Research Article

Correlation Between COVID-19 Pandemic, Emotion Intelligence and Depression

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Abstract

The Covid-19 pandemic is causing serious fear of falling sick, dying, helplessness and stigma. Such diseases have had a negative considerable influence on every aspect of society of any given nation. Although depression is a commonly occurring global mental health disease, research concerning tools and strategies for early detection, prevention and treatment has not yes focused on the possible utilisation of measures of Emotional Intelligence (EI) as a potential predictive factor impacting depression. The present study investigated the correlation between the construct of EI and the depression during Covid-19 pandemic. A population sample of 141 outpatients (57% female) have completed self-report instruments assessing EI and depression.

The regression model reveals that Covid-19 exposure predicted depressive symptoms and there was positive beta for Covid-19 (β, 176, p < 0.04). The positive beta for using emotions RO (β, 259, p < 0.06) and managing emotions UE (β, 217, p < 0.05) suggest that participants in our sample were skilled at using and managing emotions to improve their behaviour and emotions, prevent, reduce and overcome the depressive symptoms.

Conclusions: Because the neural system involved in EI overlaps with the neural system that subserves critical decision making during any serious crises such as the outbreak of Covid-19 pandemic, measures of EI may show predictive values in terms of early identification of those at risk for developing depression as a result of COVID-19 exposure. The current study points to the potential value of conducting further studies of a prospective nature.

Keywords: Covid-19; Neurology; Emotional Intelligence (EI); Depression; Medial Prefrontal Cortex (MPC); Limbic Brain

Introduction

Coronavirus pandemic became a worldwide public health issue focusing on respiratory symptoms such as high fever, shortness of breath, and cough. There is a growing evidence suggesting neurologic symptoms such as confusion, stroke, and depression have also been observed in severe infected patients. Depression is a result of a complex interaction of psychological, biological, environmental and social factors being one of the most common affective disorders characterised by persistent sad mood, anxiety and anhedonia (an inability to experience pleasure or reward and irritability) [1].

Identification of reliable predictors – who is most likely to suffer from depression as result of the Covid-19 pandemic – would offer a valuable step towards the development of prophylactic tools and strategies for preventing individuals prior to disease onset.

EI is a predictor of mental health [2]. Emotions and moods states such as anger, sadness and happiness are physiological, behavioural, cognitive, and subjective aspects. They are closely related to neurological diseases. Brain lesions affecting the limbic system including the hypothalamus, amygdale, and cingulate gyrus which are intimately associated structures such as the basal ganglia are mainly associated with emotion and mood disturbances which often are the first symptom of neurological disease [3,4].

It is also well known that the larger brain size and volume is associated with better cognitive functioning and higher intelligence. The specific regions that show the most robust correlation between volume and intelligence are the frontal, temporal and parietal lobes of the brain. The intelligence brain is also responsible for social responses and innovation [5].

Depressed patients perform cognitive tasks such as attention, memory, information processing, decision making, etc., much more poorly than non-depressed people. Linking cognition and emotion with the social world is a requirement to maintain and develop the knowledge of psychotic diseases such as schizophrenia and depression, sleep behaviour disorder, delusional jealousy, apathy which can be an early and prominent feature of Alzheimer's disease [6,7].

Depression is associated with abnormal function in the medial prefrontal cortex (MPC). The MBC is associated with self-consciousness and processes. MPC have a greater influence over the posterior cingulate cortex of the depressed patients [7,8]. There are also evidences in pathophysiology sphere and clinical studies that the hippocampal volume (Figure 1) of major depression disorder is smaller than the control groups.

Figure 1: Hippocampus gray matter volume in depressed and healthy people. Sources: Zhou., *et al.* (2016) [9].

Figure 1 shows that subthreshold depression (StD) patients had significantly reduced volumes of gray matter in the right para-hippocampus in comparison to healthy participants (peak MNI coordinate: 30, -23, -27, t = 3.96, p < 0.01; number of voxels: 201).

EI is about the ability to perceive, use, understand and regulate own and others' emotions. EI is also about a number of different social life and emotional behaviour competencies. The prefrontal cortex (PFC) plays a crucial role in human social-emotional behaviour [8]. EI can get disturbed due to different neurological diseases such as ventromedial PFC damage (vmPFCD) and dorsolateral PFC damage (dlPFCD). The damage of vmPFC is due to social incompetence, problems in interpersonal interactions, and abnormal changes in mood and personality [9-18]. EI can also be considered as an important indicator of mental health since the ability of people to understand their own emotional states or emotional problems under the period of crises such as Covid-19 is considered an important indicator of healthy mental functioning [19].

Based on the above literature review, the hypothesis of the present study is that the Covid-19 can cause depression and good EI negatively correlate with the depression symptoms. The objective of this study is to determine the correlation and relationship between emotional intelligence and depression as another side effect of Covid-19.

Methodology

In this study, an online non-probability anonymously sample survey was conducted from October 19th to 16th December 2020. The online survey was hosted by Notre Dame University server - Lebanon. The platform used to create the survey is the Blue explorance (Blue version 7). During a meeting of Faculty of Nursing and Health Sciences, the Dean have verbally asked the faculty and staff to complete the survey and to encourage other colleagues and students to participate in the survey. A total of 167 usable self-administered questionnaires from Italy, Egypt, Lebanon, Spain and Austria were collected. This study included 141 participants from Egypt and Lebanon only.

Data were analysed using descriptive statistics, correlation test, reliability test and separate regression model. Statistical significant level was set as 0.05.

The depression questions were based on Beck Depression Inventory-II (BDI-II) scores. The BDI-II is a common scale to assess the intensity of depressive symptoms within population [20]. Some of the intensive symptoms are negative mood, pessimism, sense of failure and suicidal thoughts. We adapted the following

items: 'I feel irritations and frustrations because of Covid-19 exposure (COEX) risk', 'negative feelings', 'I'm depressed', 'I have little interest in distance work', etc. A 5 Likert scale was used to measure responses, where 1 refers to "strongly disagree", 2 to "disagree", 3 to "neutral", 4 to "agree" and 5 to "strongly agree".

We used the emotional intelligence questionnaire that is composed of 10 measure items. The emotional intelligence questionnaire items are adapted from Davies., *et al.* (2010) brief emotional intelligence scale (BEIS-10) and Saloveyand Mayer's (1997) four-factor conceptualization model [21,22]. The BEIS-10 is a sum of the following five factor constructs:

- **AO:** Appraisal of own emotions (e.g. my emotion under Covid-19: I am/was worried, I feel/felt anxiety symptoms, I am/was depressed, etc.)

- **AOT:** Appraisal of others' emotions (e.g. social support and understanding others´ emotions under the Covid-19)

- **RO:** Regulation of own emotions/Using emotions (e.g., ability to adjust my lifestyle to cope with Covid-19)

- **ROT:** Regulation of others' emotions (e.g., provide social support to others to change their moods)

- **UE:** Utilization of emotions (managing) (e.g., I have good knowledge about Covid-19 and use these knowledge to advice and help others to feel better).

To analyse the tool's suitability, a number of tests were run on the collected data. The reliability test was performed using SPSS 26.0.

Results and Analyses

Reliability and validity

The reliability and validity of the questionnaire has been validated by many previous studies and the reliability of the questionnaire of this study is 0.88 with the use of Cronbach's alpha test, which indicates a proper reliability for the questionnaire. Table 1 shows that the Cronbache´s alpha values for all items ranges from 0.87 to 0.89.

Regression findings

A multiple regression analyses were used in order to test if the dimension or dependent variables 'depression' is significantly predicted by participants' Covid-19 exposure and EI constructs. The model which is shown in table 1 only includes statistically significant variables.

			R^2	
DEP		β	,15	*P*
	COEX	,176		,04
	RO	,259		,06
	ROT	-,258		,00
	UE	,217		,05

Table 1: Regression model for Covid-19, depression (DEP) and EI. Dependent Variable: Depression (DEP).

The regression model including was significant and accounted for 15% of the variance in DEP (R^2 = 0.15). It shows that Covid-19 exposure predicted depressive symptoms and there was positive beta for Covid-19 (β, 176, $p < 0.04$). The positive beta for using emotions RO (β, 259, $p < 0.06$) and managing emotions UE (β, 217, $p < 0.05$) suggest that participants in our sample were skilled at using and managing emotions to improve their behaviour and emotions, prevent, reduce and overcome the depressive symptoms as a result of the anxiety of Covid-19 exposure. The negative beta for perceiving emotions ROT (β, 258, $p < 0.00$) suggests that participants in our sample who had difficulties in understanding the emotions of others supposed to be more likely than their peers to experience high levels of depressive symptoms. It means that by the reduction of EI, depression was increasing or vice versa. The result is also consistent with the investigation conducted by others [23,24].

Discussion and Limitation

The present investigation was conducted to explain the role of EI on depression as a result of Covid-19 exposure. After analysing the results, it was found that depression is positively correlated to Covid-19 exposure and emotional intelligence is negatively correlated with the negative symptoms of depression. The result shows that EI can predict mental health scale whereas sub-scales are supported. The findings of the present study indicate that the different levels of EI were established. To some extent, these findings are related with depression scales. Positive correlation with the depression and Covid-19 exposure and the negative correlation of perceived EI with negative symptoms of depression highlights that EI can be helpful tool as means in dealing with different symptoms of depression disorders.

A clinical study conducted by Krueger., *et al*. (2009) provides empirical evidence that key competencies underlying EI are mediated by distinct neural Prefrontal cortex (PFC) substrates. It found that vmPFC damage diminishes Strategic EI and therefore hinders the understanding and managing of emotional information. The neural system involved in Strategic EI overlaps with the neural system that subserves personal judgment and real-life decision making in particular during the period of serious crises such as the outbreak of Covid-19 pandemic. Patients with such lesions have a diminished capacity to take sound decisions in laboratory tasks. Such people use to display poor judgment regarding the importance and the utilization of the prevention measure (such as distances, using of face and nose masks, staying home and travel restrictions, etc.) during the Covid-19 pandemic [8].

Our study suggests that that depressive disorder is associated with increased anxiety and worry feeling for any potential severe consequences of Covid-19 symptoms. High skills and competences how to use, manage and control emotions are correlated with depression diseases, and reflected in significant deficits in the EI abilities to recognize and express emotions, manage, control and regulate positive and negative emotions. The main result of this study is supporting the belief that the lack of emotional control and regulation ability are critical factors positively associated with depression and Covid-19.

Conclusion

Because, the neural system involved in EI overlaps with the neural system that subserves critical decision making during any serious crises such as the outbreak of Covid-19 pandemic, measures of EI may show predictive values in terms of early identification of those at risk for developing depression as a result of COVID-19 exposure. The current study points to the potential value of conducting further studies of a prospective nature.

Conflict of Interest

The authors have none to declare.

Authors Contributions

- Mosad Zineldin conducted the research and developed the content, including the design of the analysis.

- Anotine Farhat was involved in data collection and final revision of the article.

- Melita Sogomonjan was involved in writing and editing the general sections of the paper in close collaboration with the leading author. She has also helped the leading author in designing the analysis of the research.

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