Razavi Int J Med. 2021; 9(2): e1008 doi:10.30483/rijm.2021.254153.1008

Published online 2021 June **Original Article**

Effectiveness of Mindfulness-Based Therapy on Resilience, Psychological Well-Being, and Blood Sugar Levels in Patients with Type II Diabetes

Seyedeh Sareh Hosseini[1], Morvarid Ahadi[2*], Mohammad Hatami[3], Javad Khalatbari[4]

[1] Department of Psychology, United Arab Emirates Branch, Islamic Azad University, Dubai, UAE

[2] Department of Psychology, East Tehran Branch, Islamic Azad University, Tehran, Iran

[3] Department of Clinical Psychology, Kharazmi University, Tehran, Iran

[4] Department of Psychology, Tonekabon Branch, Islamic Azad University, Tonekabon, Iran

[*] ***Corresponding authors:*** Morvarid Ahadi, Department of Psychology, East Tehran Branch, Islamic Azad University, Tehran, Iran.
E-mail: hassanahadi275@yahoo.com, Tax; +989102223277

Received 2020 December 10; **Accepted** 2021 April 02.

Abstract

Background: Diabetes as one of the most common chronic diseases has attracted the increasing attention of health professionals. The present study aimed to assess the effectiveness of mindfulness-based therapy in resilience, psychological well-being, and blood sugar levels among patients with type II diabetes in Tehran.

Methods: The research method was semi-experimental with pre-test, post-test, and control group. The statistical population of the study consisted of all patients with type II diabetes referring to health centers in Tehran in 2018. Among this population, 30 patients were selected via convenience sampling method and randomly assigned to experimental and control groups (n=15 in each group). The mindfulness treatment group received training in 10 sessions, while the control group remained on the waiting list. The instruments used in the present study included Connor and Davidson Resilience Questionnaire (2003), and Ryff Short Form Well-being Scale psychological well-being (Ryff, 1980). Their blood sugar was measured by glycosylated hemoglobin test in two stages of pre-test and post-test. Data were analyzed in SPSS software (version 19) using multivariate analysis of covariance.

Results: As evidenced by the obtained results, the intervention used in the current study could significantly improve resilience (P<0.001, psychological well-being (P<0.001), and blood sugar (P<0.001) in patients with type II diabetes.

Conclusion: It can be concluded that mindfulness-based therapy was effective in the improvement of resilience and psychological well-being, followed by a decrease in the blood sugar levels among patients with type II diabetes

Keywords: Blood glucose, Mindfulness, Diabetes mellitus, Resilience

1. Introduction

Diabetes as one of the most common chronic diseases has attracted the increasing attention of health professionals and is a rich area for investigating the effectiveness of psychological interventions. Type II diabetes accounts for about 90-95% of diagnosed diabetes cases (1), and according to the Iranian Diabetes Society, there were 2,700,000 diabetic patients in the age group of 15-65 years in 2009. Moreover, 3 million people had glucose tolerance without being aware of this disorder; nonetheless, the statistics triple every 15 years (2). Type II diabetes is a class of metabolic diseases that raise blood sugar levels due to defects in insulin secretion, its function, or both (3). Increased blood sugar usually leads to disability, early death, and widespread problems in social relationships, and even deaths if poorly managed (4). A fasting blood sugar of 126 mg/dl can be a sign of diabetes. Impaired fasting blood sugar in people with diabetes is classified and defined in the range of 100-125 mg (5). In most studies, the HbA1C index (glycosylated hemoglobin) is considered to perform a major role in measuring blood glucose levels in people with type II diabetes (6). The elevated blood glucose levels in type II diabetic patients can be associated with many physical problems, such as kidney disease (7). Environmental factors significantly contribute to the etiology of type II diabetes (8). Moreover, these patients may encounter some problems, especially long-term complications, such as cardiac, ocular, kidney, psychological, personal, familial, and social complications. The treatment of these problems imposes heavy direct and indirect costs on patients and the government (9). Psychological disorders are one of the most common complications that negatively affect patients' ability to perform and sustain recommended

© 2021 The Authors. This is an open access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

medical care (10).

Resilience is one of the factors that protect individuals from injuries and diseases, and transformational psychologists have been interested in resilience structures for years. Rojas et al. (11) considered resilience to be a dynamic process leading to positive adaptation in the face of traumas and unpleasant problems. Miller, Seals, and Hamilton (12) believe that resilience constitutes a shield against psychopathology. In initial theories in the field of resilience, the emphasis was on the identification of personality traits and characteristics that provide positive adaptation in dealing with problems. In new theories, resilience is regarded as a multidimensional construct encompassing such variables as personality factors and specific skills (such as active problem-solving methods that allow a person to deal with traumatic life events) (13).

These cases are one of the most important factors affecting the mental well-being of patients with diabetes and are closely related to the incidence of mental disorders. As illustrated in previous studies, the quality of life and psychological well-being in these patients decrease with the increased severity of the disease (14). A desirable life has been always a human aspiration for greater well-being, higher **life expectancy**, and a better quality of life which signifies the years of life that come with satisfaction, happiness, and pleasure (15). Psychological well-being as one of the components of quality of life refers to **people's emotional** and **cognitive** evaluations of **their lives**. The cognitive component signifies cognitive assessment of life satisfaction, while emotional positivity means having a maximum positive effect and minimum negative affect (16). Today, researchers believe that creating psychological well-being and life satisfaction brings humans greater success in life, better health, healthier supportive social communication, and ultimately, higher mental and physical health (17).

Mindfulness-based therapy is a non-pharmacological approach that can be considered a therapeutic option to increase physical health, mental well-being, and resilience in these patients (18). People learn to give alternative answers to emotional discomfort and reduce conditioned responses with the use of mindfulness-based exercises. In mindfulness, people learn to make a distinction between themselves and their experiences and regard them as a transient and thematic state of change. Mindfulness training seeks to increase acceptance of distinct awareness through a particular focus on physical and emotional discomfort and teaches clients to observe emotional, physical, and cognitive status without involuntary reaction (19). According to the conducted studies, balanced meditation, mindfulness meditation, Vipassana meditation, yoga, and other medic techniques exert a significant impact on patients' rehabilitation (20). Studies show that mindfulness therapy is associated with a variety of health outcomes, such as the reduction of pain, anxiety, depression, and stress (21). Other studies have demonstrated that mindfulness improves mood and its short-term education reduces depression and enhances patients' mental well-being. Mindfulness-based therapy improves symptoms of stress and anxiety, increases self-esteem, and improves the quality of life (22-23).

Diabetes is one of the most common and costly chronic diseases that impose numerous limitations on patients' activities. Moreover, it leads to other undesirable outcomes, such as decreased quality of life, undesirable metabolic control, and increased mortality rate due to low levels of emotional health, as well as decreased resilience and mental well-being. In this regard, numerous therapeutic interventions have been carried out for different purposes. Some of these interventions focused on patients' inadequate information about diabetes, some targeted the treatment of diabetes-related mental disorders, a bunch of them have shifted their focus on weight management and stress methods, and finally, some studies have introduced the issue of acceptance of treatment methods for diabetic patients, strengthening communication, and increasing social support (24). Therefore, despite numerous investigations on the treatment of diabetic patients and the obtainment of contradictory results, there still exist many uncertainties and confusion in this regard that lead to increased damages, prolongation, and costly treatment of patients.

2. Objectives

The present study aimed to determine the effectiveness of mindfulness-based therapy in resilience, psychological well-being, and fasting blood sugar in patients with type II diabetes.

3. Methods

The research method was semi-experimental with pre-test, post-test, and control group. The statistical population of the study consisted of all patients with type II diabetes referring to health centers in Tehran in 2018. Among this population, 30 patients were selected via convenience sampling method and randomly assigned to experimental and control groups. The mindfulness treatment group received training in 10 sessions, while the control group remained on the waiting list. The ethical considerations of the present study were as follows: 1- Participation in the research is free, 2- The participants were informed of the right to leave the research at any time, 3. Even after completing the questionnaires, they would not be able to enter the results of his questionnaire. 3- The subjects were informed of the purpose and usefulness of the research, and 4- It was emphasized that participation in this research project will not be harmful.

Mindfulness-Based Cognitive Therapy (MBCT) is a method for increasing the awareness of automatic patterns and cultivating the capacity to disengage undesirable reactivity (28). For individual practice, participants read printed copies of material about an important part of the

program, carried out daily formal practice for 30 minutes, performed informal practice, and listened to a 20-60-minute prerecorded CD two times daily over a period of 8 weeks (28). At the beginning of each session, the therapist asked the patients to perform mindfulness skills during class and described one person's individual experience with mindfulness out of class. The therapist then helped the patients to archive the corrected mindfulness skills.

3.1. Connor and Davidson Resilience Questionnaire (CD-RISC) (2003)

Connor and Davidson Resilience Questionnaire (CD-RISC) (2003) was prepared by the revision of research resources in the field of resilience from 1979-1999. The chronometric characteristics of this scale were investigated in six groups: the general population, primary care unit patients, psychiatric outpatients, patients with generalized anxiety disorder, and two groups of patients with post-traumatic stress disorder. The designers of this scale believe that this questionnaire has been able to differentiate between resilient individuals and their non-resilient counterparts in clinical and non-clinical groups and can be used in research and clinical situations (25). This 25-item questionnaire is scored on the Likert scale ranging from 0 (completely incorrect) to 4 (always true). The mean score of this scale is 52 so that the scores above 52 signify a higher resilience, while the scores closer to 0 are suggestive of less resilience. The internal consistency was calculated rendering a Cronbach's alpha coefficient of 0.84-0.93 (26). The total score on the CD-RISC was positively correlated with the Rosenberg Self-Esteem Scale (RSES) ($r=0.56$; $P<0.01$). On the contrary, the Beck Depression Inventory (BDI) ($r=-0.46$; $P<0.01$), Perceived Stress Scale (PSS) ($r=-0.32$; $P<0.01$), and the Impact of Event Scale-Revised (IES-R) scores ($r=-0.26$; $P<0.01$) were negatively correlated with the CD-RISC. The CD-RISC showed good validity (26). In the present study, the internal consistency of this questionnaire was confirmed rendering a Cronbach's alpha of 0.81.

3.2. Ryff Short Form Well-being Scale (1980)

This scale which was designed by Ryff consists of 120 items and 6 subscales of autonomy, environmental dominance, personal growth, positive relationship with others, purposeful life, and self-accepting. Each item is scored using a scale of completely disagree=1 to fully agree=6, and higher scores indicate a high level of psychological well-being. It is worth noting that this scale was presented in 84, 54, and 18 item versions in the next studies. The 18-item version questions summarized by Ryff and Keyes was used in the present study. Ryff and Keyes reported that the correlation between 18-item and 120-item versions was between 0.70 and 0.89 (27). In the present study, the internal consistency of this questionnaire (subscales) was validated rendering a Cronbach's alpha coefficient of 0.72-0.86.

The following list is a model treatment outline of mindfulness-based cognitive therapy sessions for women with premenstrual syndrome based on the study conducted by Kabat-Zinn (28).

Data were analyzed in SPSS software (version 22). In the descriptive analysis of data, statistical indicators related to each of the research variables were calculated, while a multivariate analysis of covariance (MANCOVA) and analysis of covariance (ANOVA) were used in the inferential statistics section.

Table 1. Mindfulness-based cognitive therapy sessions

Session	Content
Session 1	Building a therapeutic alliance and obtaining information from the client, identifying automatic thoughts, introducing the body scan, raisin exercise, and introducing mindfulness meditation in practice sessions. Assignment: reading about the body scan meditation technique, 30-minute daily formal practice (body scan meditation), informal practice, and awareness of some routine activity, such as washing dishes or eating a meal (continued throughout the trial period).
Session 2	Helping the client recognize that thoughts are not facts, teaching the use of the thought record, sitting meditation using the breath as the primary object of awareness, and alternating this with the body scan (sitting one day, body scan the next, etc.). Assignment: reading about and doing formal and informal sitting meditation
Session 3	Dealing with automatic thoughts in life, meditation, and walking meditation Assignment: mindful yoga
Session 4	Stopping one-minute breathing space. Assignment: mindful yoga and sitting meditation (continued throughout the trial period)
Session 5	Dealing with difficult emotions, wisdom, meditation, and walking meditation. Assignment: mindful yoga
Session 6	Communication. Assignment: listening to others carefully and mindful yoga.
Session 7	Self-compassion. Assignment: loving yourself and mindful Yoga
Session 8	Helping the client develop a practice of his/her own, reviewing progress, insights, and techniques, and individual evaluation of the sessions.

4. Results

The Mean±SD age scores of participants in the experimental group and control group were obtained at 42.50±7.40 and 41.70±6.11 (P>0.05), respectively. The participants in this research were in the age range of 33-57 years, and 57.31% of cases were male. Table 1 displays the mean and standard deviation of well-being and resiliency variables in the experimental and control groups.

To measure the equality of variances, data were evaluated with Levene's test of homogeneity of variance. The results demonstrated that variances of the experimental and control groups for well-Being (F=1.18; P=0.39), resiliency (F=1.98; P=0.18), and HbA1c (F=1.11; P=0.56) were equal. The results revealed a significant homogeneity using MANCOVA tests, including Pillai's trace, Wilks' lambda, Lawley-Hotelling trace, and Roy's largest root. Experimental and control groups differed in at least two dependent variables; therefore, these variables could be used for data analysis.

Table 2 illustrates the MANCOVA results on the variables of well-being, resiliency, and HbA1c in both control and experimental groups after controlling the pretest. This analysis showed that the two groups were different in two investigated variables according to the means presented in Table 1. Furthermore, an increase in well-being and resiliency, as well as a decrease in HbA1c scores were observed in the experimental group, as compared to the control group.

5. Discussion

The present study aimed to determine the effectiveness of mindfulness-based therapy in resilience, psychological well-being, and fasting blood glucose in patients with type II diabetes. The obtained results confirmed this effectiveness. These findings were in line with the results reported by Youngwanichsetha et al. (29), Hofmann & Gómez (30), Zimmermann et al. (31), Langer et al. (32), and Jones et al. (33).

In explaining the effectiveness of mindfulness-based therapy in resilience among patients with type II diabetes, it can be concluded that mindfulness therapy increases patients' awareness of physical sensations, thoughts, and emotions. Moreover, it helps them to respond adaptively to the warning signs of relapse; therefore, mindfulness gives us the ability to observe and face pervasive vulnerabilities in humans. And challenge them who are part of the inherent and inner existence of human beings (30). Mindfulness is a kind of awareness that develops when we devote attention to our experiences on a particular subject. Attention is focused on the goal (attention is openly focused on certain aspects of experience) and in the present (when the mind focuses on the past or the future, we return it to the present) and without judgment (a process that is accompanied by the spirit of acceptance of what happened) (15). Awareness of what is happening in the future means "paying deep and direct attention to these events and linking them to the acceptance of the subject and the power of participatory practice." Although the nature of the subject and attention to it is easy, mindfulness practice often seems a daunting challenge. It is an exercise in which we regularly train ourselves to ensure what is happening in front of us at the present moment. This exercise also makes our instinct avoid problems and challenging aspects of the therapeutic experience. Therefore, it can be concluded that the use of

Table 1. Mean and Standard Deviation of Well-Being, Resiliency and HbA1c Variables in The Experimental and Control Groups [a]

Variables	Experimental Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
Psychological Well-Being	221.27±14.99	248.13±13.85	220.47±11.99	213.00±18.17
Resiliency	63.60±6.50	74.40±7.60	63.80±5.65	63.00±5.86
HbA1c diabetes	174.47±22.59	162.167±25.78	175.67±18.66	174.00±20.03

[a] Data are presented as Mean±SD.

Table 2. Multiple Analysis of Covariance Results on the Variables of Well-Being, Resiliency and HbA1c in Control and Experimental Groups After Controlling the Pre-Test

Dependent Variable	Type III Sum of Squares	Degree of Freedom	Mean Square	F	P-Value
Well-Being					
Group	578.44	1	578.44	39.24	< 0.001
Error	127.32	28	37.70		
Resiliency					
Group	356.11	1	356.11	55.59	< 0.001
Error	64.083	28	78.002		
HbA1c					
Group	284.36	1	284.36	40.30	< 0.001
Error	93.794	28	19.245		

such interventions for patients with diabetes along with medical treatments will reduce the severity of their disease by changing patients' perceptions of their disease in the long run and **strengthen** the resilience of these patients.

Furthermore, in explaining the effectiveness of mindfulness-based therapy in psychological well-being in patients with type II diabetes, it can be argued that mindfulness is a non-judicial and unspeakable consciousness. It is based on individuals' experiences within the limits of their attention at a particular moment. In addition, this concept includes accepting the mentioned experiences and increasing mindfulness in an effort to improve psychological well-being. The components of acceptance, comprehensibility, and personal growth are effective, allowing individuals to respond to events inexorably and contemplatively without any contemplation and thinking. Moreover, they help people in recognizing, managing, and solving their everyday problems. Several studies have pointed to the effect of enhanced mindfulness on increased psychological well-being, life satisfaction, self-esteem, optimism, as well as decreased anxiety depression, and psychological symptoms (31). The results of the present study illustrated that psychological well-being can be enhanced by increasing people's mindfulness.

Furthermore, it can be stated that the implementation of mindfulness group intervention provides a platform for emotional acceptance using mind techniques. Moreover, it educates patients to overcome the resultant struggles, control negative emotions and experiences, and promote them to pursue values and move forward committed actions based on them. Consequently, it can be argued that all these give rise to an increase in quality of life and help to stabilize blood sugar levels in patients with diabetes. Therefore, the acceptance and commitment approach can be considered a suitable psychological intervention to reduce stress in diabetic patients (30).

Regarding the limitations of the current study, one can refer to small sample size; therefore, generalization must be made cautiously. Moreover, the use of the available sampling method may have caused unwanted bias in the results. In addition, the data were obtained using self-report questionnaires which may have generated response bias. It is not possible to draw causal conclusions about the data since this study was cross-sectional. It is also suggested that future studies be conducted on other urban samples and their results be compared with those obtained in the present study to validate their generalization. In order to confirm the results of the present research, wider studies are suggested in larger communities considering the importance of variables. It is also suggested that these variables be investigated along with other variables, such as social skills, self-confidence, self-concept, and emotional intelligence so that the results can be compared at different times.

Conclusion

It can be concluded that mindfulness-based therapy was effective in the improvement of resilience and psychological well-being, followed by a decrease in the blood sugar levels among patients with type II diabetes.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Footnotes

Authors' Contribution: All authors participated in the study concept and design, acquisition of data, data analysis, and critical revision of the manuscript for important intellectual content.

Conflict of Interests: None.

Ethical Approval: The ethical approval code was IR.SBMU.RETECH.REC.1399.589.

Funding/Support: The current study was financially supported by Shahid Beheshti University of Medical Sciences.

References

1. Li C, Xu D, Hu M, Tan Y, Zhang P, Li G, Chen L. A systematic review and meta-analysis of randomized controlled trials of cognitive behavior therapy for patients with diabetes and depression. Journal of Psychosomatic Research. 2017 Apr 1;95:44-54. https://doi.org/10.1016/j.jpsychores.2017.02.006

2. Jones L, Crabb S, Turnbull D, Oxlad M. Barriers and facilitators to effective type 2 diabetes management in a rural context: a qualitative study with diabetic patients and health professionals. Journal of health psychology. 2014 Mar;19(3):441-53. https://doi.org/10.1177/1359105312473786

3. Espeland MA, Carmichael O, Yasar S, Hugenschmidt C, Hazzard W, Hayden KM, Rapp SR, Neiberg R, Johnson KC, Hoscheidt S, Mielke MM. Sex-related differences in the prevalence of cognitive impairment among overweight and obese adults with type 2 diabetes. Alzheimer's & Dementia. 2018 Sep 1;14(9):1184-92. https://doi.org/10.1016/j.jalz.2018.05.015

4. Barkas F, Elisaf M, Liberopoulos E, Liamis G, Ntzani EE, Rizos EC. Atherogenic dyslipidemia increases the risk of incident diabetes in statin-treated patients with impaired fasting glucose or obesity. Journal of cardiology. 2019 Sep 1;74(3):290-5. https://doi.org/10.1016/j.jjcc.2019.02.009

5. Furler J, O'Neal D, Speight J, Blackberry I, Manski-Nankervis JA, Thuraisingam S, de La Rue K, Ginnivan L, Doyle R, Holmes-Truscott E, Khunti K. Use of professional-mode flash glucose monitoring, at 3-month intervals, in adults with type 2 diabetes in general practice (GP-OSMOTIC): a pragmatic, open-label, 12-month, randomised controlled trial. The Lancet Diabetes & Endocrinology. 2020 Jan 1;8(1):17-26. https://doi.org/10.1016/S2213-8587(19)30385-7

6. Cai T, Yang J. Diabetic kidney disease. InChronic

Kidney Disease 2020 (pp. 33-43). Springer, Singapore. https://doi.org/10.1007/978-981-32-9131-7_3
7. Egede LE, Dismuke CE. Serious psychological distress and diabetes: a review of the literature. Current psychiatry reports. 2012 Feb 1;14(1):15-22. https://doi.org/10.1007/s11920-011-0240-0
8. Ghazi A, Landerman LR, Lien LF, Colon-Emeric CS. Impact of race on the incidence of hypoglycemia in hospitalized older adults with type 2 diabetes. Clinical Diabetes. 2013 Apr 1;31(2):66-72. https://doi.org/10.2337/diaclin.31.2.66
9. Arigo D, Smyth JM, Haggerty K, Raggio GA. The social context of the relationship between glycemic control and depressive symptoms in type 2 diabetes. Chronic illness. 2015 Mar;11(1):33-43. https://doi.org/10.1177/1742395314531990
10. Miller BF, Seals DR, Hamilton KL. A viewpoint on considering physiological principles to study stress resistance and resilience with aging. Ageing research reviews. 2017 Sep 1;38:1-5. https://doi.org/10.1016/j.arr.2017.06.004
11. Rojas M, Rodriguez Y, Pacheco Y, Zapata E, Monsalve DM, Mantilla RD, Rodríguez-Jimenez M, Ramírez-Santana C, Molano-González N, Anaya JM. Resilience in women with autoimmune rheumatic diseases. Joint Bone Spine. 2018 Dec 1;85(6):715-20. https://doi.org/10.1016/j.jbspin.2017.12.012
12. Bristow G, Healy A. Regional resilience: an agency perspective. InHandbook on Regional Economic Resilience 2020 Feb 3. Edward Elgar Publishing. https://doi.org/10.4337/9781785360862
13. Folke C. Resilience (republished). Ecology and Society. 2016 Dec 1;21(4). https://doi.org/10.5751/ES-09088-210444
14. Diener E, Lucas RE, Oishi S. Subjective well-being: The science of happiness and life satisfaction. Handbook of positive psychology. 2002 Sep;2:63-73.
15. Boell JE, Guerreiro DM, Da Silva V, Hegadoren K, Eche ME, Guanilo V. Relationships Among Sociodemographic, Psychosocial Factors and Resilience in Those with Diabetes in Urban Brazil. Canadian Journal of Diabetes. 2017 Oct 1;41(5):S83. https://doi.org/10.1016/j.jcjd.2017.08.261
16. Linden K, Berg M, Adolfsson A, Sparud-Lundin C. Well-being, diabetes management and breastfeeding in mothers with type 1 diabetes-An explorative analysis. Sexual & reproductive healthcare. 2018 Mar 1;15:77-82. https://doi.org/10.1016/j.srhc.2017.12.004
17. Meerow S, Newell JP. Urban resilience for whom, what, when, where, and why?. Urban Geography. 2019 Mar 16;40(3):309-29. https://doi.org/10.1080/02723638.2016.1206395
18. Pesantes MA, Lazo-Porras M, Ávila-Ramírez JR, Caycho M, Villamonte GY, Sánchez-Pérez GP, Málaga G, Bernabé-Ortiz A, Miranda JJ. Resilience in vulnerable populations with type 2 diabetes mellitus and hypertension: a systematic review and meta-analysis. Canadian Journal of Cardiology. 2015 Sep 1;31(9):1180-8. https://doi.org/10.1016/j.cjca.2015.06.003
19. Keyes CL, Shmotkin D, Ryff CD. Optimizing well-being: the empirical encounter of two traditions. Journal of personality and social psychology. 2002 Jun;82(6):1007. https://doi.org/10.1037/0022-3514.82.6.1007
20. Petter M, McGrath PJ, Chambers CT, Dick BD. The effects of mindful attention and state mindfulness on acute experimental pain among adolescents. Journal of Pediatric Psychology. 2014 Jun 1;39(5):521-31. https://doi.org/10.1093/jpepsy/jsu007
21. Veenhoven R. Healthy happiness: Effects of happiness on physical health and the consequences for preventive health care. Journal of happiness studies. 2008 Sep 1;9(3):449-69. https://doi.org/10.1007/s10902-006-9042-1
22. Hsu SH, Grow J, Marlatt GA. Mindfulness and addiction. InRecent developments in alcoholism 2008 (pp. 229-250). Springer, New York, NY. https://doi.org/10.1007/978-0-387-77725-2_13
23. Gromisch ES, Fiszdon JM, Kurtz MM. The effects of cognitive-focused interventions on cognition and psychological well-being in persons with multiple sclerosis: A meta-analysis. Neuropsychological rehabilitation. 2018 Jul 5. https://doi.org/10.1080/09602011.2018.1491408
24. Bowen S, Chawla N, Marlatt GA. Mindfulness-based relapse prevention for addictive behaviors: A clinician's guide. Guilford Press; 2011 Apr 25. https://doi.org/10.1037/t68971-000
25. Amstadter AB, Moscati A, Maes HH, Myers JM, Kendler KS. Personality, cognitive/psychological traits and psychiatric resilience: A multivariate twin study. Personality and Individual Differences. 2016 Mar 1;91:74-9. https://doi.org/10.1016/j.paid.2015.11.041
26. Baek HS, Lee KU, Joo EJ, Lee MY, Choi KS. Reliability and validity of the Korean version of the Connor-Davidson Resilience Scale. Psychiatry investigation. 2010 Jun;7(2):109. https://doi.org/10.4306/pi.2010.7.2.109
27. Carpenter JK, Sanford J, Hofmann SG. The effect of a brief mindfulness training on distress tolerance and stress reactivity. Behavior therapy. 2019 May 1;50(3):630-45. https://doi.org/10.1016/j.beth.2018.10.003
28. Kabat-Zinn J. Mindfulness-based interventions in context: past, present, and future. Clinical psychology: Science and practice. 2003 Jun;10(2):144-56. https://doi.org/10.1093/clipsy.bpg016
29. Youngwanichsetha S, Phumdoung S, Ingkathawornwong T. The effects of mindfulness eating and yoga exercise on blood sugar levels of pregnant women with gestational diabetes mellitus. Applied Nursing Research. 2014 Nov 1;27(4):227-30. https://doi.org/10.1016/j.apnr.2014.02.002
30. Hofmann SG, Gómez AF. Mindfulness-based

interventions for anxiety and depression. Psychiatric clinics. 2017 Dec 1;40(4):739-49. https://doi.org/10.1016/j.psc.2017.08.008
31. Zimmermann FF, Burrell B, Jordan J. The acceptability and potential benefits of mindfulness-based interventions in improving psychological well-being for adults with advanced cancer: a systematic review. Complementary therapies in clinical practice. 2018 Feb 1;30:68-78.
32. https://doi.org/10.1016/j.ctcp.2017.12.014
33. Langer ÁI, Schmidt C, Mayol R, Díaz M, Lecaros J, Krogh E, Pardow A, Vergara C, Vergara G, Pérez-Herrera B, Villar MJ. The effect of a mindfulness-based intervention in cognitive functions and psychological well-being applied as an early intervention in schizophrenia and high-risk mental state in a Chilean sample: study protocol for a randomized controlled trial. Trials. 2017 Dec;18(1):1-9. https://doi.org/10.1186/s13063-017-1967-7
34. Jones BJ, Kaur S, Miller M, Spencer R. Mindfulness-Based Stress Reduction Benefits Psychological Well-Being, Sleep Quality, and Athletic Performance in Female Collegiate Rowers. Frontiers in Psychology. 2020 Sep 18;11:2373.
35. https://doi.org/10.3389/fpsyg.2020.572980