COVID-19 is viewed as severe as Tumor and HIV; Perceptions towards Covid-19.

Mesay Menebo

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Abstract

COVID-19 pandemic has killed thousands and still does. Since its first emergence, people have been having different attitudes and perceptions towards the virus. Perceptions have profound consequences on behavior. For example, patient's perception of disease threat (disease severity) leads to medication adherence. COVID-19 perception studies guide public awareness efforts or help in understanding behavior, yet limited. This study responds that call, offers a glimpse. A repeated cross-sectional data is collected from 376 randomly selected respondents located all over the world in two periods. Perceived severity (how severe people think COVID-19 and 16 other illnesses are), perceived disease belongingness (rating of COVID-19 and 16 other illnesses as mental or physical) and demographic variables (gender, age and education) are measured. ANOVA, Spearman correlation and scatter analysis are applied. Perceived severity, perceived disease belongingness and age correlate between each other. Participants perceive 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 perceive COVID-19 as more severe than the under 50 ($F(1,240) = 10.378$, $p < .001$). A month later, depression surpassed COVID-19 to be perceived as more severe. Majority of respondents attribute COVID-19 as a physical (vs mental) illness, thus consider it severe (vs not severe). Implications could mean; (1) COVID-19 patients might be susceptible to social stigmatization as HIV patients, (2) stay-home obligations are possibly exposing to depression and (3) severity perception is shaping intervention friendly behaviors.

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Abstract

COVID-19 pandemic has killed thousands and still does. Since its first emergence, people have been having different attitudes and perceptions towards the virus. Perceptions have profound consequences on behavior. For example, patient's perception of disease threat (disease severity) leads to medication adherence. COVID-19 perception studies guide public awareness efforts or help in understanding behavior, yet limited. This study responds that call, offers a glimpse. A repeated cross-sectional data is collected from 376 randomly selected respondents located all over the world in two periods. Perceived severity (how severe people think COVID-19 and 16 other illnesses are), perceived disease belongingness (rating of COVID-19 and 16 other illnesses as mental or physical) and demographic variables (gender, age and education) are measured. ANOVA, Spearman correlation and scatter analysis are applied. Perceived severity, perceived disease belongingness and age correlate between each other. Participants perceive 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 perceive COVID-19 as more severe than the under 50 ($F(1,240) = 10.378$, $p < .001$). A month later, depression surpassed COVID-19 to be perceived as more severe. Majority of respondents attribute COVID-19 as a physical (vs mental) illness, thus consider it severe (vs not severe). Implications could mean; (1) COVID-19 patients might be susceptible to social stigmatization as HIV patients, (2) stay-home obligations are possibly exposing to depression and (3) severity perception is shaping intervention friendly behaviors.

Key terms; 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) was reported mostly on those people whom WHO labeled 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 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, human 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). People were avoiding COVID-19 lock-downs because they didn't perceive the virus to be that serious (Tendo, 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) shown the link between patients 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 than mental go to a physician and get treatment early before it progresses to a higher level condition (Nonye & Oseloka, 2009). There are a variety of perception variables in the health field. However, 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

Design

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

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 out that MTurk samples are more representative than other convenience 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 for by using MTurk samples. 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 April 4, 2020 to April 7, 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 criteria. 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.

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

***n_0** is the sample size*
***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).*

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 are adopted from validated scales previously used by Weinstein's (Weinstein, 2000) and Meikle's (Meikle et al., 1984) work 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 according to WHO's disease grouping and included in this study(WHO, 2020c). This enabled perception comparison analysis 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 participants rating of COVID-19 and the 16 other illnesses as a mental or a physical illness. Physical and mental naming of illnesses, despite are simply the fifth of seventeen categories of disease (World Health Organization, 1992), they are still the two most widely used official nomenclatures. 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).

SPSS 26.0 was used to analyze the data. Some of the data variables does not satisfy 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 percent have taken college and education above, 88% are below the age of 50).

Figure 1
Continent wise variation of perception

Following tumor (Mean=77%) and AIDS (Mean=75), COVID-19 is 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 significance ($F(2,722) = 2.347$; $p = .096$) difference between perceived severity of tumor, AIDS and Covid-19. This implies that participants view COVID-19 as severe as tumor and AIDS.

Figure 2
Perceived severity of COVID-19 in relative to 16 other medical conditions (April 4, 2020 to April 7, 2020)

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).

Figure 3
Perceived severity of COVID-19 in relative to 16 other medical conditions (May 9, 2020 to May 16, 2020)

98.7% of the participants also viewed COVID-19 as a physical illness 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).

Figure 4
Perceived disease belongingness of COVID-19 in relative to 16 other medical conditions

One of the factors that affect human perception are target characteristics (the degree of danger the target poses). As per several studies (Cascella et al., 2020; Du et al., 2020) ,the severity of the COVID-19 virus was reported mostly on people with age above 50 and who have 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 5b) 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 5a).

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

Perceived severity, perceived disease belongingness and age are related between each other (See Table 1). The association between perceived severity and disease belongingness is stronger than the other relationships (r=.258; p<.001).

Table 1
Correlational relationship among perception and demographic variables

As people attribute COVID-19 as a physical illness than a mental illness, the chance of them

to consider it severe also mildly goes higher (See figure 6).

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

4. Discussion

In this study, it is shown that COVID-19 is 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 is perceived as severe as HIV and more severe than 15 medical illnesses including Tumor. In a time gap of a month, 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. Geographic wise, respondents from Asia and North America perceived COVID-19 to be more severe than respondents in 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. 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 four implications that could be drawn from this study. First are 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. One of such congruent behaviors in COVID-19 are stay home rules. After the emergence of COVID-19, it was noted that the stay home rules might have disadvantages like triggering other public health crisis e.g. anxiety and depression, but supporting data was scarce(Zandifar & Badrfam, 2020). The shift in severity perception magnitude from COVID-19 to depression recorded in this study within a gap of a month time might give a clue to the credibility of the ongoing *‘COVID-Stay home-Depression’* reasoning. This therefore calls for integration of depression prevention activities in the stay-home guidelines.

The second implication 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(Smith, 2006), 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 high perceived severity of COVID-19, and if so, how much 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 would have given a strong support to the Covid-19 perception and stigmatization prospect. Third, it's 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 ?'. Fourth, despite we used random assignment of participants, there is still a chance for confounding variables to account for some of the implication explanations. For example, an alternative explanation for the switch in perceived severity to depression in the second cross-sectional survey could be because of other confounding variables than COVID-19 stay home rules. Controlled experiment that accounts for variation of confounding variables or longitudinal studies that follow same participants over time are recommended choice in this regard.

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6. Tables

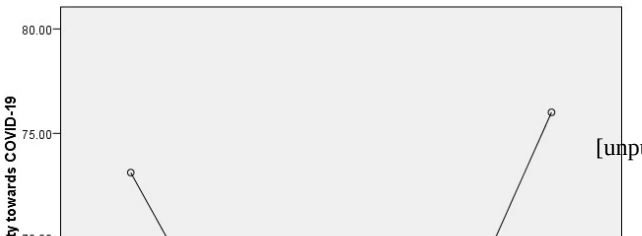
Table 1
Correlational relationship among perception and demographic variables

	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

7. Figures

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 in relative to 16 other medical conditions (April 4, 2020 to April 7, 2020)

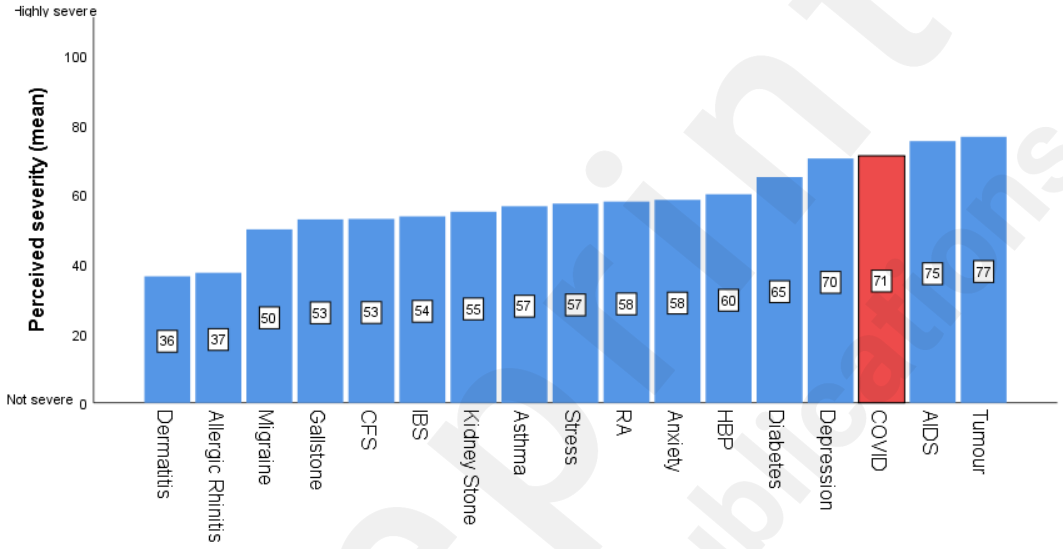


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Figure 3

Perceived severity of COVID-19 in relative to 16 other medical conditions (May 9, 2020 to May 16, 2020)

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AIDS-

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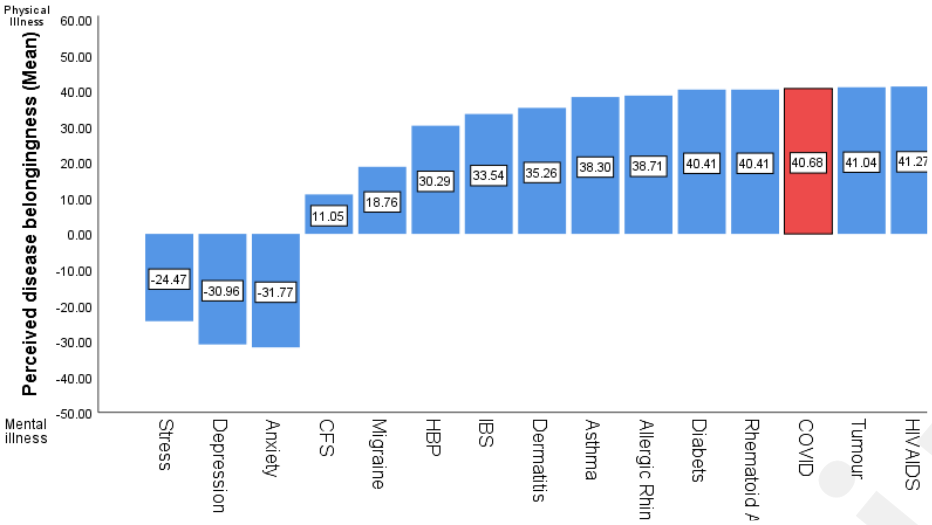
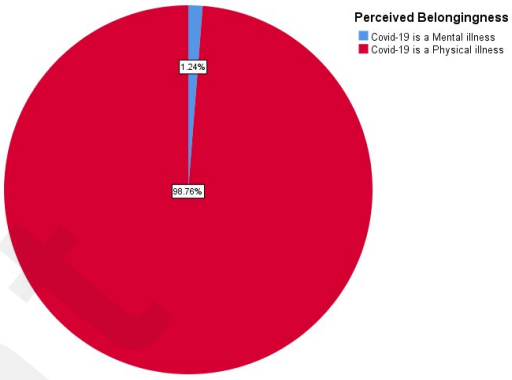
Figure 4

Perceived disease belongingness of COVID-19 in relative to 16 other medical conditions





other medical conditions