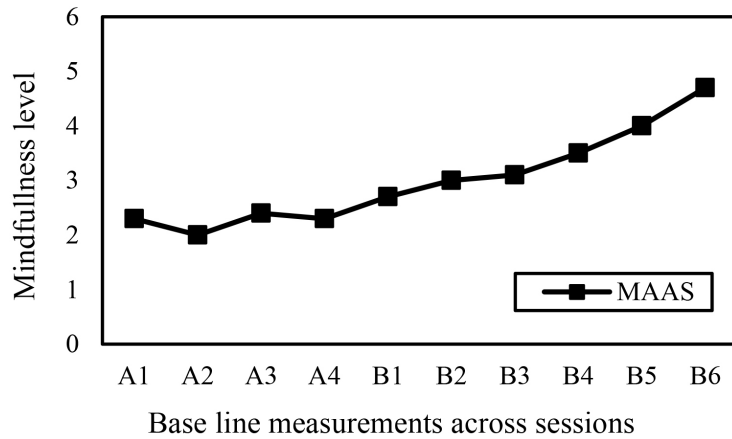


Figure 8. Changes in mindfulness level throughout the study. MAAS = Mindfulness Attention Awareness Scale.

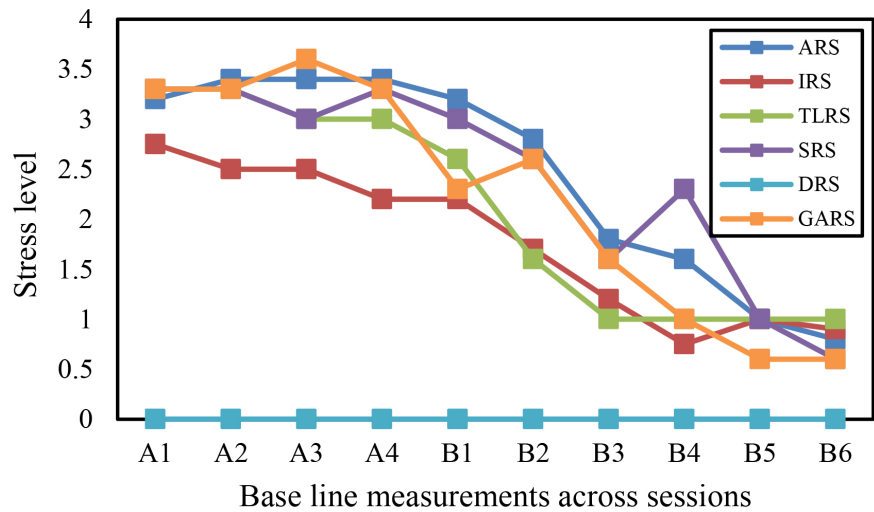


Figure 9. Changes in the levels of stress throughout the study. *ARS = Academic Related Stress; IRS = Interpersonal and Intrapersonal Related Stress; TLRS = Teaching and Learning Related Stress; SRS = Social Related Stress; DRS = Drive and Desire Related Stress; GARS = Group Activity Related Stress.

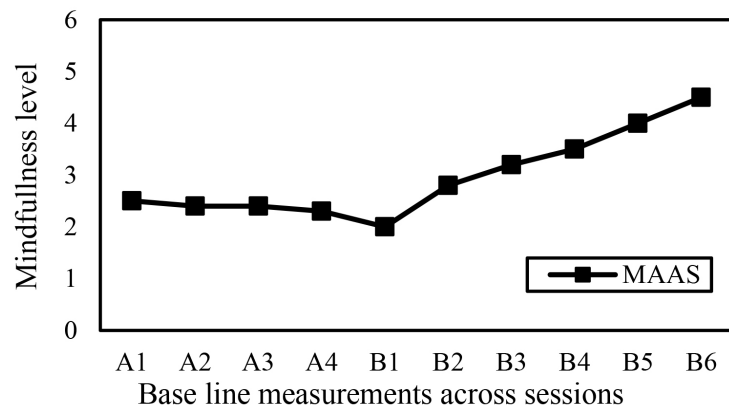


Figure 10. Changes in the levels of mindfulness throughout the study. MAAS = Mindfulness Attention awareness Scale.

trends of stress throughout the intervention. Likewise, **Figure 2, Figure 4, Figure 6, Figure 8, and Figure 10** indicates increasing levels of mindfulness from start till the end of the MBCT intervention. It proves that with increase in mindfulness, stress experienced by people decreases. Some authors have explained that mindfulness reduces stress and affects the well-being of an individual in two ways (Schreiner & Malcolm, 2008). Firstly, mindfulness can help a person break the cycle of bad habits and harmful thoughts. Secondly, mindfulness can enhance clarity and add vividness to a person's experiences. This helps to better process and responds to the situation (Brown & Ryan, 2003).

The results also indicate that all six domains of stress showed improvement but, MBCT was most effective against Group activity related stressors, Social related stressors and Academic related stressors. All the participants showed marked decrease in these 3 domains as shown in the figures above. Previous data on the effects of MBCT suggests that higher levels of mindfulness are also associated with lower academic stress. Students having higher mindfulness and attention levels suffer less from academic stressors (Blackburn, 2020). Similarly, mindfulness as a trait also helps in better academic copying. The university students who have higher levels of mindfulness are shown to calm down much quickly than others and take on stressors without panicking (Miller et al., 2017). Moreover, mindfulness promotes better interpersonal relationships. As explained by one of the participants: "Mindful breathing meditation has helped me a lot in controlling my impulsive reactions when I have a disagreement with friends and group members. Previously, I used to react aggressively sometimes that made relationships worst. But now I practice mindful breathing before reacting and my friendships are smoother now". Mindfulness-based interventions reduce interpersonal stressors and make people better adjusted in their relationships. Various examinations have featured the positive connections between relationship satisfaction and mindfulness interventions (Kappen et al., 2019). Likewise, student's social behaviors in the class form and group academic related activities also improve through mindfulness-based techniques (Schoert-Reichl & Lawlor, 2010).

Practicing mindfulness has been linked with better adaptability of the stress causing situations. As mindfulness enhances the attention and awareness of the moment, the students are less distracted and can perform better at stressful event. Hence, by practicing more mindfulness, students experience less academic stress and improvement in their overall wellbeing (Blackburn, 2020). The MBCT intervention enhanced mental well-being and quality of life among students and these positive effects were maintained even after the intervention was completed (Assumpcao et al., 2019).

It was rationalized that mindfulness can act as a protecting force against high levels of stress, therefore, increasing levels of mindfulness among participant using MBCT intervention was one of the objectives of the current study. As supported by literature, increase in mindfulness decreases negative states of mind. Mindfulness enhances promotes positive cognitions, enhances person's

over all well-being and reduces negative mental health symptoms like stress and anxiety (Keng et al., 2011). Further, Increased mindfulness enhances positive cognitive traits like hope and decreases negative experiences like stress among individuals (Munoz et al., 2018). People who have higher levels of mindfulness and awareness in a present moment also led a better day to day life. Research shows that higher levels of mindfulness cause lower mood disturbances and significantly reduce the symptoms of stress (Garland et al., 2013). Mindfulness among individuals can be enhanced through therapy and meditation. The clients report significant reduction in severity of their psychological symptoms and issues. Severity of anxiety, depression, and stress can be lowered down using mindfulness-based interventions (Schreiner & Malcolm, 2008).

4.1. Limitations

As the study was a small n or single subject design, it consisted of 5 participants. Due to small sample size, the results cannot be generalized onto a larger population. As this research was completed during the times of global pandemic, it has to be restricted to the twin cities of Islamabad and Rawalpindi. It could have been done on diverse including other cities of Pakistan. Due to restrictions imposed due to COVID-19, the sample chosen could not be of diverse nature. All participants belonged to middle or upper class socio economic status and there was a lack of representation from the lower socio economic status. Likewise, due to nationwide lockdown to combat COVID-19, government institutes could not be targeted, and the entire sample was from private institutes.

4.2. Implications of the Study

The current study established Mindfulness based Cognitive Therapy MBCT as a stress buffer. It was a therapy research that was meant to prove effectiveness of MBCT intervention in reducing stress. MBCT can be incorporated into the syllabus of medical students during their studying and training years. It can equip them with skills necessary to handle stressful situations like health emergencies and pandemics. Further, MBCT techniques must be taught in schools and colleges for lowering students stress and improving quality of life and work performance among students. MBCT can show enormous benefits in the mental health of working class as well. MBCT trainings can be carried out in offices and workplaces to promote resilience, life satisfaction, job satisfaction, and job performance.

Apart from younger populations, MBCT can also be practiced with older generation who often suffer from acute stressors in life. MBCT can be very fertile to cope with life challenges and live a more meaningful life.

4.3. Future Recommendations

Future researchers can apply Mindfulness Based Cognitive Therapy on a larger population in order to generalize its' effectiveness. This study administered

MBCT on medical students, in future the effects of MBCT on other students need to be studied. Like medical students, research tells us that students of engineering and statistics also experience great levels of stress, therefore MBCT must be experimented to lessen their stress levels. Moreover, this study targeted stress as the main variable to test MBCT. Future researchers need to test MBCT on other psychological issues and mental disorders that might be prevailing among students. Apart from university students, MBCT must also be applied to the primary and secondary level students. It is also recommended that after testing the effectiveness of MBCT techniques, it must be included as a part of curriculum to equip our upcoming generations in skills necessary to cope with stressors in life. Teachers can also be trained in Mindfulness Based Techniques to help themselves and their students to achieve optimal mental health and well-being.

It can be very enlightening to observe the effects of Mindfulness Based Cognitive Therapy on the professionals of various fields. Senior doctors, engineers, teachers, artists, sportsmen; the scope of MBCT must be enhanced. As MBCT has a huge scope of becoming one of the most promising therapeutic techniques of the 21st century, it is highly recommended to study MBCT on the population of diverse ages, professions, cultures, demographic areas and socio-economic status.

5. Conclusion

The current study was carried out to find out the effectiveness of Mindfulness Based Cognitive Therapy in reducing stress levels among the senior medical students. It was hypothesized that MBCT intervention will reduce stress levels and increase mindfulness experienced by participants. The findings of the results revealed similar trends in stress and mindfulness as proposed in the hypothesis. The trends of stress and mindfulness showed inverse relationship as established by literature. At the end of the intervention, stress levels among all participants were reduced whereas, experienced mindfulness was enhanced. Overall, the study highlighted the effectiveness of Mindfulness Based Cognitive Therapy against stress. The results also suggest studying MBCT treatment against many other psychological symptoms and issues.

Acknowledgements

The author would like to thank the participants of the research for their time and contribution.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

- Abdulghani, H. M., AlKanhal, A. A., Mahmoud, E. S., Ponnampuruma, G. G., & Alfaris, E. A. (2011). Stress and Its Effects on Medical Students: A Cross-Sectional Study at a

- College of Medicine in Saudi Arabia. *Journal of Health, Population and Nutrition*, 29, 516-522. <https://doi.org/10.3329/jhpn.v29i5.8906>
- Abebe, A. M., Kebede, Y. G., & Mengistu, F. (2018). Prevalence of Stress and Associated Factors among Regular Students at Debre Birhan Governmental and Nongovernmental Health Science Colleges North Showa Zone, Amhara Region, Ethiopia 2016. *Psychiatry Journal*, 2018, Article ID: 7534937. <https://doi.org/10.1155/2018/7534937>
- Asif, S., Mudassar, A., Shahzad, T. Z., Raouf, M., & Pervaiz, T. (2020). Frequency of Depression, Anxiety and Stress among University Students. *Pakistan Journal of Medical Sciences*, 36, 971-976. <https://doi.org/10.12669/pjms.36.5.1873>
- Assumpcao, A. A., Pena, C., Neufeld, C., & Teodoro, M. (2019). Mindfulness-Based Cognitive Therapy for University Students with Depression, Anxiety, and Stress Symptoms: A Randomized Controlled Trial. *Asia Pacific Journal of Clinical Trials: Nervous System Diseases*, 4, 51.
- Blackburn, T. (2020). *The Relationship between Mindfulness, Academic Stress, and Attention*. Utah State University Logan.
- Brown, K. W., & Ryan, R. M. (2003). The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being. *Journal of Personality and Social Psychology*, 84, 822-848. <https://doi.org/10.1037/0022-3514.84.4.822>
- Burnette, J. L., Hoyt, C. L., Buttrick, N., & Auster-Gussman, L. A. (2022). Well-Being in the Time of COVID-19: Do Metaphors and Mindsets Matter? *International Journal of Psychology*, 57, 87-95. <https://doi.org/10.1002/ijop.12785>
- Coker, A. O., Coker, O. O., & Sanni, D. (2018). Psychometric Properties of the 21-Item Depression Anxiety Stress Scale (DASS-21). *African Research Review*, 12, 135. <https://doi.org/10.4314/afrrrev.v12i2.13>
- Garland, S. N., Tamagawa, R., Todd, S. C., Specia, M., & Carlson, L. E. (2013). Increased Mindfulness Is Related to Improved Stress and Mood Following Participation in a Mindfulness-Based Stress Reduction Program in Individuals with Cancer. *Integrative Cancer Therapies*, 12, 31-40. <https://doi.org/10.1177/1534735412442370>
- Harries, A. J., Lee, C., Jones, L., Rodriguez, R. M., Davis, J. A., Boysen-Osborn, M., Kashima, K. J., Krane, N. K., Rae, G., Kman, N., Langsfeld, J. M., & Juarez, M. (2021). Effects of the COVID-19 Pandemic on Medical Students: A Multicenter Quantitative Study. *BMC Medical Education*, 21, 1-8. <https://doi.org/10.1186/s12909-020-02462-1>
- Jayarajah, U., Lakmal, K., Athapathu, A., Jayawardena, A. J., & de Silva, V. (2020). Validating the Medical Students' Stressor Questionnaire (MSSQ) from a Sri Lankan Medical Faculty. *Journal of Taibah University Medical Sciences*, 15, 344-350. <https://doi.org/10.1016/j.jtumed.2020.08.003>
- Kappen, G., Karremans, J. C., & Burk, W. J. (2019). Effects of a Short Online Mindfulness Intervention on Relationship Satisfaction and Partner Acceptance: The Moderating Role of Trait Mindfulness. *Mindfulness*, 10, 2186-2199. <https://doi.org/10.1007/s12671-019-01174-y>
- Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of Mindfulness on Psychological Health: A Review of Empirical Studies. *Clinical Psychology Review*, 31, 1041-1056. <https://doi.org/10.1016/j.cpr.2011.04.006>
- Mental Health Foundation (2018). *Stress: Are We Coping?*
- Miller, C. J., Di Pierdomenico, E.-A., & Kadziolka, M. (2017). Mindfulness Correlates with Stress and Coping in University Students. *Canadian Journal of Higher Education*, 47, 121-134. <https://doi.org/10.47678/cjhe.v47i2.187383>
- Munoz, R. T., Hoppes, S., Hellman, C. M., Brunk, K. L., Bragg, J. E., & Cummins, C. (2018). The Effects of Mindfulness Meditation on Hope and Stress. *Research on Social*

- Work Practice*, 28, 696-707. <https://doi.org/10.1177/1049731516674319>
- O'Byrne, L., Gavin, B., Adamis, D., Lim, Y. X., & McNicholas, F. (2021). Levels of Stress in Medical Students Due to COVID-19. *Journal of Medical Ethics*, 47, 1-6. <https://doi.org/10.1136/medethics-2020-107155>
- Obschonka, M., Cai, Q., Chan, A. C. Y., Marsalis, S., Basha, S. A. J., Lee, S. K., & Gewirtz, A. H. (2022). International Psychological Research Addressing the Early Phase of the COVID-19 Pandemic: A Rapid Scoping Review and Implications for Global Psychology. *International Journal of Psychology*, 57, 1-19. <https://doi.org/10.1002/ijop.12823>
- Results of the Mental Health Foundation's Study (2018). *Mental Health Statistics: Stress*. <https://www.mentalhealth.org.uk/statistics/mental-health-statistics-stress>
- Schonert-Reichl, K. A., & Lawlor, M. S. (2010). The Effects of a Mindfulness-Based Education Program on Pre- and Early Adolescents' Well-Being and Social and Emotional Competence. *Mindfulness*, 1, 137-151. <https://doi.org/10.1007/s12671-010-0011-8>
- Schreiner, I., & Malcolm, J. P. (2008). The Benefits of Mindfulness Meditation: Changes in Emotional States of Depression, Anxiety, and Stress. *Behaviour Change*, 25, 156-168. <https://doi.org/10.1375/bech.25.3.156>
- Segal, Z. V., Teasdale, J. D., & Williams, J. M. G. (2013). *Mindfulness Based Cognitive Therapy for Depression* (2nd ed.). The Guilford Press.
- Shaikh, B. T., Kahloon, A., Kazmi, M., Khalid, H., Nawaz, K., Khan, N. A., & Khan, S. (2004). Students, Stress and Coping Strategies: A Case of Pakistani Medical School. *Education for Health*, 17, 346-353. <https://doi.org/10.1080/13576280400002585>
- Stokes, D. C. (2020). Senior Medical Students in the COVID-19 Response: An Opportunity to Be Proactive. *Academic Emergency Medicine*, 27, 343-345. <https://doi.org/10.1111/acem.13972>
- Torun, F., & Torun, S. D. (2020). The Psychological Impact of the COVID-19 Pandemic on Medical Students in Turkey. *Pakistan Journal of Medical Sciences*, 36, 1355-1359. <https://doi.org/10.12669/pjms.36.6.2985>