Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Prevalence and correlates of depression during the COVID-19 pandemic and the major role of stigmatization in low- and middle-income countries: A multinational cross-sectional study

Jude Mary Cénat a, *, Pari-Gole Noorishad a, Cyrille Kossigan Kokou-Kpolou a, b, Rose Darly Dalexis c, Saba Hajizadeh a, Mireille Guerrier a, Lewis Ampidu Clormeus d, Jacqueline Bukaka e, Jean-Pierre Birangui f, Kouami Adansikou g, Assumpta Ndengeyingoma h, Vincent Sezibera i, Daniel Derivois j, Cécile Rousseau k

a School of psychology, University of Ottawa, Ontario, Canada
b University of Picardie Jules Verne, Amiens, France
c Interdisciplinary School of Health Sciences, University of Ottawa, Ontario, Canada
d University of State of Haiti, Port-au-Prince, Haiti
e University of Kinshasa, Kinshasa, Democratic Republic of the Congo
f University of Lubumbashi, Lubumbashi, Democratic Republic of the Congo
g Université de Lomé, Lomé, Togo
h Université du Québec en Outaouais, Canada
i University of Rwanda, Rwanda
j Université Bourgogne Franche Comté, Dijon, France
k McGill University, Canada

ARTICLE INFO

Keywords:
COVID-19
Stigmatization
Resilience
Depression
DR Congo, Haiti, Rwanda and Togo

ABSTRACT

Objectives: Currently, there is little data on the mental health consequences of the COVID-19 pandemic in low- and middle-income countries (LMICs). This study aims to examine the pooled and separate prevalence and determinants of depression during the pandemic in samples from four LMICs.

Methods: Participants (N = 1267, 40.9% women) were recruited from the Democratic Republic of the Congo (DRC), Haiti, Rwanda, and Togo. They completed an online cross-sectional survey on sociodemographics, exposure and stigmatization related to COVID-19, the Hopkins Symptom Checklist depression subscale, and the Connor-Davidson Resilience Scale-2.

Results: The pooled prevalence for depression symptoms was 24.3% (95% CI: 22.08-26.79%), with significant differences across countries. Younger age, gender (women), and high levels of exposure and stigmatization related to COVID-19, and resilience were associated with depression in the pooled data. There were significant variations at the country level. Stigmatization (but not exposure to COVID-19 and resilience) was a strong predictor among the four countries.

Conclusions: The prevalence of depression symptoms in the LMICs are similar to those reported in China and in most high-income countries during the pandemic. The findings emphasize the need for implementing non-fear-based education programs during epidemics to reduce stigmatization.

1. Introduction

The current Coronavirus Disease 2019 (COVID-19) pandemic has caused significant human damage, including more than 1.5 million deaths among 66.5 million confirmed cases worldwide as of December 6, 2020 (John Hopkins University, 2020). In addition to concerns, anxiety, and distress provoked by the spread of COVID-19, the pandemic has had major negative impacts on people’s lives (Bonaccorsi et al., 2020; Cénat, 2020a; Di Nicola et al., 2020; Helliwell et al., 2020; Holmes et al., 2020). In fact, measures taken to curb the spread of the
higher prevalence of anxiety, psychological distress, insomnia, post-traumatic stress disorder, and depression (Cénat et al., 2020; Lai et al., 2020; Lei et al., 2020; Mazza et al., 2020; Pappa et al., 2020). Studies have shown that COVID-19 is associated with a higher prevalence of anxiety, psychological distress, insomnia, post-traumatic stress disorder, and depression (Cénat et al., 2021a; Lai et al., 2020; Liu et al., 2020; Pappa et al., 2020). The fear of being infected or of having a loved one become infected, social isolation due to physical and social distancing, exacerbation of violence within families, multiple job losses, and financial problems caused by the pandemic are among the potential risk factors for depression and other mental health problems observed in affected populations (Cénat et al., 2021a; Kokou-Kpolou et al., 2020a; Mazza et al., 2020). Studies have also shown that people with low socioeconomic status are at even greater risk of contracting COVID-19, and related complications such as death, but also mental health problems (Iacobucci, 2020; Raifman and Raifman, 2020; Yancy, 2020).

While the COVID-19 pandemic has revealed the vulnerability of healthcare systems and facilities in HIC (Chopra et al., 2020; Emanuel et al., 2020), people in low- and middle-income countries (LMICs) are also concerned about the known fragility of their healthcare systems (Cénat, 2020b; Gilbert et al., 2020). In addition, situations of precariousness and poverty have made it impossible to confine populations and to respect physical distancing measures and other restrictive measures (Cénat, 2020b; Gilbert et al., 2020). Lack of education and the fear of being infected has contributed to stigmatization related to COVID-19 (Brns et al., 2020; Roberto et al., 2020). In another context, studies conducted on the Ebola Virus Disease (EVD) have revealed strong associations between experiences of stigmatization and mental health problems (Cénat et al., 2020d, 2020b). While this pandemic has fostered stigmatization, it is important to study its association with mental health problems in LMICs in order to develop mental health programs that respond to the real needs of communities. On the other hand, resilience has often been observed as one of the protective factors associated with depression (Cénat et al., 2015; Kokou-Kpolou et al., 2020b; Kukihara et al., 2014). Studies that have explored the association between resilience and mental health problems during the COVID-19 pandemic have particularly shown its protective role in the development of depressive symptoms (Barzilay et al., 2020; Zhang et al., 2020; Luceno-Moreno et al., 2020; Ran et al., 2020). However, few studies have evaluated resilience in LMICs. During this pandemic it is particularly important to evaluate the association between resilience and mental health problems, as it may play a role in the development of prevention and intervention programs among infected populations (Cénat et al., 2020b; Mymin Kahn et al., 2016; United Nations Children’s Fund, 2016).

1.1. The current study

The purpose of this study is to analyse the prevalence and the risk and protective factors associated with depressive symptoms during the COVID-19 pandemic in four low-income countries: Rwanda (5,174 confirmed cases and 35 deaths), Haiti (9,100 confirmed cases and 232 deaths), Democratic Republic of the Congo (DRC, 11,450 confirmed cases and 315 deaths), and Togo (2,406 confirmed cases and 57 deaths). Specifically, this study aims to: 1) examine the combined and separate prevalence of depression during the pandemic in relation to sociodemographic characteristics (gender, age, and relationship status); 2) analyse the level of exposure to COVID-19 and stigmatization related to COVID-19 as risk factors associated with depression; 3) investigate resilience as a protective factor associated with depression.

2. Method

2.1. Participants and procedures

We recruited 1,267 participants (40.8 % women) to complete an online survey on COVID-19, from March to May 2020. Participants were from four LMICs: RDC (626; 43.4% women), Haiti (225; 42.0% women), Rwanda (174; 40.5% women), and Togo (242; 33.2% women). Participants mean age was of 32 (SD = 10.1). Participants were recruited through the social networks Facebook, Twitter, WhatsApp, and via telephone, where they received information on the study and a recruitment script. Participants had the option of completing the questionnaire in French, Creole, English, or Kinyarwanda. Participants signed an informed electronic consent form or provided oral consent by phone. The study was reviewed by the University of Ottawa Research Ethics Board and the Institut National de Recherche Biomédical of the Democratic Republic of the Congo.

2.2. Measures

We used self-reported measures to assess sociodemographic characteristics of the sample, level of exposure to COVID-19, stigmatization related to the COVID-19, resilience, and depression.

2.2.1. Sociodemographics

Information about gender, age, marital status, living country, etc. were provided by participants.

2.2.2. Exposure to COVID-19

The Exposure to COVID-19 scale was inspired by the Exposure to Infectious Disease Questionnaire (Cénat et al., 2020d). However, the Exposure to COVID-19 scale differed as it was created to be a short form questionnaire. The Exposure to Infectious Disease Questionnaire has been used to examine exposure level to Ebola Virus Disease (e.g., Have you been in a town or village where people have fallen ill with Ebola? Have you been sick with Ebola yourself?). Exposure to COVID-19 was measured with five items on a two-point scale (yes, no). Cronbach’s alpha was .68 in our sample.

2.2.3. Stigmatization related to the COVID-19

The Stigmatization Related to the COVID-19 scale was inspired by the Stigmatization Related to Ebola Virus Disease Questionnaire (Cénat et al., 2020d). This scale was adapted to be a short form questionnaire and was developed in our laboratory with a panel of experts according to WHO studies. Cronbach’s alpha was .81 in our sample.

2.2.4. Depression

Depressive symptoms were assessed using the depression subscale of the Hopkins Symptom Checklist (HSCL) (Winokur et al., 1984). The HSCL depression subscale is a 15-item scale ranging from 1 to 4 (‘Not at all’, ‘A little’, ‘Quite a bit’, ’Extremely’). It is a widely used questionnaire with strong psychometric properties among different cultures (Lee et al., 2008). An average score of 1.75 indicates a significant level of distress and this was the cutoff point used in our analyses (Winokur et al., 1984). Cronbach’s alpha was .91 in our sample.

2.2.5. Resilience

We used a short version of the Connor-Davidson Resilience Scale (CD-RISC) to assess resilience: the CD-RISC2 (Connor and Davidson, 2003; Vaishnavi et al., 2007). This scale includes two items, which are items 1 (Able to adapt to change) and 8 of the original scale (Tend to bounce back after illness or hardship). The CD-RISC has shown good internal consistency across different cultures. Cronbach’s alpha was .72 in our sample.
2.3. Data analysis

Frequencies of the prevalence of clinical depression were computed across country, gender, age, and marital status along with Chi-Squared tests (95% confidence intervals). We then performed a t-test to compare the mean score of exposure level to COVID-19, stigmatization related to COVID-19, and resilience scores among those who are clinically depressed or not. We tested the homogeneity of variances using a Levene test and t-test results were reported accordingly.

The risk and protective factors associated with depression were further investigated using multivariate linear regressions on the scores of exposure to COVID-19, stigmatization, and resilience as covariates and while controlling for the sociodemographic characteristics mentioned above.

We assessed normality and heterogeneity by examining the Shapiro test, Skewness and Kurtosis values, and the Levene test. All analyses were performed using the Statistical Package for Social Science (SPSS) version 26 for Mac.

3. Results

Overall, 24.37% (95% CI: 22.08-26.79%) of participants in the combined sample reported significant depressive symptoms (Table 1). Results showed significant discrepancies in the reported prevalence across the four countries (11.18%, 30.86%, 27.02%, and 20.66%, respectively for Togo, Haiti, DRC, and Rwanda; $\bar{x}^2 = 23.0, p < .0001$).

The prevalence of significant symptoms of depression was generally higher among women participants compared to their men counterparts in the pooled data (respectively 29.9% and 20.1%; $\bar{x}^2 = 12.6, p = .002$) and among participants from Haiti (respectively 45.5% and 17.9%; $\bar{x}^2 = 13.9, p = .001$). However, no significant differences were found between male and female participants in DRC, Rwanda, and Togo (respectively, $\bar{x}^2 = 2.37, p = .31$; $\bar{x}^2 = 4.76, p = .09$; $\bar{x}^2 = 3.35, p = .19$). The same pattern was observed when comparing the prevalence of clinical depression within different age groups.

The second part of Table 1 shows the distribution of mean scores of exposure to COVID-19, stigmatization related to COVID-19, and resilience for participants that presented significant symptoms of depression or not (according to the ANOVA). For exposure to COVID-19 and stigmatization related to COVID-19 statistically significant higher mean scores were observed among those with significant symptoms of depression in the pooled data ($\bar{x} ± 1.0$ VS $\bar{x} ± 1.8, p < .001$; 4.1 $± 4.2$ VS 2.4 $± 3.4, p < .001$ respectively for exposure to COVID-19 and stigmatization).

Similarly, those without clinical depression reported higher resilience scores compared to those with depression (8.5 $± 1.9$ VS 7.3 $± 2.1, p < .001$). When considered individually, a significant difference was found for stigmatization related to COVID-19 and resilience scores; nevertheless, only DRC and Haiti presented significant differences for exposure to COVID-19.

Multivariate linear regression analyses were performed for the pooled sample and for each country to further investigate the relationship between depression and exposure to COVID-19, stigmatization related to Covid-19, and resilience (Table 2). Results for the pooled data showed a significant relationship between both exposure to COVID-19 ($\beta = .09, p < .001$) and stigmatization related to COVID-19 ($\beta = .03, p < .001$). Additionally, resilience was negatively associated with depression ($\beta = -.07, p < .001$). Compared to DRC as the reference country, participants from Haiti were more likely to report higher depression scores ($\beta = .18, p < .001$).

When performing national regression models, stigmatization related to COVID-19 was similarly significant for each country ($\beta = .02, p = .002; \beta = -.07, p < .001; \beta = .04, p < .004; \beta = .05, p < .001$, respectively for the DRC, Rwanda, Haiti, and Togo). However, exposure to COVID-19 was statistically associated with depression scores only for Haiti ($\beta = .26, p < .001$) and DRC ($\beta = .08, p < .001$). Moreover, resilience was negatively associated with depression in Togo and DRC (respectively $\beta = -.06, p = .003$ and $\beta = -.07, p < .001$). For the combined data, 19% of the variance was explained by the model; the $R^2$ value varied from 17% to 30% for the individual regression models (Table 2).

4. Discussion

This study had three main objectives. The first was to analyse the combined and separate prevalence of depression in Rwanda, Haiti, DRC, and Togo in relation to socio-demographic characteristics. The results first showed that one in five participants presented significant symptoms of depression during the COVID-19 pandemic. The results then revealed that symptoms of depression were more prevalent in Haiti and the DRC compared to Rwanda and Togo. The prevalence of depressive symptoms remains high in all four countries, considering the latest World Health Organization studies in which between 3.8 and 4.3% of populations in these countries presented significant symptoms of depression (World Health Organization, 2017). However, these prevalence rates are comparable to those observed among adults in crisis situations in Haiti, Rwanda, Togo, and the DRC (e.g., an earthquake, an epidemic) (Cénat et al., 2020c; Nakimuli-Mpungu et al., 2012). The results also showed

| Table 1 |
|---|
| Prevalence of depression over gender, age and marital status, and mean (standard deviation) scores of exposure to COVID-19, stigmatization, and resilience over clinical depression. |
| | Countries |
| | Pooled % | DRC % | Rwanda % | Haiti % | Togo % |
| Total | 24.37 | 27.02 | 20.66 | 30.86 | 11.18 |
| Gender | | | | | |
| Men | 20.07 | 24.71 | 14.29 | 17.86 | 9.09 |
| Women | 29.93 | 29.74 | 23.64 | 45.45 | 17.65 |
| Non-binary | 26.09 | 40.00 | 44.44 | 41.67 | 5.00 |
| | 13.52 | 2.37 | 4.76 | 13.90 | 3.35 |
| p | 0.001 | 0.306 | 0.093 | 0.001 | 0.187 |
| Age | | | | | |
| Less than 24 years | 30.48 | 32.18 | 28.57 | 54.17 | 15.79 |
| 25-34 years | 26.37 | 26.84 | 22.86 | 33.33 | 14.29 |
| 35 and more | 18.50 | 22.11 | 15.63 | 19.44 | 6.38 |
| | 12.55 | 4.80 | 1.60 | 7.81 | 2.32 |
| p | 0.002 | 0.091 | 0.449 | 0.020 | 0.314 |
| Marital status | | | | | |
| Single | 26.82 | 27.21 | 24.39 | 39.36 | 14.43 |
| In relationship | 21.66 | 26.72 | 19.48 | 21.31 | 5.63 |
| Other | 23.64 | 27.27 | 0.00 | 0.00 | 50.00 |
| | 3.70 | 0.019 | 1.20 | 8.44 | 6.27 |
| p | 0.157 | 0.99 | 0.55 | 0.015 | 0.044 |

Mean (SD) Exposure to COVID-19

| Clinical Depression | 0.91 (1.04) | 0.96 | 1.16 | 0.76 | 0.53 |
| No clinical Depression | 0.62 (0.82) | 0.65 | 0.93 | 0.42 | 0.46 |
| | 1.09 | 1.14 | 0.92 | 0.61 |
| t-value | -4.69 | -3.81 | -1.01 | -2.28 | -0.41 |
| p | <.001 | <.001 | 0.315 | 0.025 | 0.682 |
| Stigmatization due to COVID-19

| Clinical Depression | 4.14 (4.16) | 4.36 | 3.76 | 3.72 | 3.53 |
| No clinical Depression | 2.42 (3.43) | 3.06 | 1.42 | 2.01 | 1.45 |
| | 4.20 | 4.08 | 4.46 | 2.93 |
| t-value | -6.05 | -3.48 | -2.76 | -2.48 | -3.22 |
| p | <.001 | <.001 | 0.016 | 0.002 |
| Resilience

| Clinical Depression | 7.29 (2.12) | 7.13 | 8.16 | 8.32 | 7.99 |
| No clinical Depression | 8.50 (1.86) | 8.40 | 8.92 | 7.50 | 8.70 |
| | 2.25 | 1.68 | 1.65 | 2.19 |
| t-value | 8.27 | 6.64 | 2.08 | 2.86 | 3.28 |
| p | <.001 | <.001 | 0.04 | 0.005 | 0.004 |
that, except for Haiti, there were no significant gender differences. This observation is becoming more and more consistent in our studies of mental health problems in LMICs and their association with lack of differences between men and women in the prevalence of internalized mental health problems. Similarly, the results showed significant age differences only for Haiti, where more than one in two young adults under the age of 24 and more than one in three participants aged 24 to 34 presented significant depressive symptoms, whereas this prevalence was less than one in four among participants aged 35 and over. These findings reflect the vulnerability of young adults in Haiti, which is an issue that needs to be addressed (Cénat et al., 2018). Studies conducted in the context of the 2010 earthquake in Haiti found similar results Cadichon et al., 2017; Cénat et al., 2018; Cénat and Derivois, 2015; Derivois et al., 2014). The pandemic may be exacerbating a situation of hopelessness among youth in Haiti, as they have the feeling that their future is bleak in this Caribbean country.

The second objective of this study was to analyze the roles of perceived exposure to COVID-19 and stigmatization related to COVID-19 as risk factors associated with depression during the pandemic. First, the results showed that level of exposure is not always a risk factor and that this differs between countries. In fact, exposure was a risk factor for the DRC and Haiti, but not for Togo and Rwanda. There are fewer cases and deaths in Togo (15) and Rwanda (4); this can create a feeling among local populations that the situation is under control and that there is hope. Regarding stigmatization related to COVID-19, the results of this study revealed that it is a consistent risk factor for predicting symptoms of depression in all four countries. Although we have not identified any studies on the association between COVID-19-related stigmatization and mental health problems in LMICs, various articles published since the beginning of the pandemic have alerted this issue (Jung and Jun, 2020; Zhai and Du, 2020). In addition, we have observed the same pattern for anxiety symptoms (Cénat et al., 2021b). Moreover, studies on Ebola and HIV have extensively documented the role of stigmatization in predicting mental health problems (Cénat et al., 2020d, 2020b; Oblade, 2015).

The third objective of this study was to explore the protective role of resilience in presenting symptoms of depression during the COVID-19 pandemic. The results showed different observations across countries. Indeed, resilience predicted a lower depression score for Togo and DRC, but not for Haiti and Rwanda. Although similar results were found in Haiti in the aftermath of the 2010 earthquake, this is a variable that deserves to be better explored in LMICs. In addition to individual resilience, factors such as social support and community resilience should also be studied to explore protective factors associated with depression from a more collective and community-based perspective.

5. Limitations

Although this study explores an important topic with a multinational sample, it has certain limitations. First, this study used a cross-sectional research design that does not allow for the exploration of causal relationship between the factors studied and depression. Considering the lack of information on the pre-existence of mental disorders among participants, a longitudinal design would help to better determine the association between the COVID-19 and related stigmatization and depression symptoms. Second, this study was conducted using self-reported questionnaires. Third, we had to adopt prevention measures because of the ongoing COVID-19 pandemic by conducting a web-based study. Knowing that this could be a barrier to participation in these LMICs, we also solicited participants by telephone to address this issue. However, it would be useful to have research that could include all segments of the population, especially the most vulnerable who do not have access to the Internet or to telephone services. The sample could also include more adults and elderly participants. Even though the populations of these countries are very young with a low median age, this is a selection bias that future studies should devote more efforts to reducing. Finally, other factors such as employment status, salary,
number of hours worked per week during the pandemic, adherence to social distancing measures and level of education, among others, could also have been explored.

6. Implications for research and practice

Despite these limitations, this study is important for understanding mental health issues during the pandemic in LMICs. It also provides insights for future research and implications for prevention and intervention. First, future research should focus on the observation that there are no gender differences in internalizing disorders in several African countries. What does this tell us about gender roles in Western societies where women are showing significant symptoms of depression and other internalizing disorders? But also, what does this tell us about gender roles in these so-called more traditional communities in which Western societies seek to insert their visions on the role of women? To answer these complex questions, comparative, mixed-methods, and longitudinal studies are needed and should also include Asian countries where some studies have made the same observation during the COVID-19 pandemic (Cao et al., 2020; Chen et al., 2020; Huang and Zhao, 2020). Studies should also look at the differences found between countries on resilience. Specifically, studies should also analyze both social support and community resilience because they often constitute important value in LMICs.

From a prevention and intervention perspective, this study shows the importance of implementing positive, non-fear-based education programs during epidemics to reduce stigmatization. In addition to causing mental health problems, stigmatization can play a determining role in the adoption of preventive measures (Obiade, 2015). Similarly, while intervening among those who present symptoms of depression, mental health professionals should also take an interest in the experiences of stigmatization related to the pandemic. This is a good way to address a consistent predictor of depressive symptoms, but also of other mental health problems in epidemic situations.

7. Conclusions

By examining the prevalence and factors associated with depression in these low-income countries, this study offers a global mental health perspective. Between the Caribbean (Haiti), West Africa (Togo), and Central Africa (Rwanda and DRC), this study showed similarities, but also differences that should be considered in the development of mental health programs in epidemic situations. The high prevalence of depression in these countries during the pandemic shows a pressing need to develop programs and tools that can address mental health in a global view. From this perspective, the "Psychological intervention guide: Intervening in the context of infectious disease outbreaks" is an important tool because it is adaptable, integrative, cross-cultural, and offers several possible options for mental health professionals (Cénat et al., 2020c).

Acknowledgements

This article was partially funded by the grant # 108968 from the International Development Research Center (IDRC), in collaboration with the Social Sciences and Humanities Research Council (SSHRC) and the Canadian Institutes of Health Research (CIHR), and the Faculty of Social Sciences of the University of Ottawa.

References

Barzilay, R., Moore, T.M., Greenberg, D.M., DiDomenico, G.E., Brown, L.A., White, L.K., Gur, R.C., Gur, R.E., 2020. Resilience, COVID-19-related stress, anxiety and depression during the pandemic in a large population enriched for healthcare providers. Transl. Psychiatry 10, 1–8. https://doi.org/10.1038/s41396-020-00982-3.

Bonaccorsi, G., Pierri, F., Cinelli, M., Flori, A., Galeazzi, A., Porcelli, F., Schmidt, A.L., Valensise, C.M., Scala, A., Quattrocchiocci, W., Pammolli, F., 2020. Economic and social consequences of human mobility restrictions under COVID-19. Proc. Natl. Acad. Sci. https://doi.org/10.1073/pnas.200765898.

Bruns, D.P., Kragulj, N.V., Bruns, T.R., 2020. COVID-19: facts, cultural considerations, and risk of stigmatization. J. Transcult. Nurs. 31, 326–332. https://doi.org/10.1177/1043656220917724.

Cadichon, J.M., Lignier, B., Cénat, J.M., Derivois, D., 2017. Symptoms of PTSD Among adolescents and young adult survivors six years after the 2010 Haiti Earthquake. J. Loss Trauma 22, 646–659. https://doi.org/10.1080/15325024.2017.1360585.

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., Zheng, J., 2020. The Psychological Impact of the COVID-19 Epidemic on College Students in China. https://doi.org/10.1016/j.psychres.2020.112934.

Cénat, J.M., 2020a. US Deportation Policies in the Time of COVID-19: a Public Health Threat to the Americas. Public Health. https://doi.org/10.1016/j.puhe.2020.05.017.

Cénat, J.M., 2020b. The vulnerability of low-and-middle-income countries facing the COVID-19 pandemic: the case of Haiti. Travel Med. Infect. Dis. 101684. https://doi.org/10.1016/j.tmaid.2020.101684.

Cénat, J.M., Blais-Rochette, C., Kourou-Kpou, C.K., Noorishad, P.-G., Mukunzi, J.N., McIntee, S.-E., Dalexis, R.D., Goulet, M.-A., Labelle, P., 2021a. Prevalence of symptoms of depression, anxiety, insomnia, posttraumatic stress disorder, and psychological distress among populations affected by the COVID-19 pandemic: a systematic review and meta-analysis. Psychiatry Res. 295, 113599. https://doi.org/10.1016/j.psychres.2020.113599.

Cénat, J.M., Dalexis, R.D., Guerrier, M., Noorishad, P.G., Derivois, D., Bukaka, J., Birangui, J.P., Adansiko, K., Clermont, L.A., Kourou-Kpou, C.K., Ndengeyingoma, A., Sezibera, V., Auguste, R.E., Rousseau, C., 2021b. Frequency and correlates of anxiety symptoms during the COVID-19 pandemic in low- and middle-income countries: a multinational study. J. Psychiatr. Res. 132, 13–17. https://doi.org/10.1016/j.jpsychires.2020.09.031.

Cénat, J.M., Dalexis, R.D., Kourou-Kpou, C.K., Mukunzi, J.N., Rousseau, C., 2020a. Social inequalities and collateral damages of the COVID-19 pandemic: when basic needs challenge mental health care. Int. J. Public Health. 2020. https://doi.org/10.1007/s00038-020-01426-y.

Cénat, J.M., Derivois, D., 2014. Assessment of prevalence and determinants of posttraumatic stress disorder and depression symptoms in adults survivors of earthquake in Haiti after 30 months. J. Affect. Disord. 159, 111–117. https://doi.org/10.1016/j.jad.2014.02.025.

Cénat, J.M., Derivois, D., Hebbert, M., Amédée, L., Milmam-L., Karray, A., 2018. Multiple traumas and resilience among street children in Haiti: Psychopathology of survival. Child Abuse. Negl. 79, 85–97. https://doi.org/10.1016/j.chiabu.2018.01.024.

Cénat, J.M., Derivois, D., Hebbert, M., Eid, F., Mouchenich, V., 2015. Psychometric properties of the Haitian Creole version of the Resilience-Scale with a sample of adult survivors of the 2010 earthquake. Compr. Psychiatry 63, 96–104. https://doi.org/10.1016/j.comppsych.2015.09.002.

Cénat, J.M., Felix, N., Blais-Rochette, C., Rousseau, C., Bukaka, J., Derivois, D., Noorishad, P.G., Birangui, J.P., 2020b. Prevalence of mental health problems in populations affected by Ebola virus disease: a systematic review and meta-analysis. Psychiatry Res. 289, 113033. https://doi.org/10.1016/j.psychres.2020.113033.

Cénat, J.M., McIntee, S.E., Blais-Rochette, C., 2020c. Symptoms of posttraumatic stress disorder, depression, anxiety and other mental health problems following the 2010 earthquake in Haiti: a systematic review and meta-analysis. J. Affect. Disord. https://doi.org/10.1016/j.jad.2020.04.046.

Cénat, J.M., McIntee, S.E., Guerrier, M., Derivois, D., Rousseau, C., Dalexis, R.D., Bukaka, J., Makala-Balayuda, O., 2020d. Psychological distress among adults from the urban and rural areas affected by the Ebola virus disease in the Democratic Republic of the Congo. Soc. Psychiatry Psychiatr. Epidemiol. 1–6. https://doi.org/10.1007/s00127-020-01954-8.

Cénat, J.M., McIntee, S.E., Noorishad, P.G., Rousseau, C., Derivois, D., Birangui, J., Bukaka, J., Balayulu-Makila, O., 2020e. Psychological Intervention Guide: Intervene in the Context of Infectious Disease Outbreaks. Université de Kinshasa, McGill University, Université de Bourgogne Franche-Comté, Université de Lubumbashi, Ottawa.

Chen, Y., Zhou, H., Zhou, Y., Zhou, F., 2020. Prevalence of self-reported depression and anxiety among pediatric medical staff members during the COVID-19 outbreak in Guiyang, China. Psychiatry Res. https://doi.org/10.1016/j.psychres.2020.113005.
Chopra, V., Toner, E., Waldhorn, R., Washler, L., 2020. How should U.S. Hospitals prepare for coronavirus disease 2019 (COVID-19)? Ann. Intern. Med. https://doi.org/10.7326/M20-9907.

Connor, K., Davidson, J., 2003. Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). Depress. Anxiety 18, 76–82. https://doi.org/10.1002/da.10752.

Zhang, J.J., Yang, Z., Wang, X., Li, J., Dong, L., Wang, F., Li, Y., Wei, R., Zhang, J.J., 2020. The relationship between resilience, anxiety and depression among patients with mild symptoms of COVID-19 in China: a cross-sectional study. J. Clin. Nurs. 29, 4020–4029. https://doi.org/10.1111/jocn.15425.

Derivio, D., Cénat, J.M., Joseph, N., E.N., E., Karray, A., Chahraoui, K., 2017. Prevalence and determinants of post-traumatic stress disorder, anxiety and depression symptoms in street children survivors of the 2010 earthquake in Haiti, four years after. J. Child. Neuro. 122, 104866. https://doi.org/10.1016/j.jcn.2020.104866.

Emmanuel, E.J., Persad, G., Upshur, R., Thome, B., Parker, M., Glickman, A., Zhang, C., Boyle, C., Smith, M., Phillips, J.P., 2020. Fair allocation of scarce medical resources in the time of Covid-19: N. Engl. J. Med. 382, 2049–2055. https://doi.org/10.1056/NEJMsa2005114.

Fitzpatrick, K.M., Harris, C., Drawve, G., 2020. Fear of COVID-19 and the mental health consequences in America. Psychol. Trauma Theory, Res. Pract. Policy. https://doi.org/10.1037/tpt0000924.

Gilbert, M., Pullano, G., Finotti, F., Valdano, E., Poletto, C., Boile, P.Y., D’Oretenzi, E., Yazdanpanah, Y., Eholie, S.P., Altmann, M., Gutierrez, B., Kraemer, M.U.G., Colizza, V., 2020. Preparedness and vulnerability of African countries against importations of COVID-19: A modelling study. Lancet 395, 871–877. https://doi.org/10.1016/S0140-6736(20)30411-6.

Hellwell, J.A., Bolton, W.S., Burke, J.R., Tiernan, J.P., Jayne, D.G., Chapman, S.J., 2020. Multidisciplinary Research Priorities for the COVID-19 pandemic: immediate psychological responses and associated factors. Int. J. Environ. Res. Public Health 17, 3165. https://doi.org/10.3390/ijerph170903165.

Huang, Y., Zhao, N., 2020. Mental health burden for the public affected by the COVID-19 outbreak in China. Med. Sci. Monit. 26 https://doi.org/10.12659/msm.924609.

Liu, C.H., Zhang, E., Wong, G.T.F., Huyan, S., Hahn, H., 2020. Factors associated with depression, anxiety, and PTSD symptomatology during the COVID-19 pandemic: clinical implications for U.S. young adult mental health. Psychiatry Res. 290 https://doi.org/10.1016/j.psychres.2020.113172.

Mazza, C., Ricci, E., Biondi, S., Colasanti, M., Ferracciuti, S., Napoli, C., Roma, P., 2020. A nationwide survey on psychological distress among Italian people during the COVID-19 pandemic: immediate psychological responses and associated factors. Int. J. Environ. Res. Public Health 17, 3165. https://doi.org/10.3390/ijerph170903165.

Yang, Y., Zhao, N., 2020. Prevalence of Depressive symptoms and associated psychosocial risk factors among people unaffected by quarantine during the COVID-19 epidemic in Southwestern China. Med. Sci. Monit. 26 https://doi.org/10.12659/MSM.924609.

Bhui, K., 2020. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. Brain. Behav. Immun. https://doi.org/10.1016/j.bbi.2020.05.026.

Cebolla, M., Sanz, M., Salmerón, A., Alonso, M., 2020. The relationship between resilience, anxiety, and depression among patients suffering from 2019 Novel Coronavirus disease 2019. JAMA Netw. open 3, e201392. https://doi.org/10.1001/jamanetworkopen.2020.1392.

Sloane, P., Sartorius, N., Kessler, R.C., 2020. Detecting and assessing the mental health impact of the COVID-19 pandemic: a Call for Action for Mental Health Science. The Lancet Psychiatry. Elsevier Ltd. 2020. https://doi.org/10.1016/S2215-0366(20)30168-1.

Huang, Y., Zhao, N., 2020. Mental health burden for the public affected by the COVID-19 outbreak in China: who will be the high-risk group? Psychol. Health Med. 1–12. https://doi.org/10.1080/13548506.2020.1754438.

Iacobucci, G., 2020. Covid-19: deprived areas have the highest death rates in England and Wales. BMJ 369, m1810. https://doi.org/10.1136/bmj.m1810.

John Hopkins Univ. https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/id=75494740610299425467f8e560f9edc6 (accessed 11.5.20).

John Hopkins University. 2020. Coronavirus COVID-19 (2019-nCoV) [WWW Document]. John Hopkins Univ. URL https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/id=75494740610299425467f8e560f9edc6 (accessed 11.5.20).