Proposal of a scale for COVID-19 stigma-discrimination toward health workers

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Stigma-discrimination occurs in three situations: exploitation-domination, social control, and avoiding diseases. It has been thought that, as with other infectious diseases, COVID-19 would be a source of stigma-discrimination in affected people. However, it was thought unlikely that stigma-discrimination would fall on health workers who care for patients with COVID-19. Stigma-discrimination may be associated with a high level of anxiety. Monterrosa-Castro et al. recently reported a prevalence of 39% of symptoms of anxiety among Colombian general practitioners.

The study aimed to design a scale to quantify COVID-19 stigma-discrimination. An online psychometric study was performed, and the questionnaire included informed consent and demographic information, and was sent to students’ email available on the institution’s platform. The questionnaire was available from July 3 to August 10, 2020. The study included 1108 students of a university who take pregraduate and postgraduate programs; all were residents of Mexico and were aged between 18 and 60 years old (M=21.5, SD=4.4), 80.4% of whom were women and 97.0% with a bachelor’s degree. The subjects completed an 18-point questionnaire with a dichotomous response pattern, and included questions about foreign people, patients with COVID-19, and health workers. Table 1 presents all the items studied. Exploratory and confirmatory factor analyses were applied to select items with the best performance. Roughly by consistent weighted least squares were used as the extraction method, with a tetrachoric correlation matrix for factor extraction; this method is specific for a dichotomous answer, 7 and McDonald’s omega was 0.68.

Table 1 COVID-19 Stigma-Discrimination Toward Health Workers Scale

| Item                                                                 | Yes | No |
|----------------------------------------------------------------------|-----|----|
| 1. Are all foreign nationals at higher risk of transmitting COVID-19? |     |    |
| 2. Is COVID-19 a divine punishment?                                   |     |    |
| 3. Should people fear those who are sick with COVID-19?               |     |    |
| 4. Are people sick with COVID-19 afraid to tell others that they have this disease? |     |    |
| 5. When I see news and stories about COVID-19 on television, press, or social media, do I get nervous or anxious? |     |    |
| 6. Is it embarrassing to be sick with COVID-19?                       |     |    |
| 7. Should people feel sorry for persons who are sick with COVID-19?   |     |    |
| 8. Do people get sick with COVID-19 due to irresponsible behaviors?   |     |    |
| 9. Should people who work in health services and are in contact with COVID-19 patients be isolated from society? |     |    |
| 10. Should family members treat people with COVID-19 with less respect? |     |    |
| 11. Should people sick with COVID-19 be rejected by society?          |     |    |
| 12. Can people sick with COVID-19 be neighbors of those who do not suffer from this disease? |     |    |
| 13. Am I afraid of being infected by the health personnel I meet in public transportation, on the street, or at home? |     |    |
| 14. Are people sick with COVID-19 guilty of having acquired this disease? |     |    |
| 15. Should people who have recovered from COVID-19 stay away from their workplaces? |     |    |
| 16. Should people who work in health services avoid using public transport so as not to infect the population? |     |    |
| 17. Should health personnel avoid returning home so as not to infect their family? |     |    |
| 18. Should health personnel avoid going out to the street so as not to infect the population? |     |    |

*Items that showed better performance as a scale in the factor analysis.

Five items showed the best performance in the subsequent factor analysis. The polychoric correlation matrix showed good adequacy (Bartlett’s $\chi^2=2184.5$, df = 10, $p<0.001$, Kaiser-Meyer-Olkin test=0.83, 95% CI 0.81 to 0.860). The exploratory factor analysis showed one factor with eigenvalue of 3.07, which explained 61.3% of the variance. The confirmatory factor analysis confirmed the structure, and goodness-of-fit indicators were excellent (table 2). The Kuder-Richardson’s coefficient was 0.67, while the McDonald’s omega was 0.68.

Factor analysis is the best technique to construct health scales. The present investigation showed the scale on stigma-discrimination toward health personnel due to COVID-19 showed excellent goodness-of-fit indicators

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and acceptable internal consistency. Stigma-discrimination is a stressor with a negative impact on the health of the victims. The findings of this study suggest that this scale can be used to quantify stigma-discrimination toward health workers.

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**REFERENCES**

1. Phelan JC, Link BG, Dovidio JF. Stigma and prejudice: one animal or two? *Soc Sci Med* 2008;67:358–67 https://doi.org/
2. Baldassarre A, Giorgi G, Alessio F, et al. Stigma and discrimination (SAD) at the time of the SARS-CoV-2 pandemic. *Int J Environ Res Public Health* 2020;17:6341 https://doi.org/
3. Cassiani-Miranda C, Campo-Arias A. Stigma-discrimination: significant collateral damage of COVID-19. *Indian J Psychiatry* 2020;62:610–1 https://doi.org/
4. Monterrosa-Castro A, Redondo-Mendoza V, Mercado-Lara M. Psychosocial factors associated with symptoms of generalized anxiety disorder in general practitioners during the COVID-19 pandemic. *J Investig Med* 2020;68:1228–34.
5. Li C-H. Confirmatory factor analysis with ordinal data: comparing robust maximum likelihood and diagonally weighted least squares. *Behav Res Methods* 2016;48:936–49 https://doi.org/
6. Kuder GF, Richardson MW. The theory of the estimation of test reliability. *Psychometrika* 1937;2:151–60 https://doi.org/
7. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951;16:297–334 https://doi.org/
8. McDonald RP. The theoretical foundations of principal factor analysis, canonical factor analysis, and alpha factor analysis. *Br J Math Stat Psychol* 1970;23:1–21 https://doi.org/
9. Lorenzo-Seva U, Ferrando PJ. Factor analysis (statistical program); Tarragona: Rovira i Virgili University, 2020. Available: http://psico.fep.urv.es/utilitats/factor/Bibliography.html
10. Jamovi Project. Jamovi. (Version 1.2) [Computer Software], 2020. Available: https://www.jamovi.org
11. LT H, Bentler PM. Cutoff criteria for fit indices in covariance structure analysis: conventional criteria versus new alternatives. *Struct Equat Model* 1999;6:1–55 https://doi.org/
12. Yu C, Mutheén B. Evaluation of model fit indices for latent variable models with categorical and continuous outcomes. *J Psychosom Res* 2010;68:319–23 https://doi.org/
13. Keszei AP, Novak M, Steiner DL. Introduction to health measurement scales. *J Psychosom Res* 2010;68:319–23 https://doi.org/
14. Duan W, Bu H, Chen Z. COVID-19-related stigma profiles and risk factors among people who are at high risk of contagion. *Soc Sci Med* 2020;266:113425 https://doi.org/
15. Stuber J, Meyer I, Link B. Stigma, prejudice, discrimination and health. *Soc Sci Med* 2008;67:351–7 https://doi.org/