Psychology, Health & Medicine

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cphm20

COVID-19 is viewed as severe as tumor and HIV; perceptions towards COVID-19

Mesay Moges Menebo

To cite this article: Mesay Moges Menebo (2022) COVID-19 is viewed as severe as tumor and HIV; perceptions towards COVID-19, Psychology, Health & Medicine, 27:1, 237-248, DOI: 10.1080/13548506.2021.1883070

To link to this article: https://doi.org/10.1080/13548506.2021.1883070

PSYCHOLOGY, HEALTH & MEDICINE
2022, VOL. 27, NO. 1, 237–248
https://doi.org/10.1080/13548506.2021.1883070

Taylor & Francis
Taylor & Francis Group

COVID-19 is viewed as severe as tumor and HIV; perceptions towards COVID-19

Mesay Moges Menebo

PhD research fellow; University of South-Eastern Norway; Department of Business, Marketing and Law; Hønefoss, Norway

ABSTRACT

Since its first emergence, people have been having different attitudes and perceptions towards the COVID-19 pandemic. Perceptions (e.g. perception of disease threat) have profound consequences on behavior (e.g medication adherence). If adequately available, perception studies guide public awareness efforts or help in understanding behavior. In this study , repeated cross-sectional data were collected from 376 randomly selected globally located respondents over two periods. Participants perceived COVID-19 as severe as Tumor and AIDS ($F(2,722) = 2.347$; $p = .096$), and as more severe than other 14 illnesses; e.g. Diabetes and High blood pressure. Age-wise, participants above 50 age group perceived COVID-19 as more severe than the under 50 ($F(1,240) = 10.378$, $p < .001$). In addition, the magnitude of severity perception was found to be dependent on the different stages of the outbreak in the respondents' corresponding countries. In a gap of a month time, depression surpassed COVID-19 to be perceived as more severe. Majority of respondents attributed COVID-19 as a physical (vs mental) illness, thus considered it as more severe (vs less severe). Implications of this study could mean; (1) COVID-19 patients might be susceptible to social stigmatization as HIV patients, and (2) severity perception is shaping intervention friendly behaviors.

ARTICLE HISTORY
Received 23 July 2020
Accepted 19 January 2021

KEYWORDS
COVID-19; Perception

1. Background

A new type of Pneumonia, coronavirus, with an obscured etiology was announced by the Chinese government on the 7th of January 2020 (WHO, 2020a). Barely three months after its emergence, it was declared a global pandemic. Majority of cases are reported to be asymptomatic (WHO, 2020b). Those with symptoms experience mild to moderate respiratory illness such as fever, coughing and shortness of breath. Other symptoms reported include headache, rhinorrhea, gastrointestinal symptoms, sore throat, and fatigue (Michelen et al., 2020). The severity of the virus (severe acute respiratory syndrome, kidney failure and death) is reported mostly on those people whom WHO label as risk groups: people with age above 50 and have conditions of chronic cardiovascular illnesses (Cheng et al., 2020).

Since its first emergence in Wuhan, a Chinese city, people have been having different attitudes, concerns and perceptions towards the virus. Important figures at different times

CONTACT Mesay Moges Menebo Mesay.Moges.Menebo@usn.no University of South-Eastern Norway, PhD research fellow, Bredalsveien 16A, Hønefoss, Norway

have also been expressing their feelings and perceptions. With his first public comment about the virus on January 22, the US president D.Trump commented, '*It's one person coming in from China, and we have it under control. It's going to be just fine.*' Almost after a month time, the president made another comment: '*I think when we get into April, in the warmer weather, that has a very negative effect on that and that type of a virus*'(McCarthy, 2020). After another one-month and half, the US Corona death toll overtook Italy as world's highest (Bekiempis, 2020). According to human psychology theories, perception plays a key role in guiding people towards the right or wrong actions.

Perception is a lot more than just 'information coming in'. It involves much contribution of our own senses besides the real information. Defined, it is the process of getting, interpreting, selecting, and organizing sensory information in order to represent and understand the presented information or environment (Arnheim, 1997). It includes the collection of data from sense organs through to the interpretation made by the brain. Human perception is affected by personal characteristics (e.g. a person's attitudes, personality, motives, interests, past experiences, expectations, culture, religion), target characteristics (e.g. size, sound, background, proximity, similarity), situational factors (e.g. time of the event, social setting, work setting) and mental set (e.g. preparedness, level of knowledge) (Cornsweet, 2012).

Mind perception has profound consequences. It shapes actions, attitudes, choices, decision-makings and eventually behavior (Cornsweet, 2012). Among other factors, people avoid COVID-19 lockdowns because they do not perceive the virus to be that serious (Tendo, 2020) or because some guidelines like public face mask wearing are discouraged as a result of cultural considerations (Wang et al., 2020). Since senses play a significant role in the perception processing, not the real information alone, mostly perceptions become biased and lead to errors (e.g. stereotyping, halo effect, horn effect, recency effect, primary effect, the similar-to-me effect, self-serving bias). These perception consequences also hold in the health consumption. For example, Sung and Nichol (Sung et al., 1998) evidenced the association of patient perception of poor health status with antihyperlipidemic medication compliance, Dimatheo and Haskard (DiMatteo et al., 2007) has shown the link between patient perception of disease threat (disease severity) and their adherence to treatment follow-ups, Kirscht and Rosenstock (1977) indicated patient perception of susceptibility to the effects of hypertension and regimen compliance. People who view their illnesses as physical (vs mental) tend to visit a physician more (vs less) and are willing to start treatment early before the illness progresses to its severe condition (Nonye & Oseloka, 2009). There are a variety of perception variables in the health field. Perceived severity and the grouping of an illness as mental or physical (perceived disease belongingness) are quite important in immediate or future actions patients or people make regarding their medical conditions (Erlandsson & Holgers, 2001).

COVID-19 virus's exponential spread might have been as a result of the minimal perception of its severity, especially among the younger population. COVID-19 perception studies inform and guide governments and organizations. This enables in making an informed decision-making and robust public awareness efforts. Yet, such studies are scarce right now. This study responds to that call by offering a glimpse on: COVID-19 severity and disease belongingness perception, perception tabulated in demography, association among the variables and implications of the findings.

2. Method

2.1. Design

A repeated cross-sectional survey was used to assess perception overviews towards COVID-19.

2.2. Participants

Participants were recruited via Amazon Mechanical Turk (Mturk). Amazon Mechanical Turk (MTurk) is an online crowdsourcing website that offers researchers an innovative way to collect or access an on-demand data. According to previous studies, Mturk's representativeness of the general population and the effects found in MTurk accurately represent the effects found in other sample populations (Berinsky et al., 2012). In addition, several other studies have also explored the demographic make-up of Mturk sample and found the sample characteristics to be consistent and generalizable to the general adult population, with only minor differences (Behrend et al., 2011; Paolacci et al., 2010; Ross et al., 2010). The external validity of MTurk samples on a variety of political and general attitudinal measures was also explored by comparing Mturk measures to the general population. It was found that MTurk samples are more representative than other convenient samples such as students and MTurk samples did differ slightly in some cases. However, the differences in samples were consistent with result variability within the judgment and decision-making literature (Paolacci et al., 2010). The other advantage is that Mturk samples are distributed in every region; therefore, regional bias is minimized or perhaps even controlled. In addition to geographic diversity, MTurk offers great speed with which one can collect data. In addition, the anonymity of MTurk samples is also desirable vis-à-vis author-recruited samples, minimizing or eliminating bias because of association. Accordingly, MTurk provides a viable means for recruiting samples that closely match the general population as a data source and this study is better off in that regard.

A random sampling technique was used where each Mturk member was given equal chance of selection. Criteria for inclusion was age above 18. People with approval rates of less than 90% (these participants are believed to have track of filling surveys randomly) were excluded. Cochran's sample selection method (Israel, 1992) was applied to estimate sample size requirements. Accordingly, with a 94% precision level, 241 participants were randomly selected and filled the survey from 4 April 2020 to 7 April 2020. One month after the first survey, the second round of cross-sectional survey was conducted with new participants. Therefore, participation in previous survey was considered as an exclusion criterion. Besides, similar sampling techniques and sample size selection methods were followed as the first survey. With a 93% precision level, 135 participants were recruited and participated.

$$n_0 = \frac{(Z)^2 pq}{(e)^2} = \frac{(1.88)^2 * (.5)(.5)}{(.06)^2} = 245$$

$\mathbf{n_0}$ is the sample size

$\mathbf{Z^2}$ is the abscissa of the normal curve that cuts off an area α at the tails (1 – α equals the desired confidence level at 94%, 1.88 is the Z value for 94% CI)

e is the desired level of precision (desiring a 94% confidence level, it can be accommodated a ± 6% precision)

p is the estimated proportion of an attribute that is present in the population, and q is 1-p (I assumed for maximum variability, p to be .05).

2.3. Measures

Participants answered questions regarding perceived severity and perceived disease belongingness towards COVID-19 and demographic variables. The scales for perceived severity and disease belongingness were adopted from validated scales previously used by Weinstein (2000) and Meikle et al., (1984) and applied in this survey with modifications. To compare and contrast perceptions towards COVID-19 and other disease groups, 16 other medical conditions were selected from WHO's list of disease identification and included in this study (WHO, 2020c). This enabled perception comparison among different medical conditions. Perceived severity is defined as how severe people think/feel a medical condition is. The scale measures in what extent participants perceive a given medical illness as severe for the sufferer. The participants graded the list of medical illnesses in the degree of severity, on a continuous scale ranging from 0 to 100 (with 0 as not severe and 100 as highly severe). Perceived disease belongingness measured participant rating of COVID-19 and the 16 other illnesses as a mental or a physical illness. Two different measures were applied here; one is discrete and the other is continuous. In the discrete form, participants were asked to drag from the list of 17 medical conditions (COVID-19 and others) and add the conditions they choose into one of two empty boxes labeled as 'physical illnesses' and 'mental illnesses'. In the continuous form, participants were asked a follow-up question with scales. They drag a slider towards −50 if they think the condition is more mental or towards 50 if they think the condition is more physical. They were also given a chance to keep the slider to 0, if they think the condition is both physical and mental. Demographic variables – gender (Male, Female), age (filled) and education were also measured (from no formal education, high school, college, vocational training, university, masters, doctorate/Phd, others). Respondents' countries outbreak information (Total Deaths, Daily New Deaths, Active Cases, Daily New Cases, Total Cases) were collected from the worldometers to estimate whether it relates with perceived severity of COVID-19.

SPSS 26.0 was used to analyze the data. Some of the data variables do not satisfy the normal distribution; therefore, non-parametric estimation methods were applied where necessary. Examination of the variability of perceived severity between age groups was done with one-way ANOVA analysis. Spearman bivariate correlation was used to show relationships among perceived severity, perceived belongingness, gender, age and education. T-tests were conducted to show mean differences between groups. Histogram representations, simple scatter analysis, box-plots and pie charts are used to illustrate the pattern within the data.

3. Results

241 people (See Figure 1 for continent-wise distribution of samples) participated in this study (62% are female, 85% have taken college and education above, 88% are below the age of 50).

Following tumor (Mean = 77) and AIDS (Mean = 75), COVID-19 was perceived as a more severe illness (See Figure 2) than 14 illnesses, e.g. diabetes, kidney stone, gallstone and even High blood pressure which is labelled as one of the top 5 global causes of deaths (WHO, 2020d). Statistically, there is no significant ($F(2,722) = 2.347$; $p = .096$) difference between the perceived severity of tumor, AIDS and COVID-19. This implies that participants view COVID-19 as severe as tumor and AIDS. The magnitude of severity perception was found to be dependent on the different stages of the outbreak in the respondents' corresponding countries (See Table 1).

The findings from the first cross-sectional survey are consistent in the second survey (See Figure 3) except that after a month period of time, depression (Mean = 71) became more of a concern than COVID-19 (Mean = 68).

98.7% of the participants also viewed COVID-19 as a physical illness rather than a mental illness (See Figure 4). This perception is again statistically similar ($F(2,722) = .083$; $p = .920$) with the perception participants have towards tumor (Mean = 41/50) and AIDS (Mean = 42.3/50).

One of the factors that affect human perception is target characteristics (the degree of danger the target poses). As per several studies (Cascella et al., 2020; Du et al., 2020), severity of COVID-19 virus is reported mostly in people with age above 50 and who have

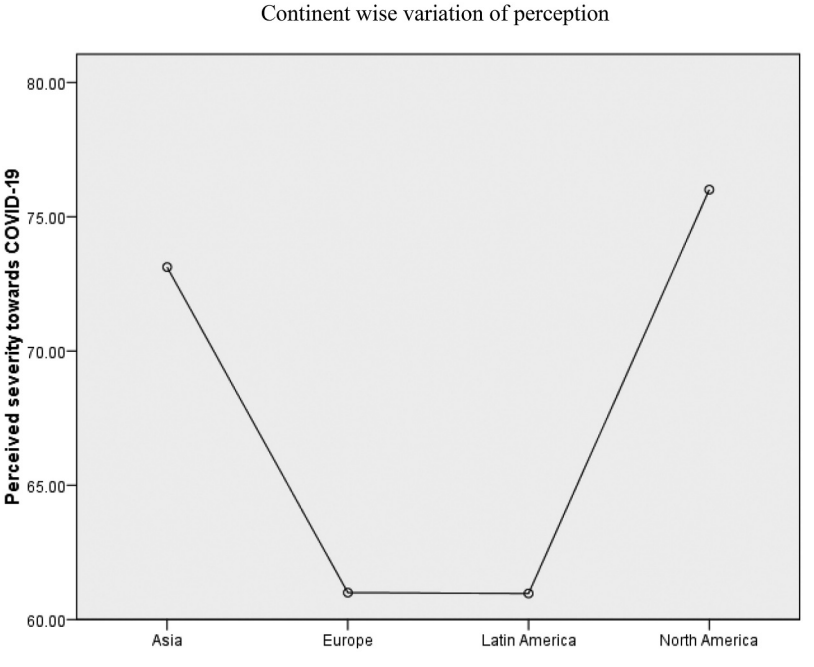

Figure 1. Continent wise variation of perception. **Participants**: Europe (34), North America (147), Asia (24), Latin America (35).

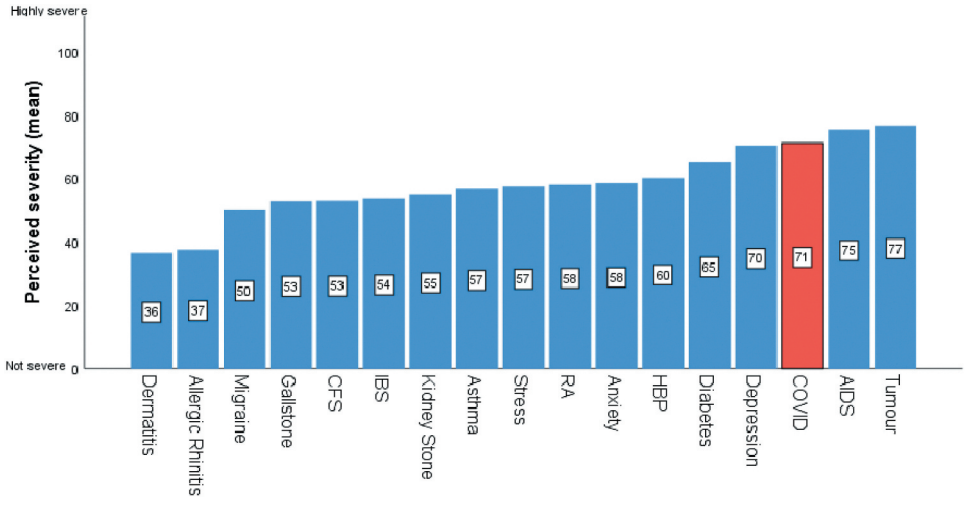

Figure 2. Perceived severity of COVID-19 relative to 16 other medical conditions (4 April 2020 to 7 April 2020). **Note**; CFS-Chronic Fatigue Syndrome, IBS-Inflammatory Bowel Syndrome, HBP-High Blood Pressure, AIDS-Acquired Immune Deficiency Virus.**Participants**: UK (8), Canada (17), Netherlands (2), Germany (2), Italy (14), France (1), USA (130), Spain (7), SK (1), India (23), Brazil (34), SA (1), Chile (1).

Table 1. Correlational relationship between perception and country outbreak information.

	COVID-19 stages of outbreak parameters				
	TD	DND	AC	DNC	TC
Perceived severity of COVID-19	.123	.185**	.187**	.194**	.188**

TD-Total Deaths; **DND**-Daily New Deaths; AC-Active Cases; DNC-Daily New Cases; TC; Total Cases. ** is at 0.01 level.

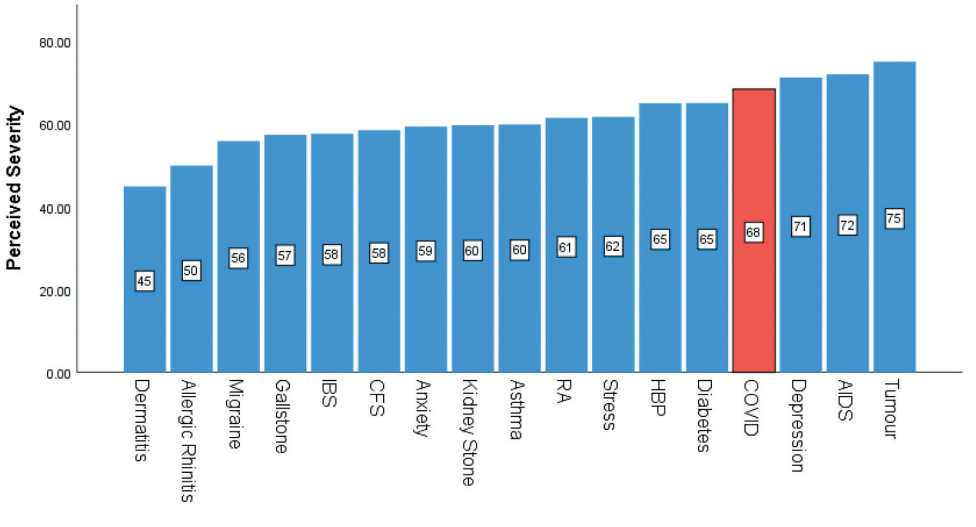

Figure 3. Perceived severity of COVID-19 relative to 16 other medical conditions (9 May 2020 to 16 May 2020). **Note**; CFS-Chronic Fatigue Syndrome, IBS-Inflammatory Bowel Syndrome, RA-Rheumatoid Arthritis, HBP-High Blood Pressure, AIDS-Acquired Immune Deficiency Virus. **Participants**: UK (2), Netherlands (1), Canada (4), Italy (4), Romania (1), USA (34), Spain (3), Algeria (1), Cuba (3), Egypt (1), India (22), Costa Rica (1), Kenya (1), Brazil (30).

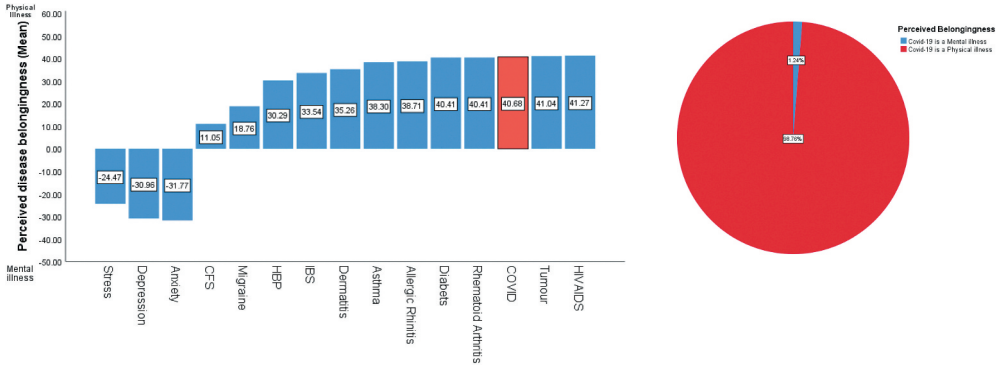

Figure 4. Perceived disease belongingness of COVID-19 relative to 16 other medical conditions. **Note**; CFS-Chronic Fatigue Syndrome, IBS-Inflammatory Bowel Syndrome, HBP-High Blood Pressure, AIDS-Acquired Immune Deficiency Virus.

conditions of chronic cardiovascular illnesses. This group of people are labeled as risk groups. In this study, participants above 50 perceived COVID-19 as more severe (See Figure 5(b)) than the under 50 group ($F(1,240) = 10.378$, $p < .001$). In addition, COVID-19 was perceived as more severe than all the other medical illnesses except HIV (See Figure 5(a)).

Perceived severity, perceived disease belongingness and age relate between each other (see Table 2). The association between perceived severity and disease belongingness is stronger than the other relationships ($r = .258$; $p < .001$).

As people attribute COVID-19 as a physical illness rather than a mental illness, their chances of considering it severe also mildly goes higher (See Figure 6).

4. Discussion

In this study, it is shown that COVID-19 was perceived as severe as Tumor and HIV as well as more severe than 14 other medical illnesses in a randomly sampled population. In the above 50-age group, COVID-19 was perceived as severe as HIV and more severe than

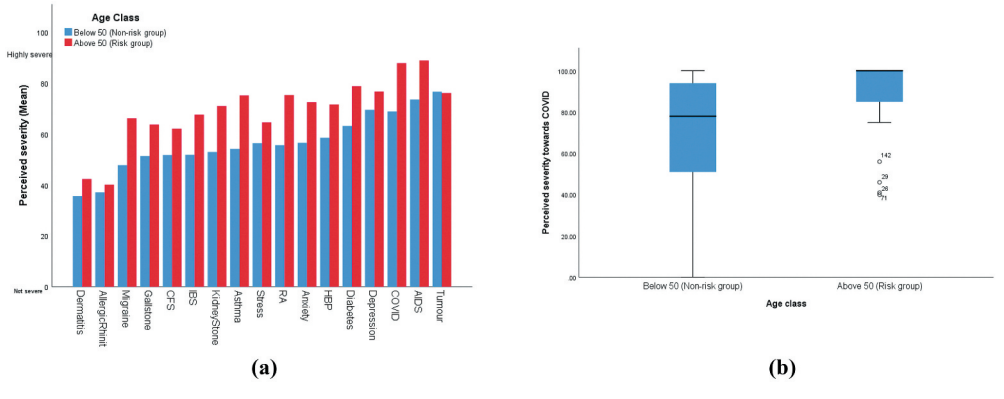

Figure 5. Age-based perceived severity of COVID-19 relative to 16 other medical conditions.

15 medical illnesses including Tumor. In a time gap of a month, the perceived severity to COVID-19 was surpassed by perceived severity towards depression. A positive correlational relationship was also found to be significant among perceived severity, perceived disease belongingness and age. Most of the participants viewed COVID-19 as a physical illness than as a mental illness. The explanation could be that people consider a physical illness more severe, or what could be perceived as a severe disease is a physical illness. It is recently documented that society holds more negative views towards physical illness like COVID-19 as compared to mental illnesses (Hao et al., 2020). In addition to that, respondents with psychiatric illnesses reported mental illness as less stigmatizing than COVID-19. From these standpoints, it is safe to say COVID-19 is a stigma prone illness.

Geographic wise, respondents from Asia and North America perceived COVID-19 to be more severe than respondents from Europe and Latin America. Until now it is only a limited number of studies that exist in the literature concerning population perception of COVID-19 (Tran, Ha et al., 2020). Findings from recent studies about the magnitude of the COVID-19 severity in older population are consistent with this study. In a perception study conducted in Egypt, a great majority of participants believed that the disease is more dangerous for the elderly (Abdelhafiz et al., 2020). In a study from Ethiopia, 72.0% of the study participants replied that older people who have chronic illnesses are at high risk of developing a severe form of COVID-19 (Kebede et al., 2020). In a study with a sample of only pregnant woman, on a scale of 1 to 10, the mean fear level of COVID-19 is nearly medium (Hossain et al., 2020). Overall, extant studies are limited in the diversity of their samples, and did not emphasize on the implications of COVID-19 perceptions.

There might be three implications that could be drawn from this study. The first are the anticipated consequences of COVID-19 perception both at an individual and societal level. Severe perceptions of diseases make people comply or adhere (Sung et al., 1998) to behaviors that are congruent with topic-related guidelines. Therefore, with these severity levels, it is expected that the adherence to COVID-19 prevention behaviors (e.g. mask wearing practice, hand-washing, physical distancing) will be strong. The second is at the societal level. As per a recent study, researchers claimed that the social stigma associated with COVID-19 might be much different from that of HIV (Abdelhafiz et al., 2020). Contrary to this thought, as long as COVID-19 is perceived as severe as (even as more severe as) HIV, there is ample reason it could be a source of stigma and discrimination. This argument is solid considering the role of severity on stigma formation (Ginsburg & Link, 1989). That being the case, public awareness efforts should craft approaches to confront COVID-19 related social stigmas.

The other two implications are interms of COVID-19 intervention. Public communication activities shape disease severity perception (Le et al., 2020; Tran, Dang et al., 2020), and severity perception increases compliance and adherence (Sung et al., 1998). Accordingly, it can be judged that COVID-19 related intervention mechanisms are successful in this regard (assuming that it led to a high severity perception) and might probably need to be persisted.

There are key questions that are important but still not answered with this study because of restrictions in (1) research objective or (2) method, and considered as a limitation and which future studies should target. First, whether it is communication efforts that led to the high perceived severity of COVID-19, and if so, how much

Table 2. Correlational relationship between perception and demographic variables.

	Perceived severity	Perceived belongingness	Gender	Age	Education
Perceived severity	1	.258**	−.112	.206*	−.049
Perceived belongingness	**.258****	1	−.118	**.130***	−.022
Gender	−.112	−.118	1	−.089	.165*
Age	**.206***	.130*	−.089	1	.203*
Education	−.049	−.022	.165*	.203*	1

** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level.
Perceived severity, perceived disease belongingness and age relate significantly and positively.

contribution do that have to the perception formation is undiscovered. Other factors besides age – like culture and personality- might moderate the magnitude of perception. Discovering this helps in undergoing targeted communication strategies. Second, participants' current stigma and discrimination level to COVID-19 victims is not measured. Doing that and regressing it over perceived severity could have given a strong support to the COVID-19 perception and stigmatization prospect. Third, it is a one time or instant information that is gathered with a cross-sectional survey, which makes this paper limited in showing dynamics, or short of answering questions like; 'for how long the COVID-19 perception lasts as severe?'. Finally, after the emergence of COVID-19, it was noted that the stay home rules might have disadvantages like triggering other public health crises, e.g. anxiety and depression, but supporting data was scarce (Zandifar & Badrfam, 2020). The reason for the shift in severity perception magnitude from COVID-19 to depression recorded in this study within a gap of a month's time needs to be explored by future studies; otherwise, unproven word of mouth claiming home-staying regulations to be the reason may deteriorate public compliance of COVID-19 guidelines. Controlled experiments that account for variations in confounding variables or longitudinal studies that follow the same participants over time are recommended choices in this regard. In the meantime, it would be worthwhile to provide psychoeducation about the virus outbreak, promote mental wellness and initiate psychological intervention to

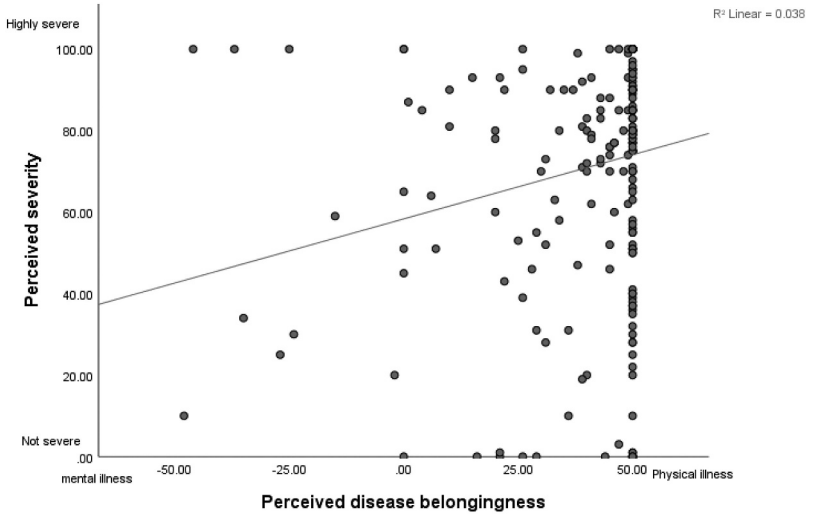

Figure 6. Mild linear relationship between perceived severity and perceived disease belongingness.

mitigate COVID-19 related depression. Psychosocial therapies, such as cognitive behavioral therapy (CBT), have been proven to be useful and efficacious in this regard (Ho et al., 2020). However, since the costs associated with such an implementation have been known to be high, cost-effective solutions like internet cognitive behavioral therapy (I-CBT) interventions are recommended choices (Soh et al., 2020; Zhang & Ho, 2017).

Disclosure statement

No potential conflict of interest was reported by the author.

ORCID

Mesay Moges Menebo http://orcid.org/0000-0002-6491-7948

References

Abdelhafiz, A. S., Mohammed, Z., Ibrahim, M. E., Ziady, H. H., Alorabi, M., Ayyad, M., & Sultan, E. A. (2020). Knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19). *Journal of Community Health*, *45*(1), 1–10. https://doi.org/10.1007/s10900-019-00710-0

Arnheim, R. (1997). *Visual thinking*. University of California Press.

Behrend, T. S., Sharek, D. J., Meade, A. W., & Wiebe, E. N. (2011). The viability of crowdsourcing for survey research. *Behavior Research Methods*, *43*(3), 800. https://doi.org/10.3758/s13428-011-0081-0

Bekiempis, V. (2020). Coronavirus: US overtakes Italy as country with most deaths. *The guardian*. https://www.theguardian.com/world/2020/apr/11/us-coronavirus-death-toll

Berinsky, A. J., Huber, G. A., & Lenz, G. S. (2012). Evaluating online labor markets for experimental research: Amazon. com's Mechanical Turk. *Political Analysis*, *20*(3), 351–368. https://doi.org/10.1093/pan/mpr057

Cascella, M., Rajnik, M., Cuomo, A., Dulebohn, S. C., & Di Napoli, R. (2020). Features, evaluation and treatment coronavirus (COVID-19). *Statpearls* [internet]. StatPearls Publishing.

Cheng, Y., Luo, R., Wang, K., Zhang, M., Wang, Z., Dong, L., Li, J., Yao, Y., Ge, S., & Xu, G. (2020). Kidney disease is associated with in-hospital death of patients with COVID-19. *Kidney International*, *97*(5), 829–838. https://doi.org/10.1016/j.kint.2020.03.005

Cornsweet, T. (2012). *Visual perception*. Academic press.

DiMatteo, M. R., Haskard, K. B., & Williams, S. L. (2007). Health beliefs, disease severity, and patient adherence: A meta-analysis. *Medical Care*, *45*(6), 521–528. https://doi.org/10.1097/MLR.0b013e318032937e

Du, Y., Tu, L., Zhu, P., Mu, M., Wang, R., Yang, P., Hu, C., Ping, R., Hu, P., Li, T., Cao, F., Chang, C., Hu, Q., Jin, Y., Xu, G., & Wang, P. (2020). Clinical features of 85 fatal cases of COVID-19 from Wuhan. A retrospective observational study. *American Journal of Respiratory and Critical Care Medicine(ja)*, *201*(11), 1372–1379. https://doi.org/10.1164/rccm.202003-0543OC

Erlandsson, S. I., & Holgers, K.-M. (2001). The impact of perceived tinnitus severity on health-related quality of life with aspects of gender. *Noise & Health*, *3*(10), 39. https://www.noiseandhealth.org/text.asp?2001/3/10/39/31758

Ginsburg, I. H., & Link, B. G. (1989). Feelings of stigmatization in patients with psoriasis. *Journal of the American Academy of Dermatology*, *20*(1), 53–63. https://doi.org/10.1016/S0190-9622(89)70007-4

Hao, F., Tan, W., Jiang, L., Zhang, L., Zhao, X., Zou, Y., Luo, X., Jiang, X., McIntyre, R. S., Tran, B., Sun, J., Zhang, Z., Ho, R., Ho, C., Tam, W., & Hu, Y. (2020). Do psychiatric patients experience

more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. *Brain, Behavior, and Immunity*, *87*(87), 100–106. https://doi.org/10.1016/j.bbi.2020.04.069

Ho, C. S., Chee, C. Y., & Ho, R. C. (2020). Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. *Annals of the Academy of Medicine, Singapore*, *49*(1), 1–3.

Hossain, N., Samuel, M., Sandeep, R., Imtiaz, S., & Zaheer, S. (2020). *Perceptions, generalized anxiety and fears of pregnant women about Corona virus infection in the heart of pandemic*. Research Square (Preprint).

Israel, G. D. (1992). *Determining sample size*. University of Florida, EFAS extension service.

Kebede, Y., Yitayih, Y., Birhanu, Z., Mekonen, S., & Ambelu, A. (2020). Knowledge, perceptions and preventive practices towards COVID-19 early in the outbreak among Jimma University Medical Center visitors, Southwest Ethiopia. *PloS One*, *15*(5), e0233744. https://doi.org/10.1371/journal.pone.0233744

Kirscht, J. P., & Rosenstock, I. M. (1977). Patient adherence to antihypertensive medical regimens. *Journal of Community Health*, *3*(2), 115–124. https://doi.org/10.1007/BF01674233

Le, H. T., Nguyen, D. N., Beydoun, A. S., Le, X. T. T., Nguyen, T. T., Pham, Q. T., Nguyen, Q. T., Nguyen, A. N., Hoang, M. T., Vu, L. G., Tran, B. X., Latkin, C. A., Ho, C. S. H., Ho, R. C. M., & Ta, N. T. K. (2020). Demand for health information on COVID-19 among Vietnamese. *International Journal of Environmental Research and Public Health*, *17*(12), 4377. https://doi.org/10.3390/ijerph17124377

McCarthy, T. (2020). 'It will disappear': The disinformation Trump spread about the coronavirus – Timeline. *The guardian*. https://www.theguardian.com/us-news/2020/apr/14/trump-coronavirus-alerts-disinformation-timeline

Meikle, M. B., Vernon, J., & Johnson, R. M. (1984). The perceived severity of tinnitus: Some observations concerning a large population of tinnitus clinic patients. *Otolaryngology—Head and Neck Surgery*, *92*(6), 689–696. https://doi.org/10.1177/019459988409200617

Michelen, M., Jones, N., & Stavropoulou, C. (2020). *In patients of COVID-19, what are the symptoms and clinical features of mild and moderate cases?* Centre for Evidence-Based Medicine. https://www.cebm.net/covid-19/in-patients-of-covid-19-what-are-the-symptoms-and-clinical-features-of-mild-and-moderatecase/accessed,16 .

Nonye, A. P., & Oseloka, E. C. (2009). Health-seeking behaviour of mentally ill patients in Enugu, Nigeria. *South African Journal of Psychiatry*, *15*(1), 4. https://doi.org/10.4102/sajpsychiatry.v15i1.167

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on amazon mechanical turk. *Judgment and Decision Making*, *5*(5), 411–419. http://journal.sjdm.org/10/10630a/jdm10630a.html

Ross, J., Irani, L., Silberman, M. S., Zaldivar, A., & Tomlinson, B. (2010). Who are the crowdworkers? Shifting demographics in Mechanical Turk. In *CHI'10 extended abstracts on human factors in computing systems* (pp. 2863–2872). ACM Digital Library

Soh, H. L., Ho, R. C., Ho, C. S., & Tam, W. W. (2020). Efficacy of digital cognitive behavioural therapy for insomnia: A meta-analysis of randomised controlled trials. *Sleep Medicine*, *75*(75), 315–325. https://doi.org/10.1016/j.sleep.2020.08.020

Sung, J., Nichol, M. B., Venturini, F., Bailey, K. L., McCombs, J. S., & Cody, M. (1998). Factors affecting patient compliance with antihyperlipidemic medications in an HMO population. *The American Journal of Managed Care*, *4*(10), 1421–1430.

Tendo, L. (2020). Italy charges more than 40,000 people with violating lockdown. *The guardian. https://www.theguardian.com/world/2020/mar/18/italy-charges-more-than-40000-people-violating-lockdown-coronavirus*

Tran, B. X., Dang, A. K., Thai, P. K., Le, H. T., Le, X. T. T., Do, T. T. T., … Vu, G. T. (2020). Coverage of health information by different sources in communities: Implication for COVID-19 epidemic response. *International Journal of Environmental Research and Public Health*, *17*(10), 3577. https://doi.org/10.3390/ijerph17103577

Tran, B. X., Ha, G. H., Nguyen, L. H., Vu, G. T., Hoang, M. T., Le, H. T., Latkin, C. A., Ho, C. S. H., & Ho, R. (2020). Studies of novel Coronavirus disease 19 (COVID-19) pandemic: A global analysis of literature. *International Journal of Environmental Research and Public Health*, *17* (11), 4095. https://doi.org/10.3390/ijerph17114095

Wang, C., Chudzicka-Czupała, A., Grabowski, D., Pan, R., Adamus, K., Wan, X., Tan, Y., Olszewska-Guizzo, A., Xu, L., McIntyre, R. S., Quek, J., Ho, R., Ho, C., & Hetnał, M. (2020). The association between physical and mental health and face mask use during the COVID-19 pandemic: A comparison of two countries with different views and practices. *Frontiers in Psychiatry*, *11*(11), 901. https://doi.org/10.3389/fpsyt.2020.569981

Weinstein, N. D. (2000). Perceived probability, perceived severity, and health-protective behavior. *Health Psychology*, *19*(1), 65. https://doi.org/10.1037/0278-6133.19.1.65

WHO. (2020a). World Health Organization. https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/

WHO. (2020b). *Coronavirus disease 2019 (COVID-19) situation report – 41*. World Health Organization. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200301-sitrep-41-covid-19.pdf?sfvrsn=6768306d_2

WHO. (2020c). *ICD-11 for mortality and morbidity statistics*. World Health Organization. https://icd.who.int/browse11/l-m/en

WHO. (2020d). *The top 10 causes of death*. World Health Organization.https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death

Zandifar, A., & Badrfam, R. (2020). Iranian mental health during the COVID-19 epidemic. *Asian Journal of Psychiatry*, *51*(51), 101990. https://doi.org/10.1016/j.ajp.2020.101990

Zhang, M. W., & Ho, R. (2017). Moodle: The cost effective solution for internet cognitive behavioral therapy (I-CBT) interventions. *Technology and Health Care*, *25*(1), 163–165. https://doi.org/10.3233/THC-161261