
Depression at the time of the COVID-19 pandemic: A CES-D survey before and during the lockdown

Sabrina Rizzo, Luciano Giromini, Claudia Pignolo

Department of Psychology, University of Turin

claudia.pignolo@unito.it

• **ABSTRACT.** Il 31 gennaio del 2020, in Italia, furono registrati i primi due casi di COVID-19; la portata e la rapidità della diffusione del virus costrinsero il governo italiano ad adottare delle misure di emergenza straordinarie per rallentare il contagio. L'obiettivo del presente studio è stato quello di indagare la sintomatologia depressiva sperimentata da un campione proveniente dalla popolazione generale, confrontando i dati raccolti prima e durante il lockdown da COVID-19. Sono stati utilizzati dati d'archivio che includevano dati relativi alla *Center for Epidemiologic Studies-Depression scale (CES-D)* somministrata prima ($n = 151$; gruppo Pre-COVID-19) e durante ($n = 352$; gruppo COVID-19) il primo lockdown italiano a un campione non-clinico. Le analisi si sono focalizzate sul confronto dei punteggi ottenuti alla CES-D nel gruppo Pre-COVID-19 e nel gruppo COVID-19. Inoltre, è stata valutata la possibile influenza di alcune variabili demografiche sui punteggi ottenuti alla CES-D prima e durante la pandemia da COVID-19. Inoltre, all'interno del gruppo COVID-19, sono state osservate delle differenze statisticamente significative tra i punteggi alla CES-D ottenuti da uomini e donne e una correlazione quasi significativa tra l'età dei partecipanti e i punteggi ottenuti alla CES-D. Lo studio ha rivelato che le misure restrittive e la pandemia stessa possono aver contribuito ad un incremento dei sintomi depressivi in un campione di individui non-clinici (e probabilmente nella popolazione generale italiana), specialmente nei giovani e nelle donne.

• **SUMMARY.** On January 31, 2020, the first two cases of COVID-19 were detected in Italy; the extent and the rapidity of virus spread forced the Italian Government to take extraordinary measures to prevent contagion. In this study, we aimed to compare data collected before and during the COVID-19 pandemic on the depression symptomatology in a sample from the general population. We used archival data from a previous dataset we had access to, which included Center for Epidemiologic Studies-Depression scale (CES-D) data from non-clinical volunteers collected before ($n = 151$; Pre-COVID-19 group) and during ($n = 352$; COVID group) the pandemic. Statistical analyses compared CES-D scores yielded by the Pre-COVID-19 sample against those yielded by the COVID-19 sample. Additionally, the possible impact of demographic variables on CES-D scores before and during COVID-19 was tested. Moreover, in the COVID-19 group we found a statistically significant difference on the CES-D scores between men and women and a nearly significant relationship between age and CES-D scores. This study showed that the lockdown measures and the pandemic itself might have led to an increasing of the depressive symptoms in a non-clinical sample (and maybe in the Italian population), especially in women and youths.

Keywords: COVID-19, Sars-Cov-2, Pandemic, Depression, Lockdown, Mental health, Women, Youths

INTRODUCTION

Italy was the first European country to be hit by the COVID-19 pandemic, with about 200.000 confirmed cases and 30.000 deaths between March and May 2020 (<https://covid19.who.int/region/euro/country/it>). To mitigate virus diffusion, the Italian Government implemented emergency measures, based on the Chinese experience, including home confinement and limitation on movement in the entire country, except for justified work reasons and health needs. As such, lockdown was officially proclaimed on March 9th, 2020, and gradually extended until May 18th, 2020. The Italian lockdown was one of the most stringent ones in Europe, in terms of duration and intensity: it involved schools, universities, and almost all fields of business, the converting of many hospital wards or of whole hospitals into pandemic centers, social-distancing and self-isolation, and an unexpected drastic change of daily life. All these elements added fears to fears, and uncertainty to uncertainty, contributing to create an unprecedented situation in every aspects of life (Porcelli, 2020). Being constantly exposed to information about the pandemic, not having definite answers on its duration or effects, and feeling one's own balance threatened, can indeed affect individuals' mental health (Özdin & Bayrak Özdin, 2020).

As such, COVID-19 pandemic marked the beginning of a series of psychological processes and reactions that will interest clinicians and researchers for a long time. The most common individuals' psychological reactions to COVID-19 were depression, stress, anxiety, and sleep disorders (Ahmed et al., 2020; Choi, Hui & Wan, 2020; Huang & Zhao, 2020; Ozamiz-Etxebarria et al., 2020; Rossi et al., 2020a; Wang et al., 2020). These psychological reactions were stronger over time especially in individuals who were subjected to more restrictive measures of virus spread containment and who were exposed first to the pandemic (Choi et al., 2020; Ozamiz-Etxebarria, Dosil-Santamaria, Picaza-Gorrochategui & Idoiaga-Mondragon, 2020; Wang et al., 2020). Furthermore, post-traumatic stress and adjustment disorder symptoms were identified and correlated to measures of quarantine (Rossi, Socci, Pacitti et al., 2020; Rossi, Socci, Talevi et al., 2020). The level of stress was often associated with several COVID-19-related risk factors, such as losing jobs, having a loved one seriously threaten by the virus, being under quarantine, and the request to adapt to new way of working, studying,

and communicating (Buonsenso, Cinicola, Raffaelli, Sollena & Iodice, 2020; Buzzi et al., 2020; Rossi, Socci, Talevi et al., 2020; Wang et al., 2020).

Referring to depression, different studies have found associations with demographic variables. In Italy, Mazza et al. (2020) assessed psychological distress variables in a sample from the Italian general population in March 2020 finding that 67.2% of the sample reported average levels of depression, whereas 32.8% reported high or very high levels of depression. In addition, they found that higher levels of depression were found in individuals with a lower level of education and in women, although they did not find any relationship with the age of the participants. In Italy, almost 50% of women had to renounce to their plans for the future because of the increased workload and 60% of them (versus 21% of men) had to manage alone family, children, and elders (<https://alleyoop.ilsole24ore.com/2020/05/28/la-donna-tra-le-vittime-del-covid-una-su-due-rinuncia-ai-proprio-progetti/>). Furthermore, an Istat report revealed that on May 2020 more women than men lost their job (.7% vs .1%; <https://www.istat.it/it/archivio/245093>). In general, international studies have reported that women were more frequently associated with increased psychological distress during the pandemic (Qiu et al., 2020; Wang et al., 2020). Moreover, youths appeared to suffer more the psychological effects of the pandemic and lockdown compared to older people (Ahmed et al., 2020; Huang & Zhao, 2020; Odriozola-González, Planchuelo-Gómez, Irurtia & De Luis-García, 2020).

AIM

The aim of the current research was to compare data collected before and during the COVID-19 pandemic on the depression symptomatology in a sample from the general population. More specifically, the current cross-sectional study investigated the effects of isolation and social distancing on the onset of depressive symptomatology by comparing archival *Center for Epidemiologic Studies – Depression (CES-D; Radloff, 1977)* data collected before the spread of COVID-19 against those collected during the pandemic. Moreover, we also tested the extent to which demographic variables such as gender, age, and education were associated with the CES-D scores before and during the lockdown.

METHOD

Participants

Both the Pre-COVID-19 and COVID-19 groups were originally recruited with the snowball sampling technique to contribute to the study of the psychometric properties of the *Inventory of Problems – 29 (IOP-29)*; (Viglione & Giromini, 2020; Viglione, Giromini & Landis, 2017), a recently introduced feigning measure. In addition to the IOP-29, all participants included in that sample were administered the CES-D and were asked to provide demographic information such as age, gender, and years of education. As data collection for that project occurred before and during the spread of COVID-19 pandemic, this dataset represents an optimal source of information for the goals of the current study.

The composition of both groups is reported in Table 1. The group recruited before the pandemic was composed of 151 adults, 57 men and 94 women, of Italian nationality, aged between 18 and 74 years old, and with an education level that ranged from 8 to 21 years. Among these participants, four did not provide any information about their education level. Moreover, geographical provenience was not reported. The group recruited during the COVID-19 pandemic was composed of 353 Italian adults, 114 men and 239 women, ranging in age between 18 and 60 years old, with a level of education ranging from 8 to 21 years. Most of the participants were native of the North-West (44.2%) and of the South of Italy (34.3%). Two participants did not report on their education level; ten did not disclose their geographical provenience.

Measures

The Italian version of the CES-D (Radloff, 1977; Italian version adapted by Fava, 1983) was administered through an online self-report survey to the participants, in order to detect depression symptoms before and during the COVID-19 pandemic. The CES-D was originally developed to measure depressive symptomatology in epidemiological studies about the general population (Radloff, 1977); however, it has also been used in primary care settings (Andresen, Malmgren, Carter & Patrick, 1994; Miller, Anton & Townson, 2008; Myers & Weissman, 1980; Vilagut,

Forero, Barbaglia & Alonso, 2016). The questionnaire is a 20-item measure developed to explore the construct of depression through a 4-points Likert scale rating. The examinee is asked to specify the frequency with which each symptom was experienced over the last week (0 = Not at all or less than one day last week; 1 = It occurred a few times – one or two days last week; 2 = It occurred frequently – three to four days last week; 3 = It occurred always, or nearly always – five to seven days last week). CES-D items measure different depression symptomatic areas, i.e. negative affect, positive affect, and somatic symptoms (Al-Modallal, 2010), and they can be understood within the frame provided by Beck's Cognitive Theory of Depression (Beck, 1967; 1987; Zauszniewski & Graham, 2008). The CES-D total score has a possible range of 0-60, where a higher score suggests that more depression symptoms are experienced.

Research shows that CES-D scores possess good internal consistency, with alpha values $\geq .85$ (Spijker et al., 2004; Stockings et al., 2015; Tran et al., 2019; Zauszniewski & Graham, 2008), as well as a good test-retest reliability, construct validity, and concurrent validity (Spijker et al., 2004). Vilagut et al. (2016) inspected different possible cut-scores for the CES-D and found that a cut-off score ≥ 16 enhanced sensitivity ($Se = .87$; 95% CI .82-.91) over specificity ($Sp = .70$; 95% CI .65-.75); a cut-off score ≥ 20 produced $Se = .83$ (95% CI .75-.89) and $Sp = .78$ (95% CI .71-.83); finally, a cut-off score ≥ 22 yielded similar results in both sensitivity ($Se = .79$; 95% CI .69-.85) and specificity ($Sp = .80$; 95% CI .75-.85). On the basis of Vilagut et al.'s (2016) findings, we chose to observe the trend of depression in the Italian population selecting the scores of 16, 20, and 22 as cut-off scores.

Procedure

All the participants gave their informed consent, and those who were not able to read and understand Italian fluently were excluded from the research. Additional exclusion criteria included having a history of severe psychiatric disorder, being younger than 18 years of age, not holding Italian citizenship, and not living in Italy during the lockdown period. The original research project received formal ethical approval by the Institutional Review Boards (approved November 19, 2019; Protocol Number 5072).

Table 1 – Demographic composition of the samples

	Pre-COVID-19 (<i>n</i> = 151)	COVID-19 (<i>n</i> = 352)
Gender		
Women	94 (62.3%)	238 (67.6%)
Men	57 (37.7%)	114 (32.4%)
Age		
<i>M</i>	30.97	34.67
<i>SD</i>	13.52	13.23
Education (yrs.)		
<i>M</i>	14.51	14.90
<i>SD</i>	3.03	2.57
Geographical provenience		
North-West	–	155 (44%)
North-East	–	11 (3.1%)
Centre	–	38 (10.8%)
South	–	121 (34.4%)
Islands	–	17 (4.8%)

Data analyses

To evaluate whether there were any differences between the CES-D scores before and during the COVID-19 pandemic, we computed a *t*-test for independent samples. Next, we evaluated whether the percentage of participants who scored above the CES-D clinical cut-off scores varied before and during the lockdown. To do so, we computed *Phi* coefficients applying the most commonly used cut-offs on the CES-D scores, i.e., ≥ 16 , ≥ 20 , and ≥ 22 . Finally, we explored the relationship between the CES-D scores and demographic characteristics within each sample.

RESULTS

The COVID-19 group ($M = 20.5$, $SD = 10.6$) showed statistically significant higher CES-D scores compared to the Pre-COVID-19 group ($M = 18.1$, $SD = 10.6$; $t_{(501)} = -2.24$; $p = .025$; $d = .22$). Thus, the severity of depressive-related problems reported by the COVID-19 group was significantly greater than that reported by the Pre-COVID-19 group. Moreover, although the percentage of individuals who scored above the cut-off of 16 at the CES-D was significantly higher in the COVID-19 group compared to the Pre-COVID-19 group, we did not find any statistically

significant differences using the other two cut-scores, i.e., ≥ 20 , and ≥ 22 (see Table 2).

Finally, considering the relationship between the CES-D scores and demographic characteristics, women showed higher CES-D scores compared to men during the COVID-19 lockdown only, with a small effect size; no gender differences were observed in the Pre-COVID-19 group (see Table 3). Furthermore, we correlated the CES-D scores of the two groups with the age of the participants. In the Pre-COVID-19 group, the correlation with age was not significant ($r = .038$; $p = .646$), whereas in the COVID-19 group the negative correlation between the depressive symptomatology and age was on the cut-off for statistical significance, with a small effect size ($r = -.104$; $p = .051$). As for the correlation between the CES-D scores and the years of education we did not find any statistically significant results in either group (Pre-COVID-19 group: $r = -.022$; $p = .079$; COVID-19 group: $r = -.054$; $p = .311$).

DISCUSSION

The main objective of the current study was to compare CES-D data collected before and during the COVID-19 lockdown in a sample from the general population. By comparing data collected in the fall 2019 with those gathered in the spring 2020 during the pandemic, we confirmed our expectations. We found a worsening of the depressive symptoms in the COVID-19 group, thus confirming the results of previous studies (Huang & Zhao, 2020; Lei et al., 2020; Özdin & Bayrak Özdin, 2020; Pappa et al., 2020). Another interesting result refers to the percentage of participants who scored above the screening cut-off score of 16 on the CES-D Total score during the lockdown. Indeed, while before the pandemic only 47% of the sample scored at or above the cut-off, during the lockdown 63% percent of the sample reported some depressive symptoms. This pattern of results, however, did not remain statistically

Table 2 – Percentage of above-threshold CES-D scores before and during COVID-19 pandemic

	Pre-COVID-19 (<i>n</i> = 151)	COVID-19 (<i>n</i> = 352)	<i>Phi</i>	<i>p</i>
CES-D Total ≥ 16	71 (47%)	223 (63%)	.152	.001
CES-D Total ≥ 20	61 (40%)	169 (48%)	.070	.116
CES-D Total ≥ 22	53 (35%)	152 (43%)	.075	.091

Table 3 – CES-D scores before and during COVID-19, divided by gender

	Men		Women		<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Pre-COVID-19	17.65	9.83	18.52	12.11	-.46	149	.650	-.08
COVID-19	18.27	10.32	21.64	10.58	-2.82	350	.005	-.32

significant when we inspected the more conservative CES-D cut-off scores of 20 and 22, although a trend towards the same direction was observed (i.e., higher percentage of cases above threshold during COVID-19 pandemic). One explanation may rely on the nature of the sample: since they were non-clinical volunteers, the overall phenomenon could perhaps be observable only at a subclinical level. In other words, these participants seemed to have experienced an increased amount of depressive symptoms, but being healthy individuals, maybe they still had coping mechanisms to remain at a subclinical level. Nevertheless, these findings represent another confirmation of the consequences that a global health emergency can produce in a non-clinical population. The COVID-19 pandemic, indeed, being an extraordinary alarming situation that have threatened the health and freedom of the entire population, forced the population to cope with the existential concerns and the life changings that this situation has produced.

Our findings indicate that women and young adults were the most affected by the lockdown in terms of depression symptomatology. Indeed, young individuals may have suffered from the restrictions posed by the government more than older individuals did. A possible explanation for this finding is that youths are characterized by the need of relations with peer and of social gatherings, which were prevented by the lockdown. Furthermore, the pre-existing fear of the future that characterize the new generations (Buzzi et al., 2020) has been exacerbated by the economic crisis that COVID-19 pandemic produced. As for women, besides being more predisposed to depression (Maji, 2018; Noble, 2005; Thornton, McQueen, Rosser, Kneale & Dixon, 1997), they may have to face more serious social and economic consequences of the pandemic compared to men. Several organizations for human rights, like Amnesty International or United Nations (UN), launched appeals to politicians and citizens, driven by the worry about the actual destinies of women in almost every country in the world. In Italy, as

mentioned before, women had to deal with the social and economic consequences of the pandemic much more than men, and this renews the inequalities already present in the society. An Istat report (https://www.istat.it/it/files//2020/05/Stat-today_Chiamate-numero-antiviolenza.pdf) showed the increase of domestic violence complaints during the quarantine period. In this frame, we can easily understand the gendered impact of COVID-19 (Wenham, Smith & Morgan, 2020) and the importance of a gendered approach in the crisis management. COVID-19 pandemic has perhaps further exacerbated the gender inequalities pre-existing in the Italian territory, and this can represent a risk factor for the increase of depressive symptoms in women.

Despite the interesting findings, we have some limitations to report. First, because the participants of the Pre-COVID-19 and COVID-19 groups are different, we could not evaluate directly differences in the experiencing of the depressive symptomatology, that is the limitation of cross-sectional studies. Second, we used only a self-report scale (i.e., the CES-D) to assess the depressive symptomatology in our sample without administering other psychological tools different in nature, such as clinical interviews, performance tests, or informant-reports. As such, we were able to assess only the subjective perspective of the participants on the matter, which depends on the self-awareness and insight of the participants. Third, given that the CES-D does not include validity scales, we did not evaluate the presence of negative impression management or response styles. As such, some participants may have adopted an intentional or unintentional response style, exaggerating or minimizing their experiences. Nevertheless, we have to face up a crisis that is upsetting the balances of the human life that we knew. For this reason, the mental health professionals should deeply analyze the short and long-term consequences that Sars-Cov-2 will bring with itself, with the aim of defining the best strategies to respond to the new individual and social needs, and of trying to deal with this dramatic situation in the best way as possible.

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