Can COVID-19 related mental health issues be measured?

To the Editor,

The COVID-19 pandemic and mitigation efforts carry a mental health toll among health care workers, individuals infected and the general population (Ji et al., 2020; Ransing et al., 2020). There is a lack of specific robust screening tools or diagnostic instruments that could promptly identify relevant symptoms and contribute to the attempts to study the epidemiology of COVID-19 related mental health problems. In fact, the use of traditional assessment tools (e.g. PHQ-9, GAD-7) may lead to under-diagnosis or over-diagnosis of the cases emerging in this current pandemic due to their poor psychometric properties (e.g. face validity). There are new scales tailored to identify COVID-19 related mental health issues (Lee, 2020a; Taylor et al., 2020), however, their clinical utility, methodological strengths and limitations have not yet been explored in the literature. In this article we provide a brief overview of these new assessment tools, with a focus on their multi-language availability.

Our search (till May 15, 2020) in PubMed, Scopus, and Google Scholar databases yielded five published new scales (Table 1) (Ahorsu et al., 2020; Lee, 2020a,b; Taylor et al., 2020): Coronavirus Anxiety Scale (CAS) (Lee, 2020b), the Obsession with COVID-19 Scale (OCS) (Lee, 2020a), the Fear of COVID-19 Scale (FCV-19S) (Ahorsu et al., 2020), the COVID Stress Scales (CSS) (Taylor et al., 2020), and the Questionnaire on Perception of Threat from COVID-19 (Pérez-Fuentes et al., 2020). Almost all of them were developed as self-report and Likert-type scales and validated using online surveys. To our surprise, there was no available clinician-administered scale to measure psychological distress or disorders in the context of COVID-19 infection.

The CAS and OCS, developed from the same data source, assess symptoms of anxiety and dysfunctional thinking as per the DSM-5 criteria. The OCS measures recurring symptoms of anxiety (i.e. cognitive and behavioral perpetuating factors). Both the OCS and CAS can assist with identifying the maintaining factors for COVID-19 anxiety and developing interventions to tackle them. Although translated versions of these scales are available in several languages, they are yet to be validated. The FCV-19S has been already translated and validated in different languages with evidence of good reliability (internal consistency) and validity (convergent and construct) (Reznik et al., 2020; Sakib et al., 2020; Satici et al., 2020; Soraci et al., 2020). The FCV-19S is a scale with a uni-dimensional structure, except for the Russian Version, which has a bi-dimensional structure. The CSS, CAS, and OCS have dimensional ratings for different yet interrelated underlying constructs or factors. Furthermore, some weaknesses [e.g. Italian FCV-19S was validated in an adequate but suboptimal sample (Table 1)], and inconsistencies in their underlying factor structures, as above mentioned, warrant further refinement with more robust and stable factor structures.

All scales were developed in the pre-peak period of the pandemic and may not be sensitive or specific enough to assess anxiety or dysfunctional thinking during peak or post-peak periods (Ransing et al., 2020). Of note that all scales have been validated in non-clinical samples consisting of middle-aged adults, a relatively less vulnerable group of people. Nevertheless, preliminary psychometric reports suggest that the CAS score was well correlated with distress, coping, and support, while the OCS score was associated with coronavirus anxiety, spiritual crisis, and alcohol/drug coping. All versions of FCV-19S and CSS were strongly correlated with depression and anxiety. Due to the unique discriminative ability and consistency with the DSM-5’s cross-cutting symptom measures of CAS and OCS, these assessment tools may prove more useful for clinicians.

In the current scenario, self-report scales might prove useful as they are short, easy to administer (through paper or a digital platform), and feasible to be used when in self-isolation or quarantine. However, these scales may have limited potential to measure outcome parameters of interventions as the findings may not be aligned with objective assessment and be more prone to response bias. It is therefore crucial to develop clinician-administered assessment tools consistent with DSM-5 or ICD-10/11 criteria, with strong psychometric properties, and sensitive to interventions.

This brief overview of scales provides several key directions for future research. First, there is a need to refine existing screening instruments with translation, validation, and cross-cultural adaptation without detracting from their psychometric properties to boost clinical and epidemiological research across the world. In particular, future validation studies should include the elderly, children, adolescents, young adults, and people with pre-existing physical and mental illness in particular settings (e.g. self-isolation or quarantine), to determine the discriminative ability and widen their utility. Second, researchers need to compare the psychometric properties of these scales with each other or with the traditional scales (e.g. PHQ-9, GAD-7) to ascertain the op-
| Sr No | Authors                  | Scale                                      | Sample Size, Age (Mean ± SD) | Country                              | Duration of data collection | English Version: Reliability: Cronbach’s alpha | English Version: Validity: Construct validity | English Version: Cut off scores | Sensitivity | Specificity | False Positive | Discrimination ability | Other comments                  |
|-------|-------------------------|-------------------------------------------|------------------------------|--------------------------------------|-----------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------------|-------------|-------------|---------------------|--------------------------|---------------------------|
| 1     | Lee et al., 2020b       | Coronavirus Anxiety Scale (CAS)           | n = 775, Age: 32.72 ± 9.35 years, United States of America, 11th to 13th March 2020 | United States of America, 11th to 13th March 2020 | Cronbach’s alpha = 0.93 | r (LD = 0.81), and coping (r = 0.80) | AUC: 0.94 | Cut off scores ≥ 9; sensitivity: 90%; specificity: 85%; false-positive: 15% | Single Factor (Uni-dimensional) | Brazil, Hebrew, Korean, Portuguese, Polish, Portuguese, Romanian, Spanish, Turkish, Urdu | Cronbach’s alpha = 0.84 to 0.85 | Single Factor (Uni-dimensional) | Low reliability of 20.1% | Cronbach’s alpha = 0.84 to 0.85 | Low reliability of 20.1% |
| 2     | Ahorsu et al., 2020     | COVID Stress Scales (CSS): Five subscales | n = 775, Age: 32.72 ± 9.35 years, United States of America, 11th to 13th March 2020 | United States of America, 11th to 13th March 2020 | Cronbach’s alpha = 0.82 | r: suicidal ideation (r = 0.72–0.81), spiritual crisis (r = 0.53–0.64), extreme hopelessness (r = 0.66–0.70). | AUC = 0.81 to 0.92 | Cut off scores ≥ 7; sensitivity: 81% to 93%; specificity: 73%; | Single Factor (Uni-dimensional) | English/Persian | Cronbach’s alpha: 0.82 | Single Factor (Uni-dimensional) | Cronbach’s alpha: 0.82 | Single Factor (Uni-dimensional) | Low reliability of 20.1% | Single Factor (Uni-dimensional) | Low reliability of 20.1% |
| 3     | Afari et al., 2020      | (single-factor: cognitive)                | n = 217, Age: 31.35 ± 12.68 years, Cameroon, 11th to 13th March 2020 | Cameroon, 11th to 13th March 2020 | Cronbach’s alpha = 0.78 | r (enhance COVID-19 fear of, correlated with anxiety (r = 0.72–0.78), depression (r = 0.65), and suicide (r = 0.63). | AUC: 0.94 | Cut off scores ≥ 9; sensitivity: 90%; specificity: 85%; false-positive: 15% | Single Factor (Uni-dimensional) | English | Cronbach’s alpha = 0.84 to 0.85 | Single Factor (Uni-dimensional) | Cronbach’s alpha = 0.84 to 0.85 | Single Factor (Uni-dimensional) | Low reliability of 20.1% | Single Factor (Uni-dimensional) | Low reliability of 20.1% |
| 4     | Sorace et al., 2020     | The Italian version of FCV-19S             | n = 249, Age: 34.50 ± 12.21 years, Italy, 18th March to 21st March 2020 | Italy, 18th March to 21st March 2020 | Cronbach’s alpha: 0.87 | r (positively correlated with the PHQ-9 (r = 0.41). | AUC: 0.81 to 0.92 | Cut off scores ≥ 9; sensitivity: 90%; specificity: 85%; false-positive: 15% | Single Factor (Uni-dimensional) | Italian | Cronbach’s alpha: 0.87 | Single Factor (Uni-dimensional) | Cronbach’s alpha: 0.87 | Single Factor (Uni-dimensional) | Low reliability of 20.1% | Single Factor (Uni-dimensional) | Low reliability of 20.1% |
| 5     | Satici et al., 2020     | Turkish version of FCV-19S                | n = 854, Age: 29.47 ± 10.54 years, Turkey, Duration: NA | Turkey, Duration: NA | Cronbach’s alpha: 0.81 | r (positively correlated with depression (r = 0.47). | AUC: 0.81 to 0.92 | Cut off scores ≥ 7; sensitivity: 81% to 93%; specificity: 73%; | Single Factor (Uni-dimensional) | Turkish | Cronbach’s alpha: 0.81 | Single Factor (Uni-dimensional) | Cronbach’s alpha: 0.81 | Single Factor (Uni-dimensional) | Low reliability of 20.1% | Single Factor (Uni-dimensional) | Low reliability of 20.1% |
| 6     | Reznik et al., 2020     | Russian version of FCV-19S                | n = 6850, Age: 49.8 ± 16.2 years, Eastern European Autonomous regions (Russia, Belarus), Duration: NA | Eastern European Autonomous regions (Russia, Belarus), Duration: NA | Cronbach’s alpha: 0.81 | r (positively correlated with depression (r = 0.47). | AUC: 0.81 to 0.92 | Cut off scores ≥ 7; sensitivity: 81% to 93%; specificity: 73%; | Single Factor (Uni-dimensional) | Russian | Cronbach’s alpha: 0.81 | Single Factor (Uni-dimensional) | Cronbach’s alpha: 0.81 | Single Factor (Uni-dimensional) | Low reliability of 20.1% | Single Factor (Uni-dimensional) | Low reliability of 20.1% |
| 7     | Taylor et al., 2020     | Questionnaire on Perception of Threat     | n = 1014, Age: 42.9 ± 13.3 years, All Spanish Autonomous regions (Canada, United States, Spanish) | All Spanish Autonomous regions (Canada, United States, Spanish) | Cronbach’s alpha = 0.66 | r (positively correlated with depression (r = 0.47). | AUC: 0.81 to 0.92 | Cut off scores ≥ 7; sensitivity: 81% to 93%; specificity: 73%; | Single Factor (Uni-dimensional) | Spanish | Cronbach’s alpha = 0.66 | Single Factor (Uni-dimensional) | Cronbach’s alpha = 0.66 | Single Factor (Uni-dimensional) | Low reliability of 20.1% | Single Factor (Uni-dimensional) | Low reliability of 20.1% |

**Table 1** Empirically Validated Scales That Measures the COVID-19 Related Mental Health Issues.

| Dimensions/Factors | Additional Points |
|--------------------|-------------------|
| Four Factors/dimensions: | Four Factors/dimensions: |
| 1) Cognitive (e.g. repetitive thinking) | 1) Cognitive (e.g. repetitive thinking) |
| 2) Emotional (e.g. fear, anger) | 2) Emotional (e.g. fear, anger) |
| 3) Social (e.g. social avoidance) | 3) Social (e.g. social avoidance) |
| 4) Physiological (e.g. sleep disturbances) | 4) Physiological (e.g. sleep disturbances) |

**Abbreviations:**
- #*: Five levels from strongly disagree (1) to strongly agree (5) over the last 2 weeks + Likert-type scale from 0 to 10. LD: Structure coefficients, r: Pearson’s correlation coefficient, $: Five levels from not at all (0) to extremely (4) over the last one week, MA: Mixed Anxiety and Depression Scale, HADS: Hospital Anxiety and Depression Scale, PHQ-9: Patient Health Questionnaire, CSS: Convergent validity (r = 0.45) and discriminant validity (r ≤ 0.39).
- #: Five levels from strongly disagree (1) to strongly agree (5) over the last 2 weeks + Likert-type scale from 0 to 10. LD: Structure coefficients, r: Pearson’s correlation coefficient, $: Five levels from not at all (0) to extremely (4) over the last one week, MA: Mixed Anxiety and Depression Scale, HADS: Hospital Anxiety and Depression Scale, PHQ-9: Patient Health Questionnaire, CSS: Convergent validity (r = 0.45) and discriminant validity (r ≤ 0.39).

**Footnote:** All scales except CSS, take 4–5 min to administer. CAS and OCS scales are available at: [https://www.google.com/search?q= Brain+Behav+Immunity+2020](https://www.google.com/search?q= Brain+Behav+Immunity+2020).
timal measure in different countries, settings, and populations. Still, these scales may be useful for epidemiological research, but perhaps less so for intervention studies that will need additional scales as outcome measures. For interventional research, the combination of scales or tools (e.g. traditional, self-report, and clinical-administered) either parallel or in a predefined sequence may be necessary to assess the change and to improve diagnostic coverage, psychometric properties, and comparative evaluation. In particular we would suggest the development of scales that can assist with the assessment of COVID-19 related psycho-social stigma, phobia, and post-traumatic stress disorder.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.bbi.2020.05.049.

References

Ahorsu, D.K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M.D., Pakpour, A.H., 2020. The fear of COVID-19 scale: development and initial validation. Int. J. Ment. Health Addict. 1–9. https://doi.org/10.1007/s11469-020-00275-8.

Lee, S.A., 2020a. How much “Thinking” about COVID-19 is clinically dysfunctional? Brain Behav. Immun. https://doi.org/10.1016/j.bbi.2020.04.067.

Lee, S.A., 2020b. Coronavirus anxiety scale: a brief mental health screener for COVID-19 related anxiety. Death Stud. 44, 393–401. https://doi.org/10.1080/07481187.2020.1748481.

Li, Z., Ge, J., Yang, M., Feng, J., Qiao, M., Jiang, R., Xi, J., Zhan, G., Xu, X., Wang, L., Zhou, Q., Zhou, C., Pan, Y., Liu, S., Zhang, H., Yang, J., Zhu, B., Hu, Y., Hashimoto, K., Liu, Y., Wang, H., Wang, B., Liu, C., Yang, C., 2020. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. Brain Behav. Immun. https://doi.org/10.1016/j.bbi.2020.03.007.

Pérez-Fuentes, M. del C., Móloco Jurado, M. del M., Oropesa Ruiz, N.F., Martos Martinez, A., Simón Márquez, M. del M., Herrera-Peco, I., Gámez-Linares, J.J., 2020. Questionnaire on Perception of Threat from COVID-19. J. Clin. Med. https://doi.org/10.3390/jm0401196.

Raming, E., Addikutu, F., Pereira-Sanchez, V., Ramalho, R., Orsolini, L., Schuh Teixeira, A.L., Gonzalez-Diaz, J.M., Pinto da Costa, M., Soler-Vidal, J., Bytyci, D.G., El Hayek, S., Larouw, A., Shalbafan, M., Sarrif, Z., Nofal, M., Kundadak, G.K., 2020. Mental health interventions during the COVID-19 pandemic: a conceptual framework by early-career psychiatrists. Asian J. Psychiatry 102085. https://doi.org/10.1016/j.ajp.2020.102085.

Reznik, A., Gritsenko, V., Konstantinov, V., Khamenka, N., Israelowitz, R., 2020. COVID-19 fear in eastern Europe: validation of the fear of COVID-19 scale. J. Ment. Health Addict Int. https://doi.org/10.1007/s11469-020-00283-3.

Sakib, N., Mamun, M., Bhuiyan, A.K.M., Hossain, S., Mamun, F., Honen, I., Abdullah, A.H., Sarker, M., Mobiuddin, M., Rayhan, I., Hossain, M., Siddqi, T., Gozal, D., Muhit, M., Sharifull Islam, S.S.M., Griffiths, M., Pakpour, A., 2020. Psychometric validation of the bangla fear of COVID-19 scale: confirmatory factor analysis and Rasch analysis. Int. J. Ment. Health Addict. https://doi.org/10.1007/s11469-020-00289-x.

Satici, B., Gocet-Tekin, E., Deniz, M.E., Satici, S.A., 2020. Adaptation of the Fear of COVID-19 Scale: Its Association with Psychological Distress and Life Satisfaction in Turkey. J. Ment. Health Addict Int. https://doi.org/10.1007/s11469-020-00294-0.

Corresponding author.

Soraci, P., Ferrari, A., Abbiati, F.A., Del Fante, E., De Pace, R., Urso, A., Griffiths, M.D., 2020. Validation and psychometric evaluation of the Italian version of the fear of. Int. J. Ment. Health Addict. 1–10. https://doi.org/10.1007/s11469-020-00277-1.

Taylor, S., Landry, C., Paluszcz, M., Fergus, T.A., McKay, D., Asmundson, G.J.G., 2020. Development and initial validation of the COVID stress scales. J. Anxiety Disord. 102232. https://doi.org/10.1016/j.janxdis.2020.102232.

Ramdas Ransing*, Rodrigo Ramalho*, Laura Orsolini*, Frances Adiukuw*, Jairo M. Gonzalez-Diaz*, Amine Larouw*, Mariana Pinto da Costa**, Paolo Grandinetti**, Drita Gashi Bytci*, Mohammadreza Shalbafan**, Ishwar Patil**, Marwa Nofal**, Victor Pereira-Sanchez**, Ozge Kilic**

*Department of Psychiatry, BKL Walawalkar Rural Medical college, Ratnagiri-415606, Maharashtra, India
**Department of Clinical Neurosciences/DIMSC, School of Medicine, Section of Psychiatry, Polytechnic University of Marche, Ancona 60126, Italy
***Drug Misuse and Novel Psychoactive Substances Research Unit, School of Life and Medical Sciences, University of Hertfordshire, Herts AL109AB, UK
†Department of Neuropsychiatry, University of Port Harcourt Teaching Hospital, East West Road, Alakia, PMB 6173, Port Harcourt, Nigeria
‡CERSAME School of Medicine and Health Sciences, Universidad del Rosario -Clínica Nuestra Señora de la Paz, Calle 12C # 25, Bogota, Colombia
§Razi Hospital, Faculty of Medicine of Tunis, Tunis El Manar University.
¶Tunis 1068, Tunisia
∥Unit for Social and Community Psychiatry, WHO Collaborating Centre for Mental Health Services Development, Queen Mary University of London, London E138SP, UK
††Institute of Biomedical Sciences Abel Salazar, University of Porto, Porto, Portugal
‡‡Hospital de Magalhães Lemos, Porto, Portugal
$$$Addictions Service, Department of Territorial Services, ASL 4 Teramo, Italy
$$$$Hospital and University Clinical Service of Kosovo, Community Based Mental Health Center and House for Integration, Prizren 20000, Kosovo
####Mental Health Research Center, Iran University of Medical Sciences, Tehran 1449614535, Iran
$$$Helwan Mental Health Hospital, Extension of Mansour St., behind Kibretaj Helwan Club, Helwan, 25562198 Cairo, Egypt
#####Department of Child and Adolescent Psychiatry, NYU Grossman School of Medicine, One Park Avenue, New York, NY 10016, USA
PPDepartment of Psychiatry, Koç University Hospital, Davutpasa Cad. No: 4, 34010, Topkapi, Istanbul, Turkey

E-mail addresses: ramdas_ransing123@yahoo.co.in (R. Ransing), r.ramalho@aucland.ac.nz (R. Ramalho), laura.orsolini01@gmail.com (L. Orsolini), Francesadiikuwu@gmail.com (F. Adiukuw), jairom.gonzalez@urosario.edu.co (J.M. Gonzalez-Diaz), Larouw.amin@gmail.com (A. Larouw), mariana.pintodacosta@gmail.com (M. Pinto da Costa), grandinetti.paulo@gmail.com (P. Grandinetti), drita.gashi1@gmail.com (D.G. Bytci), shalbafan.mr@iums.ac.ir (M. Shalbafan), iipp8507@gmail.com (I. Patil), Marwa.nofal55@gmail.com (M. Nofal), vphereira@alumni.unav.es (V. Pereira-Sanchez), drozgekilic@gmail.com (O. Kilic).

*Corresponding author.