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Abstract

This study investigates the impact of job loss on the mental health of individuals in Tunisia during the COVID-19 crisis using the counterfactual decomposition technique and the potential outcome approach. We begin by calculating mental health indicators for all the individuals included in the sample based on the WHO Five Well-Being Index. We then group individuals into two sub-populations: the first group included those who had lost their jobs and the second group included individuals whose status in the labor market had remained unchanged. Afterward, we use the Blinder and Oaxaca decomposition to explain the mean difference in the mental health scores between the two groups and determine the factors contributing to this difference. Our empirical results identify symptoms of depressed mood, decreased energy, and loss of interest in several individuals. Based on these three symptoms, we are able to classify individuals into three types of depression: mild, moderate, and severe. In addition, it appears that job loss had significantly contributed to the worsening mental health of the individuals.

JEL Classification: J1, I1

Keywords: Counterfactual decomposition, job loss, mental health, COVID-19, Tunisia.

ملخص

تبحث هذه الدراسة في تأثير فقدان الوظيفة على الصحة العقلية للأفراد في تونس خلال جائحة الكوفيد-19 باستخدام تقنية التحلل المضاد للواقع ونهج النتائج المحتملة. في الجزء الأول، قمنا بحساب مؤشرات الصحة النفسية لجميع الأفراد المشمولين في العينة استناداً إلى بنود منظمة الصحة العالمية، ثم تم تجميع الأفراد في مجموعتين فرعيتين: شملت المجموعة الأولى الذين فقدوا وظائفهم، وشملت المجموعة الثانية الأفراد الذين ظل وضعهم في سوق العمل دون تغيير. في الجزء الثاني، استخدمنا تحليل Blinder و Oaxaca لشرح متوسط الفرق في درجات الصحة العقلية بين المجموعتين وتحديد العوامل التي تسهم في هذا الاختلاف، وقد حددت نتائجنا التجريبية أعراض الاكتئاب، وانخفاض الطاقة، وفقدان الاهتمام بالعديد من الأفراد، وبناء على هذه الأعراض الثلاثة، تمكنا من تصنيف الأفراد إلى ثلاثة أنواع من الاكتئاب: خفيف ومعتدل وشديد. وبالإضافة إلى ذلك، يبدو أن فقدان الوظيفة قد أسهم إسهاماً كبيراً في تدهور الصحة العقلية للأفراد.

1. Introduction

After being detected in the city of Wuhan in China's Hubei Province, COVID-19 spread rapidly around the world, resulting in global human tragedy and enormous economic damage (Baldwin and Weder di Mauro, 2020; Elgin et al., 2020; Bel et al., 2020). Following the World Health Organization's (WHO) recommendations and to slow down the disease's rapid spread across and within countries, many governments responded with strict measures, including lockdowns with border closures, travel restrictions, self-isolation, social distancing, and school and workplace closures (Schomaker et al., 2021; Talbot, 2020; Nasri et al., 2022).

These measures resulted in a significant rise in unemployment in many countries (Blustein et al., 2020). In this regard, the International Labour Organization (ILO) estimates that working-hour losses in 2020 were approximately four times greater than those during the global financial crisis of 2009 (ILO, 2021). This decline in working hours translated into both job loss and a reduction in working hours for those who remained employed. In total, an unprecedented global employment loss of 114 million jobs was recorded in 2020 compared to 2019, with significant variations across regions, including sex and age. Globally, job losses have been highest in the Americas and among women and young workers (ILO, 2021). Furthermore, job loss signifies not only the loss of income and financial benefits for many people but also a loss of identity; hence, it can also be a major reason why they may experience depressive symptoms more than those maintaining their status in the labor market (Griffiths et al., 2021; Posel et al., 2021).

It is increasingly being recognized that in addition to economic costs, the health costs of COVID-19 are not limited to physical health but also include effects on individuals' mental or psychological well-being, especially due to COVID-19-related restrictions (Knolle et al., 2021; Petersen et al., 2021).

Tunisia, like most countries in the world, employed various measures to prevent the spread of COVID-19 across the country because once the disease circulates in a country, authorities are forced to adjust their strategy to reduce the burden on the health system. On 22 March 2020, total population containment was imposed on Tunisia for two weeks, and it was extended twice (Nasri et al., 2022). The lockdown made job searches more difficult or impossible in certain cases, and many workers lost their jobs (Krafft et al., 2021). Being worried about the indefinite duration of the disease was associated with severe symptoms of depression and anxiety. Indeed, fear, worry, and stress are normal responses to perceived or real threats and when dealing with uncertainty or the unknown. It is therefore understandable that people experienced fear and depression in the context of the COVID-19 pandemic. In this research, we aim to investigate the impact of job loss on the mental health of individuals in Tunisia during the COVID-19 crisis.

Although the psychological impact of the COVID-19 outbreak among healthcare professionals has been the subject of other studies in the health literature on Tunisia (see Fekih-Romdhane

et al., 2020; Hammami et al., 2021), to the best of our knowledge, no research has addressed the impact of job loss on the mental health of Tunisian workers. Thus, this study fills this gap in the literature. We calculated seven mental health indicators for all individuals included in the sample based on the WHO Five Well-Being Index (WHO-5), which taps into the subjective well-being of the respondents. Our empirical results identify symptoms of depressed mood, decreased energy, and loss of interest in several individuals. Based on these three symptoms, we are able to classify individuals into three types of depression: mild, moderate, and severe. By applying the counterfactual decomposition technique, our results show that job loss significantly contributed to the worsening of the mental health of individuals.

This paper is structured as follows: Section 2 presents a literature review to provide a perspective on the impact of the COVID-19 crisis and job loss on the mental health of individuals. Section 3 presents our data and descriptive statistics, while section 4 provides a detailed description of our empirical strategy. Section 5 discusses the main results, and section 6 concludes the paper.

2. Literature review

The impact of the COVID-19 crisis on the mental health of individuals has been the subject of several studies and academic work. A review of the existing literature on COVID-19 and mental health undertaken by Rajkumar (2020) finds that symptoms of anxiety, depression, and self-reported stress are common psychological reactions to the pandemic and are frequently associated with disturbed sleep quality (Xiao et al., 2020). Studies within the review also note that individuals' characteristics and behaviors, as well as other structural variables (ex. support services), may mediate and moderate risk.

In a global study of the risk and resilience factors linked to the impact of COVID-19 on mental health, Płomecka et al. (2020) build several linear and logistic regression models to examine psychological symptoms related to the COVID-19 pandemic in 12 countries and five WHO regions. This study identifies that being female and having pre-existing psychiatric conditions and previous trauma exposure are notable risk factors, while being optimistic, having the ability to share concerns with family and friends as usual, having positive predictions on COVID-19, and exercising daily predicted fewer psychological symptoms.

Using an online survey, Wang et al. (2020) estimate the frequency of individual mental health symptoms in the Chinese population. Using the Depression, Anxiety, and Stress Scale (DASS-21) and the Impact of Event Scale-Revised (IES-R), the authors show that moderate and severe symptoms of depression were present in 16.5 percent of the population and that 8.1 percent suffered from moderate and severe stress. Wang et al. (2020) also point out that the availability of accurate information and the use of specific preventive measures, such as handwashing, appear to mitigate these effects. In a study based on the general population of Denmark, Petersen et al. (2021) suggest that the first wave of the COVID-19 pandemic only had a minor impact on the mental and physical health of the general population compared to before the

pandemic. Using ordinal regression analyses, the authors conclude that gender, age, education, and physical illnesses are not associated with worry about illness, emotional distress, or the burden of physical symptoms. Moreover, Das et al. (2021), using an online cross-sectional survey of 672 Bangladeshis aged 15-65 across the country, estimate that a large portion of respondents reported mental health problems during the COVID-19 pandemic. This paper also reports that in Bangladesh, the key factors associated with poor mental health during COVID-19 were being female, being unemployed, being a student, being obese, and living without a family.

Other studies have examined the impact of the COVID-19 pandemic in some countries. For example, Zandifar and Badrfam (2020) highlight the role of unpredictability, uncertainty, misinformation, and social isolation in contributing to stress in Iran. Another study from Japan highlights the economic impact of COVID-19 and its effects on well-being as well as the likely high levels of fear and panic behavior, such as hoarding and storing resources, in the general population (Shigemura et al., 2020). This study also identifies populations at higher risk of adverse mental health outcomes, including patients with COVID-19 and their families, individuals with existing physical or psychiatric morbidity, and healthcare workers.

Conversely, several papers have addressed the impact of COVID-19 on the mental health of health workers. For example, Lai et al. (2020) conducted a survey of healthcare workers in Wuhan and other regions in China and find that participants reported experiencing psychological burdens, especially nurses, women, those in Wuhan, and frontline healthcare workers directly engaged in the diagnosis, treatment, and care of patients with COVID-19. In a cross-sectional survey conducted using online questionnaires from 20-30 April 2020, Fekih-Romdhane et al. (2020) show that 30.5 percent, 24.3 percent, and 18.6 percent of healthcare workers in Tunisia reported severe or extremely severe levels of depression, anxiety, and stress, respectively. Moreover, a multivariable logistic regression analysis showed that, after controlling for confounders, women developed more depressive symptoms than men. Being worried about the indefinite duration of the disease was associated with severe symptoms of depression and anxiety.

A large body of literature has investigated how the loss of employment during the COVID-19 crisis affected depression or anxiety, where studies compared the mental health of employed and unemployed individuals. For example, Mojtahedi et al. (2020) study the relationship between mental toughness, job loss, and mental health issues during the COVID-19 pandemic. They find that job/business loss was a significant predictor of anxiety, depression, and stress and that these findings align with previous research that identified a link between job loss and depressive symptoms (Burgard et al., 2007). This result echoes that of Mimoun et al. (2020), who highlight the relationship between temporary job loss and stress during the COVID-19 pandemic. Mimoun, Ben Ari, and Margalit (2020) explain that jobs give people a sense of confidence, self-worth, and control, and that cutting one's job is likely to reduce one's sense of worth and purpose.

3. Data and descriptive statistics

In this research, we aim to explore how job loss affects workers' mental health using micro-data collected after the introduction of the COVID-19 lockdown in Tunisia. We use Tunisian data taken from the ERF COVID-19 MENA Monitor Household Survey (OAMDI, 2021) fielded primarily in November 2020. The sample for the household survey comprised mobile phone users aged 18-64 years old. Random digit dialing (RDD) within the range of valid numbers was used. The samples were stratified by the country-specific market shares of mobile operators. The sample was designed to cover at least 2,000 unique households and individuals. Inverse probability weighting was used to reduce the bias within a number of observable dimensions. Weights were created on three levels: individual, household, and household members. The survey covered demographic and household characteristics, education and children, labor market status,⁴ food security, income, social safety net, employment and unemployment detection, attitudes toward risks, mental health, and social distancing. Additionally, it included a worker module on occupation, job formality, the impact of COVID-19 on employment, and work from home; a farmer module on crops, inputs, harvest, prices, markets...etc.; a household enterprise module on industry, employment, sales/revenue, impact of COVID-19 on business, policy response, plans for future...etc.; and a women module on caregiving time for children and housework and for activities done for the household.

As shown in Figure 1, the first wave of the COVID-19 pandemic in Tunisia lasted almost three and a half months. It started after the discovery of the first case on 2 March 2020, and it extended until 13 June 2020, which was the date of total control of the health situation, where zero new confirmed cases were recorded for several successive days. On 22 March, a national lockdown was imposed on the whole country for two weeks, which was extended twice before the return to the targeted lockdown and a total deconfinement on 7 June 2020. Several measures were taken to manage this first wave, such as the cancellation of public events, restrictions on international travel, closure of public transport, stay-at-home obligations, restriction of internal movement, and the shutdown of schools and workplaces. All these measures impacted the activities and lifestyles of Tunisians in general and changed the labor market outcomes for some categories of the population; they even made job searches more difficult or impossible in certain cases. In this regard, Krafft, Assaad, and Marouani (2021) estimate that 82 percent of the unemployed in February 2020 remained unemployed in November 2021, and 16 percent of salaried workers in the private sector became unemployed, while the public sector remained more protected.

As shown in Table 1, 85.23 percent of individuals working in February 2020 in the public and private sectors, such as farmers, business owners, or the self-employed, maintained the same

⁴ The survey asked for the labor market status in October and collected retrospective data on labor market status in February 2020.

status in October 2020; individuals who had lost their jobs represented 11.65 percent, while those who had switched to another status represented 3.11 percent.

Individuals working as farmers in February 2020 constituted 3.75 percent of the sample; among them, 88 percent remained farmers in October 2020, and 6.67 percent changed their jobs, while 5.33 percent fell into unemployment. A total of 84.48 percent of business owners or the self-employed included in the sample maintained the same status in October 2020, and 5.87 percent switched to another status. In addition, 9.65 percent of this category was unemployed in October 2020.

Conversely, we estimate that 94.42 percent of public sector employees maintained the same status; this proportion is estimated at 81.98 percent for private sector employees. Workers who changed their status in October 2020 constituted 1.23 percent and 2.13 percent of the public and private sectors, respectively. However, our results show that 4.30 percent of public workers and 15.89 percent of private sector employees lost their jobs in October 2020. In addition, 22.22 percent of individuals who were unemployed and 4.67 percent of those who were out of the workforce in February 2020 found a job in October 2020. It is increasingly being recognized that the health costs of COVID-19 are not limited to physical health but include effects on individuals' mental or psychological well-being, especially for those who lost their jobs. Job loss means not only a loss of income and benefits but also a loss of identity.

In this study, the mental health of individuals was measured using the WHO-5 questionnaire presented in Table 2, which was introduced in the survey questionnaire under the "Mental Health" module (OAMDI, 2021).

The WHO-5 is a short questionnaire comprising five simple items that tap into the subjective well-being of the respondents. It was derived from the WHO-10, which was derived from a 28-item rating scale used in a WHO multicenter study in eight different European countries. The 10 items constituting the WHO-10 were selected from among these 28 items based on a non-parametric item response theory analysis, which identified the 10 most valid items from the original 28-item scale. The items for the 28-item scale were selected from the Zung scales for depression, distress, and anxiety as well as from the General Health Questionnaire and the Psychological General Well-Being Scale. The WHO-5 items (Table 2) are: (1) "I have felt cheerful and in good spirits," (2) "I have felt calm and relaxed," (3) "I have felt active and vigorous," (4) "I woke up feeling fresh and rested," and (5) "My daily life has been filled with things that interest me." The respondent is asked to rate how well each of the five statements applies to them when considering the last 14 days. Each of the five items was scored from 5 (*all of the time*) to 0 (*none of the time*). The raw score ranges from 0 to 25, where 0 represents the worst possible mental health, and 25 represents the best possible mental health. From these total scores, we identified the following three syndromes: depressed mood (B1), reduced energy (B2), and loss of interest (B3). These three syndromes allow us to classify individuals into three depression types (mild, moderate, and severe).

4. Methodology

To examine the impact of job loss on the mental health of Tunisian workers during the COVID-19 period, we use a methodology based on the counterfactual decomposition technique popularized by Blinder (1973) and Oaxaca (1973) and the potential outcome approach.

In the first step, we calculate the mental health score S_i of all individuals. If the individual scored 0-2 on item 1, they were considered in a depressed mood (B1); they were categorized as having decreased energy (B2) if they scored 0-2 on either item 3 or 4; and as having loss of interest (B3) if they scored 0-2 on item 5. We also assume that individuals suffered from mild depression if they manifested syndrome B1 or syndromes B2 and B3. We consider those with the syndromes (B1 and B2) or (B1 and B3) as individuals with moderate depression. Conversely, depression is considered severe if individuals had all three syndromes (B1, B2, and B3).

We then identify the individuals who lost their jobs following the social distancing measures applied in Tunisia during the first wave of the pandemic and follow the same identification strategy used by Krafft et al. (2021). Workers who lost their jobs were working in the private sector, in the public sector, or who were self-employed in February 2020 and became unemployed (self-reported, using a broad definition of unemployment that does not require search) by October 2020. Workers who switched positions or activity sectors were excluded.

Then, the individuals were grouped into two sub-populations: the first one, denoted “L,” included those who had lost their jobs; the second group was denoted “NL” and included individuals whose status in the labor market had remained unchanged.

The objective of this paper is to identify and quantify the effect of job loss on the mental health of the first group “L.” For this purpose, we use the Blinder and Oaxaca decomposition to explain the mean difference in S_i (outcome variable) between the two groups (Group_1 “L” and Group_2 “NL”) and determine the factors contributing to that difference. We model separately, in group “L” and group “NL,” a linear relation between the variable of interest S_i and its determinants as follows:

$$S_i = \beta_{L0} + \sum_{i=1}^k X_{ik}\beta_{Lk} + \varepsilon_{iL} \quad \forall i \in L$$
$$S_i = \beta_{NL0} + \sum_{i=1}^k X_{ik}\beta_{NLk} + \varepsilon_{iNL} \quad \forall i \in NL$$

where X_{ik} is a set of predictors, β_{g0} the constant, β_{gk} the parameter to be estimated, and ε_{gL} the term error, $g: \{L, NL\}$. We note \bar{S}_L and \bar{S}_{NL} as the means of the explained variables in the two groups (L and NL), that is:

$$\bar{S}_L = \hat{\beta}_{L0} + \sum_{i=1}^k \bar{X}_{Lk} \hat{\beta}_{Lk}$$

$$\bar{S}_{NL} = \hat{\beta}_{NL0} + \sum_{i=1}^k \bar{X}_{NLk} \hat{\beta}_{NLk}$$

The mean outcome difference can be expressed as the difference in the linear prediction of the group-specific means of the regressors, that is:

$$\begin{aligned} \bar{S}_{NL} - \bar{S}_L &= \hat{\beta}_{NL0} + \sum_{i=1}^k \bar{X}_{NLk} \hat{\beta}_{NLk} - \hat{\beta}_{L0} - \sum_{i=1}^k \bar{X}_{Lk} \hat{\beta}_{Lk} \\ &= \hat{\beta}_{NL0} + \sum_{i=1}^k \bar{X}_{NLk} \hat{\beta}_{NLk} - \sum_{i=1}^k \bar{X}_{Lk} \hat{\beta}_{Lk} + \sum_{i=1}^k \bar{X}_{Lk} \hat{\beta}_{Lk} - \hat{\beta}_{L0} - \sum_{i=1}^k \bar{X}_{Lk} \hat{\beta}_{Lk} \\ &= \underbrace{\sum_{i=1}^k (\bar{X}_{NLk} - \bar{X}_{Lk}) \hat{\beta}_{NLk}}_{\hat{\delta}_x \text{ (explained component)}} + \underbrace{(\hat{\beta}_{NL0} - \hat{\beta}_{L0}) + \sum_{i=1}^k \bar{X}_{Lk} (\hat{\beta}_{NLk} - \hat{\beta}_{Lk})}_{\hat{\delta}_s \text{ (unexplained component)}} \end{aligned}$$

According to this decomposition, the mean differences in the mental health scores may differ from one group to another for two reasons. First, because the characteristics are not the same in group “L” and in group “NL” (differences in predictors). This explained part of the deviation is denoted by $\hat{\delta}_x$ and is known as the “endowments effect” (BenJann, 2008). The second part, denoted as $\hat{\delta}_s$, measures the contribution of differences in the coefficients (including differences in the intercept) and designates the unexplained difference because the differences in observable characteristics do not allow us to account for it.

In several studies, this unexplained part measures the discrimination between two groups, meaning, a difference in treatment that is only due to belonging to one group rather than the other. In other words, this difference can be assimilated into a causal effect under the hypothesis of conditional independence within the framework of the potential outcome approach (Rubin, 1974). Explicitly, the treatment variable corresponds to the membership variable to the group “L,” which is a dummy variable T : $T_i = 0$ if the individual $i \in NL$ and $T_i = 1$ if the individual $i \in L$.

Given S_i as the outcome variable, then $S_i(0)$ if $T_i = 0$ and $S_i(1)$ if $T_i = 1$. At any given point in time, for a given individual, we do not observe the two potential mental health scores at the same time but only the effective realization of the outcome variable depending on whether the individual belongs to the “L” group or to the “NL” group: $S_i = (1 - T_i)S_i(0) + T_iS_i(1)$. Based on the stable unit treatment value assumption (STUVA), Rubin defines the treatment effect (the impact of job loss) as the quantity $S_i(1) - S_i(0)$ and the average treatment effect on the treated (ATT) as:

$$ATT = E [S_i(1) - S_i(0)|T_i = 1] = E [S_i(1)|T_i = 1] - E [S_i(0)|T_i = 1]$$

The average treatment effect can be estimated empirically by the unexplained component resulting from the decomposition of Blinder-Oaxaca, given the average characteristics in the “L” group valued as that of the individuals of the “NL” group (noted as, $\sum_{i=1}^k \bar{X}_{Lk} \hat{\beta}_{NLK}$) is a consistent estimator of $E [S_i(0)|T_i = 1]$.

5. Results and discussion

5.1. General assessment of mental health indicators

In Table 3, we calculate seven mental health indicators for all the individuals included in the sample. As mentioned above, the raw total scores are derived from the WHO-5 questionnaire and range from 0 to 25, where 0 represents the worst possible mental health and 25 represents the best possible mental health. These scores are generally compared to the mean score of the population. Our results show that 37.75 percent of individuals had overall mental health scores lower than the mean population score (estimated at 16,921). This rate varied according to the sociodemographic characteristics of the individuals: 41.7 percent of individuals living in rural areas had scores lower than the average score of the total population, while this rate was estimated at 36.06 percent for people living in urban areas. A slight difference was observed between the estimated rate for men (38.52 percent) and that for women (36.65 percent); however, this rate varied considerably depending on the age group. A total of 31.65 percent of individuals between 18 and 29 years of age had scores lower than the mean score of the population, while this rate exceeded 44 percent for people between 50 and 64 years of age. Similarly, we estimate the highest rate among individuals living in large families, which was around 40 percent. This rate dropped to 36.64 for individuals living in households made up of three to four people and to 33.33 percent for households made up of one or two individuals. The rate decreased each time the level of education increased; it was estimated to be over 40 percent for individuals with basic and less than basic levels and 27.7 percent for individuals with higher education levels. This rate was also 39.15 percent for married individuals and 32.85 percent for unmarried individuals (never married, divorced, or widowed), while those living with children under the age of six at home had the highest rates (39.18 percent).

Conversely, the third column of Table 3 presents the proportion of people suffering from depressed mood, decreased energy, and loss of interest. Our results show that 29.2 percent of individuals had a depressed mood after the first wave of COVID-19 in Tunisia. The highest rates were estimated among individuals aged over 50 years (34.9 percent), individuals with a less than basic educational level (37.5 percent), individuals living in families made up of at least five people (32.05 percent), married people (30.89 percent), and women (29.5 percent). The second symptom was decreased energy, the highest rates of which were estimated for men (34.86 percent) and people aged 40 years and over (37 percent).

Furthermore, 41.66 percent of individuals with a less than basic educational level suffered from this second symptom. For individuals living with children under the age of six, this rate was estimated to be 38.5 percent. As for the third symptom, our estimates show that only 10.5 percent of individuals experienced a loss of interest. Unlike the other two symptoms, loss of interest was more common in individuals aged between 30 and 39 years old, individuals living in households made up of one or two people, and unmarried persons, with rates estimated at 11.28 percent, 11.25 percent, and 13.6 percent, respectively.

Based on these three symptoms, we are able to classify individuals as having three types of depression: mild, moderate, and severe. Of the individuals included in the sample, 31.6 percent suffered from mild depression, and the highest rates were estimated among men (32.14 percent), individuals aged between 50 and 64 years (37.92 percent), married people (33.09 percent), and those who did not have a basic educational level (40.83 percent). The mild depression type included individuals who had either depressed mood symptoms or both decreased energy and loss of interest at the same time.

Moderate depression was identified in individuals with two symptoms at the same time, either depressed mood and decreased energy or depressed mood and loss of interest. We estimate that 20.2 percent of people had moderate depression, with individuals over 50 years old (24.90 percent) and women being the most affected (20.87 percent) compared to men (19.72 percent). The rate of young people aged between 18 and 29 years old affected by moderate depression is estimated at 14.78 percent, and that of individuals who had completed a higher educational level at 12.74 percent. The lowest rates are estimated for unmarried individuals (16.75 percent) and for those living in a family of no more than two people (15.83 percent).

Individuals are considered to have severe depression if they experienced a depressed mood, decreased energy, and loss of interest at the same time. Our estimates show that 4.1 percent of people had severe depression. Similar to the other two types of depression, the highest rates were estimated among individuals aged between 50 and 64 years old (5.47 percent), those living in large families (4.6 percent), and individuals with a less than basic educational level (6.04 percent). This rate decreased when the educational level increased.

On the other hand, no difference was observed between married and unmarried individuals or between individuals living with children under age six. However, a clear difference was observed between individuals who had lost their jobs (hereafter, “group_1”) and those who had maintained their status in the labor market during the COVID-19 crisis (hereafter, “group_2”).

5.2. Job loss and mental health indicators

As illustrated in Figure 2, all the mental health indicators of individuals who had maintained their employment status are significantly better than those estimated for individuals who had lost their jobs. The percentage of individuals with mental health scores lower than the mean

score of the total population was estimated at 37.83 in the second group, while this rate reached 43.83 percent in the first group.

In addition, the three symptoms of depression were more prevalent in individuals in the first group. Our results show that 34.93 percent of group_1 had a depressed mood, while this rate was estimated to be 29.4 percent for the second group. In addition, 47.26 percent of individuals in the first group felt a decrease in energy, while this rate was estimated at 32.95 percent in the second group. Regarding the loss of interest, we estimate that this symptom was present in 14.39 percent of group_1 and did not exceed 10 percent in group_2.

On the other hand, more than 40 percent of individuals who had lost their jobs had mild depression; however, this rate is estimated at 31.36 percent for those included in the second group. We estimated that more than a quarter of the first group had moderate depression, and around 5.5 percent had severe depression. However, these two types of depression (moderate and severe) affected 19.85 percent and three percent of individuals in the second group, respectively.

To understand this difference, we present the following in-depth analyses, which attempt to explain the difference in mental health scores between individuals who had remained in the same labor market status and those who had lost their jobs. To do this, we use the Blinder-Oaxaca decomposition, which allows us to estimate two components (explained and unexplained).

In Table 4, we present the three regressions used to estimate the two components. The difference between the mean scores of the two groups is regressed on a set of explanatory variables included in a pooled combination, as recommended by Jann (2008). These variables were the age, gender, and marital status of the individual, educational level, respect for social discrimination, household income stability, size of the household, presence of children aged under six at home, and level of fear of individuals concerning the country's economic situation. Most variables were significant at the five percent level, except for education level, which was significant at the 10 percent level, and age, at 15 percent. However, we find that the two variables (gender and marital status) are not relevant in the pooled model.

In Table 5, the decomposition output reports the mean predictions by group and their differences in the first panel. In our sample, the mean mental health score is 17.03 for individuals in the second group (unaltered status) and 15.15 for the first group (job loss), yielding a score gap of 1.88.

In the second panel of the decomposition output, the score gap is divided into two parts.

The first part reflects the mean improvement in the scores of the individuals in the first group if they had the same characteristics as those of the second group. Differences observed in the stability of household income account for about 80 percent of the explained part of the outcome differential, whereas the other variables do not seem to matter much.

The second part quantifies the change in the scores of individuals who lost their jobs when applying the coefficients estimated from the pooled model to the first group characteristics. This is unexplained by the differences in the characteristics of the two groups, which can be attributed to the fact that they belong to one group rather than the other; in other words, it is the average effect of job loss on the mental health of individuals in the first group.

6. Conclusion and policy recommendations

In this study, we investigate the impact of job loss on the mental health of individuals in Tunisia during the COVID-19 crisis using several mental health indicators and based on the counterfactual decomposition technique. The data used in this work are derived from the ERF COVID-19 MENA Monitor Household Survey, which was primarily fielded in November 2020. This survey covers demographic and household characteristics, education and children, labor market situation, employment and detection of unemployment, attitudes toward risks, and mental health.

The mental health module is based on the WHO-5 items that tap into the subjective well-being of the respondents. From it, we calculate seven mental health indicators for all the individuals included in the sample, which are the proportion of people with a gross total score lower than the average population score, three depression symptoms (depressed mood, decreased energy, and loss of interest), and three types of depression (mild, moderate, and severe). The results show that three out of 10 people were in a depressed mood between October and November 2020. Decreased energy symptoms were present in four out of 10 people, particularly in individuals aged between 50 and 64 years old and those with less than basic education, regardless of their age. Compared to the other symptoms, the loss of interest symptom was not dominant during the COVID-19 crisis. In addition, almost one-third of the individuals included in the sample were mildly depressed, one-fifth of them suffered from moderate depression, and almost 41 in a thousand individuals experienced severe depression.

Our findings also show that the age of individuals and the size of the household can influence mental health and that having a higher level of education can strengthen individuals' resilience against mental effects during the COVID-19 crisis. However, we have not been able to observe that mental health indicators constantly differ according to the sex or marital status of the individuals. In addition, these last two variables did not contribute to the explanation of differences in mean scores calculated for individuals who had lost their jobs and those who had maintained their status in the labor market during the COVID-19 crisis.

By applying the counterfactual decomposition technique, our results show that mental health is significantly better in the second group than in the first group. There is clear evidence that the instability of household income caused by job loss has significantly contributed to the worsening of individuals' mental health.

By decomposing the difference in the mean scores of the two groups, no evidence shows that age, household size, and fear of the country's economic situation can explain the difference observed between the scores of individuals who had lost their jobs and those who had maintained their job status. This difference is mainly due to the household income stability variable, which, in turn, is strongly linked to the protection of employment status in the labor market. These results call into question the effectiveness of social measures and the decisions taken during this period of crisis, particularly the aid granted to companies to encourage them to grade their workers.

From this research, several policies and suggestions are recommended. Other than financial aid to encourage firms to keep their workers, psychological support policies intended for vulnerable groups (such as elderly individuals and those with a low level of education) should have been implemented. These can strengthen the capacity to resist health shocks, such as the crisis caused by COVID-19. There is an urgent need to establish a job loss insurance system managed by an independent fund bringing together employees made redundant for economic or technical reasons as well as graduates who completed their higher education and have been unemployed for some time by supporting and accompanying them in the implementation of projects. Even though these unemployment benefits may seem costly for the time being, their positive effects on social and economic conditions in the long run are highly important; they keep the unemployed linked to the labor market, thereby avoiding more costly economic, social, and mental health consequences in the future. In addition, informal workers are encouraged to participate in the social security system to receive benefits in the event of job loss or old age.

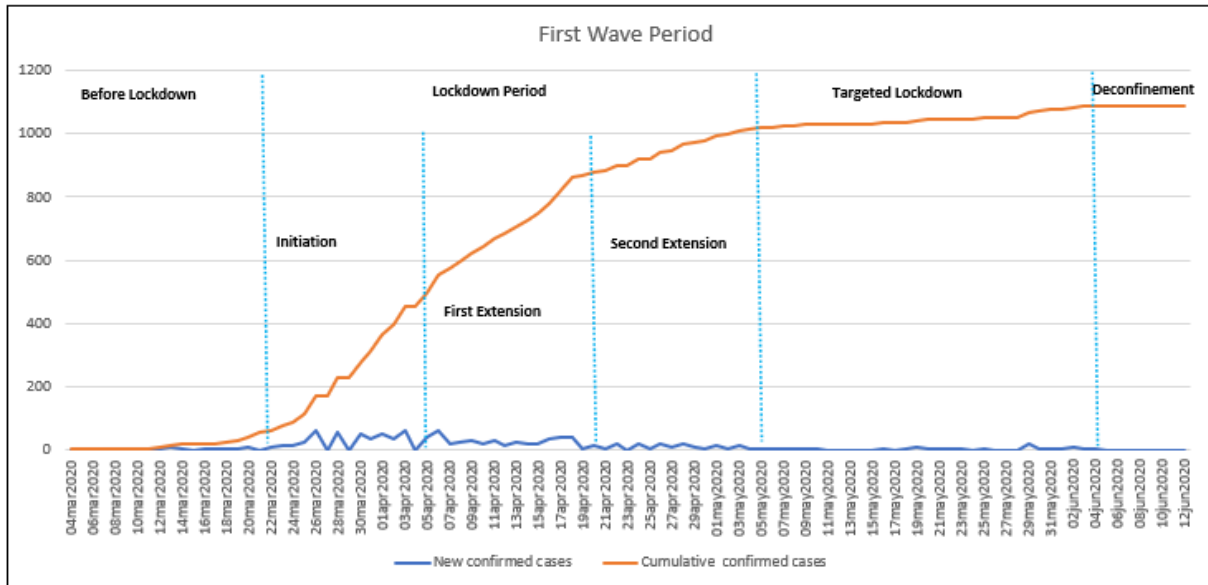
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Figure 1. Evolution of cumulative confirmed COVID-19 cases and daily new confirmed cases during the first wave in Tunisia



Source: Nasri et al. (2022).

Figure 2. Comparison of mental health indicators between G_1 and G_2

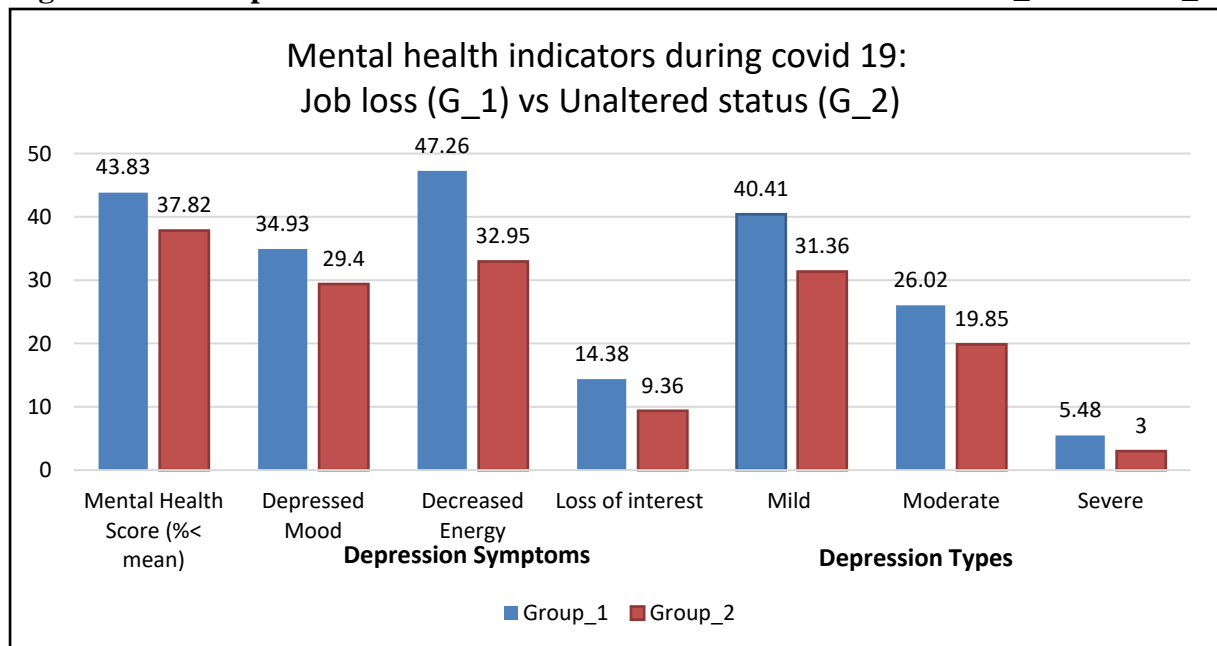


Table 1. Labor market outcomes transition between February and October 2020

Labor market status in February 2020		Labor market Status in October 2020			
Sample Size	Sample share (%)	keeping the same status	Transition to Unemployment	Job loss	Switched to another status
Farmer	75	3.75	88	5.33	6.67
Business owner/self-employed	290	14.50	84.48	9.65	5.87
Public wage	233	11.65	94.42	4.30	1.28
Private wage	655	32.75	81.98	15.89	2.13
Total	1253	62.65	85.23	11.66	3.11
Unemployed	126	6.30	77.78	0	22.22
Out of Labor force	621	31.05	93.08	2.25	4.67
Total	2000	100			

Table 2. The WHO-5 Well-Being Index: Instructions and scoring principle

Over the past two weeks...	The WHO-5- questionnaire					
	All of the time	Most of the time	More than half the time	Less than half the time	Some of the time	At no time
1- I have felt cheerful and in good spirits	5	4	3	2	1	0
2- I have felt calm and relaxed	5	4	3	2	1	0
3- I have felt active and vigorous	5	4	3	2	1	0
4- I woke up feeling fresh and rested	5	4	3	2	1	0
5- My daily life filled with things that interest me	5	4	3	2	1	0

Table 3. Mental health: Score, symptoms, and depression types

		Mental Health	Symptoms			Depression Types		
		score (% <mean)	B1	B2	B3	Mild	Moderate	Severe
Overall		37.75	29.2	34.4	10.5	31.6	20.2	4.1
Location	Rural %	41.7	31.15	39.86	13.4	34.33	22.11	6.36
	Urban %	36.06	28.36	32.07	9.26	30.43	19.38	3.13
Gender	Female %	36.65	29.5	33.73	6.91	30.82	20.87	2.8
	Male %	38.52	29	34.86	13.01	32.14	19.72	5.01
Age	18–29	31.56	24.27	29.19	10.95	26.09	14.78	2.55
	30–39	36	25.38	33.40	11.28	28.41	17.35	4.12
	40–49	39.47	32.32	37.1	9.32	34.05	24.07	4.33
	50–64	44.15	34.9	38.3	10.37	37.92	24.90	5.47
HH size	1–2	33.33	25	31.25	11.25	28.75	15.83	3.75
	3–4	36.64	27.3	33.57	10.04	29.66	18.91	3.66
	≥ 5	39.93	32.05	36	10.72	34.13	22.53	4.6
Marital status	Married %	39.15	30.89	35.77	8.72	33.09	22.16	4.08
	Not married %	32.86	26.23	32	13.6	29	16.75	4.12
Education levels	Less than basic%	45.83	37.5	41.66	13.54	40.83	25.41	6.04
	Basic %	42.33	30.33	42	15.33	35.33	23.66	5
	Secondary%	36.87	29.15	32.54	9.54	30.71	20	4.05
	Higher education%	27.7	19.78	24.83	5.71	20.87	12.74	1.53
Children under age six at Home	Yes %	39.18	27.6	38.5	9.88	30.32	19.93	4.25
	No %	37.15	29.86	32.7	10.75	32.13	20.31	4.03

B1: Depressed Mood; B2: Decreased Energy and B3: Loss of interest

Table 4. Covariates and regression results

Covariates	Sample	Model 1	Model 2	Pooled Model	
	Label	coefficients	coefficients	coefficients	Sig ^a
Age	COR5	-.0367043 (0.02) ^b	.0024046 (0.05)	-0.0307464	*
Education level	COR14	.2808552 (0.18)	.7900822 (0.54)	0.3266413	**
Respect of social distance	COR41	-2.149504 (0.59)	-4.354863 (1.92)	-2.365476	***
Marital status	COR7	.4238517 (0.45)	.1614637 (1.30)	0.3738509	
Household's income stability	COR23	.9258828 (0.17)	.9668539 (0.55)	0.9380525	***
Gender	COR6	-.6071867 (0.44)	1.797182 (1.27)	-0.2722172	
HH size	COR9	-.2341163 (0.09)	.0961547 (0.28)	-0.2081632	***
Worry about Economic situation	COR35	-.3739039 (0.18)	-.8723501 (0.54)	-0.4268047	***
Constant	--	20.37894 (1.59)	15.94243 (4.63)	19.95548	***

(a)* significant at 15 percent, ** significant at 10 percent, *** significant at five percent. (b) Standard deviation

Table 5. Blinder-Oaxaca decomposition outcomes

Blinder-Oaxaca decomposition		Number of obs = 1,214				
1: T = 0						
2: T = 1						
Scores	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
Differential						
Prediction_1	17.0309	.1914163	88.97	0.000	16.65573	17.40607
Prediction_2	15.15068	.5760496	26.30	0.000	14.02165	16.27972
Difference	1.880214	.6070201	3.10	0.002	.6904765	3.069951
Decomposition						
Explained	0.6219107	.178526	3.48	0.000	.2720061	.9718152
COR5	-0.0705					
COR14	0.0853*					
COR23	0.4930***					
COR9	0.0825*					
COR35	-0.0381					
Unexplained	1.258303	.5901864	2.13	0.033	.1015592	2.415047

* Significant at 15 percent, *** significant at five percent.