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Mental Health for Medical Students, what do we know today?

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Abstract

Mental health illnesses are rampant among university students. Symptoms of depression, anxiety, stress, and burnout are experienced in undergraduate and graduate levels especially among medical students. This systematic review explores the effectiveness of online mindfulness intervention on medical students. The review provide evidence that online mindfulness has the potential to be effective to address stress but not enough evidence to address depression and anxiety among medical students. The existing research designs are exploratory pilot studies, more robust research approaches such as randomized control trials interventions are needed.

Keywords: Mental Health; eHealth; Virtual Communities; Virtual Care; Depression; Anxiety; Stress; Burnout; Students; Medical Students

1. Introduction

Several surveys provided evidence that mental health of university students and college students are not at its best. Undergraduate and graduate students are facing important mental health challenges (e.g., depression, anxiety) [1-4]; particularly, medical students are under tremendous pressure and re subject to psychological distress and a decline in life satisfaction [2]. At the same time, many types of interventions [5-8] and ehealth [9, 10] and virtual communities applications [11-15] have been developing during the last decade to address mental health challenges

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particularly among medical students. In addition, with the recent developments in analytics and machine learning [16-21], researchers attempted to measure adherence and its impact on health outcomes. However, little has been done towards addressing mental health for medical students. Thus, it is important to collect and analyse the available evidence regarding the use of online mindfulness interventions targeting medical students. Our current paper presents the results of a systematic review to answer such need.

2. Methods

We have conducted a systematic review using the following online databases: ProQuest, Medline, PubMed, PsycINFO, Web of Science, IEEE Explore, Cochrane, and CINAHL. We included studies targeting medical students only, in the last 10 years, using online mindfulness or Cognitive Behavioural Therapy (CBT) or Acceptance and Commitment Therapy (ACT). We excluded studies written in a language different than English or did not have a full text available. The most recent search took place on 28 October 2020.

3. Results

The search resulted in 6 articles, three of which were duplicates. Only 3 articles were kept for analysis [22-24]. The result of the search is displayed in Table 1.

Table 1. An example of a table.

Article	Intervention	Outcomes
Sarah Moore, Rita Barbou, Hanh Ngo, Craig Sinclair, Richard Chambers, Kirsten Auret, Craig Hassed & Denese Playford (2020)	Single-arm prospective mixed method cohort study	-No immediate post-training impact on stress levels
Lattie, E. G., Kashima, K., Duffecy, J. L., (2019)	Prospective pilot cohort design	-No significant changes in depression, Anxiety or Stress. -Increase in cognitive coping.
Danilewitz M., Koszycki D., Maclean H., Sanchez-Campos M., Gonsalves C., Archibald D., and Bradwejn J. (2018)	Prospective pilot cohort design	-Significant increase for self-compassion - no significant change in burnout levels

The existing 3 project consider a population of medical student whose mean age is that ranges between 23.76 [23], 23.8 [22] and 26.7 [1]. Most of the participants were female in all 3 studies; the percentage of females varied between 66.04% [23], 69.2%[22] and 80.85% [1]. The length and type of intervention varied between 8 weeks[1], 16 weeks [23], seven weeks to four months [22].

In terms of mental health outcomes, Moore et al. demonstrated statistically significant changes in stress [1] and while they did not measure anxiety and depression. Lattie et al. reported [23] no significant changes in the depression, anxiety, and stress. Finally, Danilewitz et al. measured burnout and mindfulness, they reported no statistically significant changes in burnout measurements and only statistically significant impact on the “describe” and “observe” facets of the Five Facet Mindfulness Questionnaire [22].

Moore et al. [1] and Lattie et al. [23] reported high use of their intervention (50% and 66% respectively); Danilewitz et al. did not report on usage [22].

4. Discussion

The evidence provided the three studies is not clear as each of the three studies was designed as either one arm or as pilot study. There is a need for a more robust interventions that include randomized control trials to make any final robust conclusions; there seem overall an impact on stress in some instance. Given the nature of medical students work an App that provide access to online mindfulness might be more appropriate as it allows access to tools when needed and where needed.

The intervention use was not properly measure and was self-reported; there was mid to low program usage. There is a need to have objectives measurement of usage and that it would be reported in each study, absence of usage measurement would not allow us to understand the impact of the intervention vs. placebo.

A proper user experience testing for any online-based intervention would be recommended to ensure adoption, retention, and use; such assessment was not done in any of the studies.

eHealth has proven to be effective in many domains [10, 25], mHealth was also effective in intervening in the domain of chronic disease management [26], both approaches can be used to provide a supportive environment for medical students' mental health. The current covid-19 pandemic supports the need for virtual care to provide health services.

In the context of mental health machine learning can play an important role [9], particularly it might allow detecting trends in mental health events and allow early intervention [17]. Such approaches are emerging and promising [27-32].

5. Conclusion

While online mindfulness proved to be effective for students in universities and colleges, currently, we lack conclusive evidence about the effectiveness of online mindfulness for medical students. There is a vital need to address mental health for medical students using a gold standard randomized control trials to generate solid evidence about the effectiveness of online mindfulness for this part if the population. Some information systems best practices should be taken into consideration in future interventions, including user experience testing to ensure adoption and background analytics to measure adherence.

References

[1] Moore, S., et al., *Determining the feasibility and effectiveness of brief online mindfulness training for rural medical students: a pilot study.* BMC Med Educ, 2020. **20**(1): p. 104.

[2] van Dijk, I., P.L. Lucassen, and A.E. Speckens, *Mindfulness training for medical students in their clinical clerkships: two cross-sectional studies exploring interest and participation.* BMC Med Educ, 2015. **15**: p. 24.

[3] Ahmad, F., J.J. Wang, and C. El Morr, *Online Mindfulness Interventions: A Systematic Review*, in *Novel Applications of Virtual Communities in Healthcare Settings*, C. El Morr, Editor. 2018, IGI Global: Hershey, PA, USA. p. 1-27.

[4] Lal, R., et al., *Mental Health Seeking Behaviour of Women University Students: An Intersectional Analysis.* International Health Trends and Perspectives, 2021. **1**(2): p. 288-307.

[5] Ahmad, F., et al., *An Eight-Week, Web-Based Mindfulness Virtual Community Intervention for Students' Mental Health: Randomized Controlled Trial.* JMIR Ment Health, 2020. **7**(2): p. e15520.

[6] El Morr, C., et al., *Design of a Mindfulness Virtual Community: A focus-group analysis.* Health Informatics J, 2020. **26**(3): p. 1560-1576.

[7] El Morr, C., et al., *Effectiveness of an 8-Week Web-Based Mindfulness Virtual Community Intervention for University Students on Symptoms of Stress, Anxiety, and Depression: Randomized Controlled Trial.* JMIR Ment Health, 2020. **7**(7): p. e18595.

[8] Ritvo, P., et al., *A Mindfulness-Based Intervention for Student Depression, Anxiety, and Stress: Randomized Controlled Trial.* JMIR Ment Health, 2021. **8**(1): p. e23491.

[9] El Morr, C., *Virtual Communities, Machine Learning and IoT: Opportunities and Challenges in Mental Health*

Research. International Journal of Extreme Automation and Connectivity in Healthcare, 2019. **1**(1): p. 4-11.
[10] El Morr, C., *Introduction to Health Informatics: A Canadian Perspective*. 2018, Toronto, Canada: Canadian Scholars' Press. 354.
[11] El Morr, C. and L. Eftychiou, *Evaluation Frameworks for Health Virtual Communities*, in *The Digitization of Healthcare*, L. Menvielle, A.-F. Audrain-Pontevia, and W. Menvielle, Editors. 2017, Palgrave Macmillan UK: London. p. 99-118.
[12] El Morr, C., et al., *A Student-Centered Mental Health Virtual Community Needs and Features: A Focus Group Study.* Stud Health Technol Inform, 2017. **234**: p. 104-108.
[13] El Morr, C., *Health Care Virtual Communities: challenges and opportunities*, in *Handbook of Research on Developments in E-Health and Telemedicine*, M.M. Cruz-Cunha, A.J. Tavares, and R. Simoes, Editors. 2010, IGI Global: Hershey, PA. p. 278-298.
[14] El Morr, C., et al., *Virtual community life cycle: A model to develop systems with fluid requirements*, in *Virtual Community Building and the Information Society*, C. El Morr and P. Maret, Editors. 2012, IGI Global: Hershey, PA, USA. p. 1-14.
[15] Subercaze, J., et al. *Towards Successful Virtual Communities*. in *Enterprise Information Systems*. 2009. Milan, Italy: Springer Berlin Heidelberg.
[16] El Morr, C. and H. Ali-Hassan, *Analytics in Healthcare: A Practical Introduction*. SpringerBriefs in Health Care Management and Economics, ed. J.K. Tan. 2019, Cham, Switzerland: Springer International Publishing. 105.
[17] El Morr, C. and H. Ali-Hassan, *Descriptive, Predictive, and Prescriptive Analytics*, in *Analytics in Healthcare: A Practical Introduction*. 2019, Springer International Publishing: Cham, Switzerland. p. 31-55.
[18] El Morr, C. and H. Ali-Hassan, *Healthcare, Data Analytics, and Business Intelligence*, in *Analytics in Healthcare: A Practical Introduction*. 2019, Springer International Publishing: Cham, Switzerland. p. 1-13.
[19] El Morr, C. and H. Ali-Hassan, *Analytics Building Blocks*, in *Analytics in Healthcare: A Practical Introduction*. 2019, Springer International Publishing: Cham, Switzerland. p. 15-30.
[20] El Morr, C. and H. Ali-Hassan, *Healthcare Analytics Applications*, in *Analytics in Healthcare: A Practical Introduction*. 2019, Springer International Publishing: Cham, Switzerland. p. 57-70.
[21] El Morr, C. and H. Ali-Hassan, *Data Visualization*, in *Analytics in Healthcare: A Practical Introduction*. 2019, Springer International Publishing: Cham, Switzerland. p. 71-90.
[22] Danilewitz, M., et al., *Feasibility and effectiveness of an online mindfulness meditation program for medical students.* Can Med Educ J, 2018. **9**(4): p. e15-e25.
[23] Lattie, E.G., K. Kashima, and J.L. Duffecy, *An open trial of internet-based cognitive behavioral therapy for first year medical students.* Internet Interv, 2019. **18**: p. 100279.
[24] Moore, S., et al., *Determining the feasibility and effectiveness of brief online mindfulness training for rural medical students: a pilot study.* BMC MEDICAL EDUCATION, 2020. **20**(1).
[25] Saraswat, I., et al., *Accessibility Monitoring for People with Disabilities: A Collaborative Virtual Community.* International Journal of Extreme Automation and Connectivity in Healthcare, 2020. **2**(1): p. 128-137.
[26] Saleh, S., et al., *mHealth use for non-communicable diseases care in primary health: patients' perspective from rural settings and refugee camps.* J Public Health (Oxf), 2018. **40**(suppl_2): p. ii52-ii63.
[27] Tate, A.E., et al., *Predicting mental health problems in adolescence using machine learning techniques.* PLoS One, 2020. **15**(4): p. e0230389.
[28] Shatte, A.B.R., D.M. Hutchinson, and S.J. Teague, *Machine learning in mental health: a scoping review of methods and applications.* Psychol Med, 2019. **49**(9): p. 1426-1448.
[29] Le Glaz, A., et al., *Machine Learning and Natural Language Processing in Mental Health: Systematic Review.* J Med Internet Res, 2021. **23**(5): p. e15708.
[30] Kim, J., D. Lee, and E. Park, *Machine Learning for Mental Health in Social Media: Bibliometric Study.* J Med Internet Res, 2021. **23**(3): p. e24870.
[31] Iorfino, F., et al., *Predicting self-harm within six months after initial presentation to youth mental health services: A machine learning study.* PLoS One, 2020. **15**(12): p. e0243467.
[32] Edgcomb, J.B. and B. Zima, *Machine Learning, Natural Language Processing, and the Electronic Health Record: Innovations in Mental Health Services Research.* Psychiatr Serv, 2019. **70**(4): p. 346-349.