Mental health in selected MENA countries during COVID-19: an empirical investigation

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Received 3 June 2023
Revised 26 October 2023
20 November 2023
Accepted 5 December 2023

Abstract

Purpose – The outbreak of COVID-19 not only had serious negative impacts on the world economy but also on the global mental health because of the psychological disorders associated with the spread of the pandemic, the increased degree of uncertainty and the unprecedented measures taken by different countries to face the pandemic's spread. This paper analyses the mental health well-being of individuals in selected MENA countries (Jordan, Morocco, Tunisia and Egypt) during the pandemic.

Design/methodology/approach – The study employs a pooled OLS model using the Economic Research Forum (ERF) COVID-19 MENA Monitor Survey panel dataset collected during 2020 and 2021.

Findings – The findings show that there is no association between the mental health of individuals in the selected countries and their age, gender, family size, marital status, receipt of social support and participation in care work. Mental health improved at higher levels of education, being employed, being a rural area resident and living in Morocco or Tunisia compared to living in Jordan while it worsened as income declined, food insecurity and anxiety about being infected with Covid-19 increased, being a resident in camps, and during waves 4 and 5. Based on these results, it is recommended that suitable financial, physical and human resources should be directed towards the provision of mental health care services in the region. Also, mental health care services should be accessible to different population groups, with a special focus towards the most vulnerable since they are more prone to mental illnesses, especially during health crises and economic shocks. This should be accompanied by increasing awareness about the provided services and reducing stigma against mental illnesses. Furthermore, introduction of policies targeted towards reducing food insecurity and income instability can play a key role in enhancing mental well-being.

Originality/value – Although few papers have previously investigated the impact of COVID-19 on mental health in MENA countries, most of them have focused on a country-level analysis and adopted a gender perspective. Hence, this paper aims at exploring the association between mental health well-being and socio-economic factors in selected MENA countries during the pandemic.

Keywords Mental health, COVID-19, MENA countries, WHO-5 well-being index

Paper type Research paper

Introduction

The outbreak of Covid-19 had an unprecedented impact not only on the world economy, mortality, and morbidity but also on the mental well-being of individuals. Its negative repercussions on mental distress were associated with the lockdowns, quarantine, school closures, domestic violence upsurge, the fear of being infected with the pandemic or losing loved ones and movement restrictions imposed by different governments around the world which had led to separation from family and/or friends and restricted the individuals' freedom. This has been exacerbated by its adverse effect on local and global economies through the disruption of economic activity that led to business closures, contraction in

JEL Classification — I10, I18, C33

Review of Economics and Political Science
Emerald Publishing Limited
e-ISSN: 2631-3561
p-ISSN: 2356-9980
DOI 10.1108/REPS-06-2023-0050

production, job loss and a high degree of uncertainty about the future (Dong and Bouey, 2020; Shuwiekh *et al.*, 2022; UN Women, 2021).

Since the beginning of the outbreak, the World Health Organization had emphasized the significant negative impact of that health crisis on human health and well-being and has warned that it shall lead to an upsurge in mental and psychological distress; such as loneliness, anxiety, depression, self-harm and suicidal behavior (Al-Dhaheri *et al.*, 2021; Ben Salah *et al.*, 2022; Kumar and Nayar, 2021). Similar impacts were witnessed during the spread of the severe acute respiratory syndrome (SARS) epidemic in 2003, where anxiety, distress and depression were some of the main psychological disorders that resulted from it, yet its impact was less severe than that of COVID-19. Moreover, the traumatic stress of COVID-19 is a continuous ongoing stress that affected both those who did not suffer from mental health problems and those with a mental health history and hence shall lead to more severe post-traumatic stress disorder symptoms as evidenced by research on SARS and Middle East respiratory syndrome (Boden *et al.*, 2021).

Only few studies have tackled the impact of COVID-19 on mental health in the MENA region, mainly through a gender perspective, although the region is a very sensitive area that faces multiple economic and political challenges. In addition to that, the MENA countries suffered from a higher than the global average burden of mental health before the outbreak of COVID-19 where the Arab Barometer's survey reported that around 35% of the respondents suffered from stress and 29% suffered from depression. Also, the share of mental disorders in the Eastern Mediterranean region reached 5.6% of the total disease burden in 2013. Hence, the region was already suffering from poor mental health before the pandemic and which is expected to have exacerbated after its outbreak (Ibrahim, 2021; Spinardi *et al.*, 2022; Thomas, 2019).

Moreover, the region has been suffering from historical traumas due to political turmoil that resulted from the Iraqi gulf wars, the Arab spring, and Syrian and Libyan civil wars. Hence, COVID-19's traumatic stress is expected to be exacerbated in those countries especially in light of the negative impact of the Russian-Ukrainian war on the region. Accordingly, special attention needs to be directed towards mental health in the region (Shuwiekh *et al.*, 2022; Süß and Weipert-Fenner, 2022).

Hence, the paper aims at investigating the association between mental health and the socio-economic factors in selected MENA countries (Jordan, Morocco, Tunisia and Egypt) during the pandemic. That relationship shall be estimated through employing a pooled OLS model where the Economic Research Forum (ERF) COVID-19 MENA Monitor Household Survey collected over five waves during 2020 and 2021 will be utilized and the WHO-5 mental well-being index will be used to measure mental health during the study period. The paper will be divided into 4 sections. Section I will review the literature and explore the key findings reached by previous studies. Section II will provide a description of the survey data and the methodology employed in the study. This will be followed by Section III which will present a descriptive and an empirical analysis of the association between mental health and the socio-economic factors during the pandemic. And the last section concludes the paper with policy implications and data limitations.

Literature review

Although the impact of COVID-19 on mental health has been studied extensively in the literature in both developed and developing countries, it has been under-researched in the MENA region. Furthermore, most of the studies focused on evaluating the impact of COVID-19 on mental health of the general population in contrast to few studies that focused on the mental health of subgroups in the population, such as women (Farrell *et al.*, 2020; Wu *et al.*, 2020; Ravaldi *et al.*, 2020; Sieverding *et al.*, 2023; Spinardi *et al.*, 2022) and health care workers (Azam *et al.*, 2022; Davico *et al.*, 2021; García-Fernández *et al.*, 2022; Sabbah, 2022; Shreffler *et al.*, 2020).

Throughout those studies, the dependent variable is mental health and is mainly measured through the Impact of Event Scale-Revised; the Depression, Anxiety and Stress Scale; WHO Well-being Index; Personality Inventory for DSM-5–Brief Form–Adult and General Anxiety Disorder-7. The independent variables utilized included a wide range of socio-economic factors; such as marital status, age, educational level, employment, place of residence and household size.

Across different countries, mental health was found to have worsened during the pandemic, however the mental stressors and individuals' characteristics suffering from mental disorders have differed. Although anxiety and depression were found to be key stressors that affected the mental health of individuals in most studies (Cayo-Rojas, 2021; Lee *et al.*, 2021; Mmanga *et al.*, 2023; Verma, 2020; Villatoro *et al.*, 2022; Wang *et al.*, 2020; Zhang and Ma, 2020), other stressors included loneliness (Chandola *et al.*, 2020; Lee *et al.*, 2021) and stress (Ma *et al.*, 2020; Wang *et al.*, 2020).

Age and gender were found to be key factors that were associated with suffering from mental disorders in most studies where females and youth were found to be affected by the pandemic more than men and the elderly (Davico *et al.*, 2021; Mmanga *et al.*, 2023; Qiu *et al.*, 2020; Wang *et al.*, 2020). However, no significant impact was found for age and gender on the mental health of 403 Peruvian dentistry students by Cayo-Rojas *et al.* (2021).

Having a history of mental illness and medical problems, being infected with a chronic disease, and having an infected relative with Covid-19 increased the severity of mental disorders during the pandemic (Mazza *et al.*, 2020). Also, attaining higher levels of education were found to have an adverse effect on mental health (Mmanga *et al.*, 2023). Students were found to be among the most affected population groups due to a wide variety of reasons related to the fear of losing loved ones, lack of activity, worries about finances and future jobs in addition to taking care of families. Furthermore, long school closures and the uncertainties associated with online education exacerbated the negative consequences of the pandemic (Lee *et al.*, 2021; Wang *et al.*, 2020). Results regarding the marital status and employment were inconclusive. Although Ma *et al.* (2020) found a positive impact of marital status on mental health of 728 individuals in mainland China during April 2020, Cayo-Rojas (2021) did not find any significant impact. Similarly, Ma *et al.* (2020) did not find any significant impact of employment on mental health in contrast to Chandola *et al.* (2020) who found a negative impact of unemployment on mental health and Pierce *et al.* (2020) who found a negative impact of employment on mental health.

In accordance with the global literature, the literature in the MENA region has reached similar results. Anxiety, depression and stress were found to be the key stressors in Egypt, Qatar and Iran (El-Zoghby *et al.*, 2020; Farrell *et al.*, 2020; Shahriarirad *et al.*, 2021). Mental distress was found to be most prevalent among females, youth, university students, urban area residents, individuals suffering from chronic diseases, being employed, watching/reading news about the pandemic, lack of emotional support from family and society and after introduction of the quarantine measures (Alkhamees *et al.*, 2020; Arafa *et al.*, 2021; Farrell *et al.*, 2020; Fawaz and Samaha, 2020).

In contrast, no significant impact of age and gender was found on mental health in Saudi Arabia (Alsaqri *et al.*, 2020) and among university students in the United Arab Emirates (Drissi *et al.*, 2020). Also, Shahriarirad *et al.* (2021) found that being more informed about the disease and being older had a protective impact against mental disorders, while being a member of a large family increased the risk of suffering from anxiety among the general population in Iran. Furthermore, he found that higher education had a positive impact on mental health similar to the results reached among a panel of 18 MENA countries by Al-Dhaheri *et al.* (2021) and in Saudi Arabia by Alkhamees *et al.* (2020). However, Abdel-Fattah *et al.* (2020) concluded that medium-educated participants suffered from higher levels of anxiety and depression compared to low and high educated participants in Cairo and Giza during the period (October 2019–April 2020).

Results regarding the marital status were inconclusive. Although Shahriarirad *et al.* (2021) found a positive impact on mental health in Iran, Alsaqri *et al.* (2020) found a negative impact. On the other hand, Al-Dhaheri *et al.* (2021) did not find any significant impact. Also, previous mental health problems or pregnancy complications were found to have no significant impact on the mental health of perinatal women in Qatar during June and July 2020 (Farrell *et al.*, 2020). Moreover, health care workers were found to suffer more from mental disorders (Alkhamees *et al.*, 2020; Shariarid *et al.*, 2021) in contrast to the results reached by Davico *et al.* (2021).

Using a panel of 7 Arab countries, the impact of COVID-19 on mental health was examined by Shuwiekh *et al.* (2022) through conducting a survey that covered 1374 participants during April and May 2020. Similar to previous studies, the pandemic was found to have a negative impact on mental health in most Arab countries, especially Egypt, which was significantly affected by income, religion and age in contrast to education. From a gender perspective, Barsoum and Majbouri (2021) and Sieverding *et al.* (2023) analyzed the impact of the pandemic on women's subjective well-being in Jordan, Egypt, Morocco, Tunisia and Sudan. Worse subjective well-being for women was associated with employment, income loss, limitations in food access and time spent on housework while no significant impact was found for transfer payments. In contrast, Spinardi *et al.* (2022) did not find any significant impact of shifts in the labor market status, income loss and number of coping strategies on the mental well-being of women while food insecurity had a negative impact similar to previous studies.

Furthermore, systematic reviews were conducted by Serafini *et al.* (2020), Semo and Frissa (2020), Xiong *et al.* (2020), Lu and Lin (2021) and OECD (2021). Prevalence of mental health problems was found to be associated with unemployment due to the pandemic, income uncertainty, salary reduction and suffering from chronic diseases or disabilities. Also, mental health problems were found to be more prevalent among women, privately employed individuals, the disadvantaged groups and those who are frequently exposed to social media; however, results regarding age and gender were inconclusive.

Also, Singh *et al.* (2020) reviewed the impact of the pandemic on the mental health of children and adolescents. They concluded that children and adolescents were affected by the pandemic due to school closures associated with disruption in education and lack of socialization opportunities, an increase in child labor for underprivileged families and the incapability of poor families' children of having an adequate access to online learning offered during the pandemic. This has been associated with violence against children due to financial difficulties faced by poor families and separation of children from their families because of being infected with COVID-19. Similar results were reached by Nearchou *et al.* (2020) and Panchal *et al.* (2021).

To conclude, although the impact of the pandemic on mental health has been widely investigated globally, the results were inconclusive especially in the MENA region. Most studies have focused on analyzing that relationship on a country-level while only a few examined it across a number of countries in the MENA region and mainly adopted a gender perspective. However, gendered roles were proven to have less impact than expected in selected countries in the region by Sieverding *et al.* (2023). Hence, this study aims at gaining a more holistic and comprehensive understanding of that relationship across selected MENA middle-income countries.

Materials and methods

This paper utilizes the ERF COVID-19 MENA Monitor Household Survey where a panel dataset was collected by the ERF using a series of short panel mobile phone surveys over five waves between June 2020 and August 2021 (OAMDI, 2021). The survey was conducted in five MENA countries, which are: Jordan, Morocco, Tunisia, Egypt and Sudan, where between two to four surveys were conducted in each country starting with an initial sample of around 2000 individuals. The study will focus on Jordan, Morocco, Tunisia and Egypt since they are lower

middle-income while Sudan will be excluded since it is a low-income country. Table 1 shows the number of participants in each country per wave.

Participants in the survey were mobile phone users aged 18–64 years. The sample was selected based on random digit dialing, with up to three attempts if a phone number was not picked up/answered, was disconnected or busy, or picked up but could not complete the interview at that time. Weights were created to account for the sampling strategy and non-response by observable characteristics relative to the population of 18–64-year-old phone owners in nationally representative pre-COVID-19 in-person surveys.

The survey covered topics such as demographic and household characteristics, education and children, employment characteristics, social distancing, mental health in addition to a number of other indicators and modules related to farmers, workers, women and household enterprises. The survey considered the key demographic and socio-economic characteristics of each country in the questionnaires' design to understand the different distributional consequences of the COVID-19 impact and responses to it.

The data collection procedure underwent Institutional Research Board (IRB) approval. The survey was harmonized by the ERF to create comparable data that can facilitate cross-country and comparative research. All the COVID-19 MENA Monitor Surveys incorporate similar survey designs, with data on households and individuals within those households.

In order to estimate the association between different socio-economic factors and mental health during the pandemic in the MENA region, a descriptive analysis shall be presented in addition to estimating a pooled OLS model using STATA 14. Pooled OLS is adopted to capture the association between both time variant and time invariant variables with the mental well-being. Also, country and time dummies are added to the model to account for unobserved heterogeneities across countries and variations over time and sampling weights are used in the estimation procedure.

The pooled OLS model takes the following form:

$$Y_{it} = \alpha + x'_{it}\beta + \varepsilon_{it}$$

Where

Y_{it}: dependent variable

α: intercept

x'_{it}: vector of independent variables

β: vector of parameters to be estimated

ε_{it}: error term

Wave	Country				
	Jordan	Morocco	Tunisia	Egypt	Total
W1:Jun-2020				1923	1923
W1: Nov-2020		2007	2000		4007
W2:Feb-2021	2549	2002	2077	2000	8628
W3:Apr-2021		2105	2057		4162
W4:Jun-2021	2503	2006	2009	2007	8525
W5:Aug-2021	2573				2573
Total	7625	8120	8143	5930	29,818

Source(s): Prepared by the author

Table 1. COVID-19 MENA Monitor Survey by country and wave

The dependent variable (mental health) is measured through using the World Health Organization's five-question module to measure self-reported mental well-being. The five component questions aimed at evaluating the feelings of an individual during the pandemic on a scale from 0 "at no time" to 5 "all of the time" through inquiring about the following:

(1) Felt cheerful and in good spirits;

(2) Felt calm and relaxed;

(3) Felt active and vigorous;

(4) Woken up feeling fresh and rested;

(5) Felt their daily life has been filled with things that interest them.

In order to create a single variable that measures the mental health of the respondents in the study, the WHO-5 mental well-being index is calculated through summing the scores of each individual for each one of the five questions which scores from 0 (worst possible quality of life) to 25 (best possible quality of life). Then the result is multiplied by four to have a 0–100 scale, with 100 representing the best mental well-being. A score below or equal 50 indicates poor mental well-being which may be secondary to a depressive disorder or other etiology and hence further investigation needs to be made especially regarding suffering from depression (Psykiatric Center North Zealand, 2022).

The index has been validated in various contexts as a representative of the individual's mental health (Downs *et al.*, 2017; Krieger *et al.*, 2014; Topp *et al.*, 2015). It has also been validated internally through the utilization of the Cronbach's alpha test which showed a coefficient greater than 0.7 indicating a high degree of internal consistency in addition to fulfilling the Mokken analysis for scalability (De Wit *et al.*, 2007; Omani-Samani *et al.*, 2019; Tavakol and Dennick, 2011). Furthermore, the items included in the index resemble some of the subscales used by SF-36 and ICD-10 in measuring mental health disorders (Bech *et al.*, 2003).

Table 2 provides a description of the independent variables. The choice of the independent variables was based on previous studies conducted both globally and on a regional level and that were discussed in the previous section. Mixed results have been reached regarding the association between the chosen independent variables and mental health across different countries and hence they were chosen to analyze the association between them in the context of the MENA region. Age, gender, marital status, place of residence, educational level and employment have been used as independent variables in most of the studies.

Variables related to household size, anxiety about being infected with Covid-19, income, food insecurity, social assistance, and care work during the study period shall also be utilized. Results were mixed regarding household size, where Shahriarirad *et al.* (2021) found a negative impact of larger household size on mental health in contrast to Sempungu *et al.* (2023) who found a positive relationship.

Although anxiety about being infected with Covid-19 could have a negative impact on mental well-being due to the exposure to news about the pandemic through different platforms of social media and its devastating impact on health (Arafa *et al.*, 2021), it could also enhance mental well-being through an increase in awareness about it and the ways through which infection could be reduced or avoided (Shahriarirad *et al.*, 2021).

Food insecurity has been a major cause of mental disorders and has exacerbated since the onset of the pandemic (Amare *et al.*, 2021; Jones, 2017; Sieverding *et al.*, 2023; Spinardi *et al.*, 2022). Care work has been increased during the pandemic due to lockdowns and school closures and which mainly affected the mental health of females due to carrying out most of that type of work (Craig and Churchill, 2021; Hendy and Yassin, 2022; Möhring *et al.*, 2021). However, results were inconclusive where Seck *et al.* (2021) found a negative impact while Barsoum and Majbouri (2021) did not find any significant impact.

Independent variable	Description
Gender	Dummy variable that takes the value of 1 if the participant is a female and 0 if the participant is a male
Age	Age of the participant in years
Household size	A continuous variable that shows the number of individuals in a household
Place of residence	Categorical variable that takes the value of 1 if the place of residence is urban, 2 if the place of residence is rural and 3 if the place of residence is in a camp (Jordan only)
Educational level	Categorical variable that takes the following values (less than basic education, basic education, secondary education, higher education)
Marital status	Categorical variable that takes the following values (never married, currently married, widowed/divorced)
Employment	Dummy variable that takes the value of 1 if the participant is employed and 0 if the participant is non-employed
Income	Categorical variable that measures the change in household's total monthly income compared to February 2020 and takes the following values (decreased by more than 25%, decreased by 1–25%, stayed the same, increased by 1–25%, increased by more than 25%)
Anxiety	Categorical variable that measures anxiety about being infected with COVID-19 and takes the following values (not at all worried, a little worried, rather worried, very worried, I had it already)
Food security	Count variable that measures the level of food insecurity faced by anyone in the household during a week before due to five key limitations in access to food, which are: mobility restrictions, food shortages in markets, price increases, decline in income and reduced meals/portions. The variable ranges from (0–5)
Social support	Dummy variable that takes the value of 1 if the individual received irregular social assistance during the past month in the form of food, cash or other and 0 in case he did not receive it
Care work	Dummy variable that takes the value of 1 if women participated in housework (cooking, cleaning, house repairs, shopping or transporting family, tending children aged 0–5 years, caring for children aged 6–17 years, caring for adult ill/dependents) during the past seven days and 0 if they did not participate in any housework
Country	Categorical variable that takes the following values (Jordan, Morocco, Tunisia, Egypt)
Wave	Categorical variable that takes the following values (wave 1, wave 2, wave 3, wave 4, wave 5)

Source(s): Prepared by the author

Table 2. Independent variables' description

During the pandemic, labor markets have witnessed significant changes that led to an increase in the number of the unemployed where Khamis *et al.* (2021) found that around 34% of workers, on average, lost their jobs in 39 countries and the situation was not different in the MENA region where the unemployment levels increased compared to the pre-COVID levels (Elbehairy *et al.*, 2022). Hence, income was found to be a key indicator that affected mental health due to its impact on access to food and other goods and services (Alkhamees *et al.*, 2020; Sieverding *et al.*, 2023; Shuwiekh *et al.*, 2022). Although social assistance was provided to individuals during the pandemic, through an increase in regular assistance programs or through irregular assistance programs, as a way of providing financial protection against its negative repercussions, results reached by previous studies were mixed where a significant impact was found by Tham *et al.* (2021) and Ward and Lee (2022) in contrast to Sieverding *et al.* (2023).

Empirical results

Around 71% of the respondents were found to suffer from mental health problems with a mental health score of less than or equal 50. Based on Table 3, the prevalence of poor mental health problems was higher among females in Morocco and Egypt while it was slightly higher among males in Tunisia and Jordan. Regarding education, poor mental health was more prevalent among individuals with secondary education (71.9%) followed by those with less than basic education (70.4%), basic education (69.1%), and higher education (67.9%). Poor mental health was also more prevalent among those who resided in camps (84.8%) while it was less prevalent in rural areas (71.6%) and urban areas (71.4%).

Prevalence of poor mental health reached 73.3% among the non-employed compared to the employed (66.6%) and among the married (72.2%) compared to the widowed or divorced (71.3%) and the never married (65.2%). Also, it was more prevalent among individuals who witnessed a decline in their income (73%), who were very worried about being infected with COVID-19 (75%) and who faced a larger number of limitations in access to food where it reached 91% among those who faced five limitations (Figure 1). Although the studied sample across Jordan, Morocco, Tunisia and Egypt suffered from poor mental health through different waves of the pandemic, there was a significant increase during wave 4 as shown in Figure 2.

Results of the pooled OLS model are displayed in Table 4. Similar to previous studies, gender, age and household size did not have a significant impact on mental well-being (Alsaqri *et al.*, 2020; Cayo-Rojas, 2021; Davico *et al.*, 2021; Drissi *et al.*, 2020; Ma *et al.*, 2020; Shahriarirad *et al.*, 2021), while a positive significant relationship was found between residing in rural areas compared to living in urban areas in contrast to living in camps which had a negative impact on mental health with 8.6% points (Ma *et al.*, 2022; Menculini *et al.*, 2021;

Table 3.
Prevalence of mental health problems by country and gender

Country	Male	Female
Jordan	70.5%	69.9%
Morocco	59.3%	68.6%
Tunisia	72.1%	71%
Egypt	78.1%	82.8%

Source(s): Prepared by the author

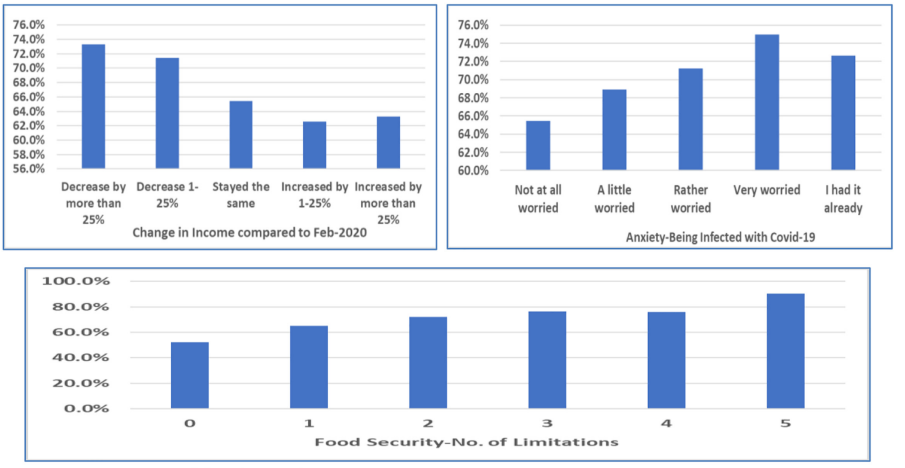
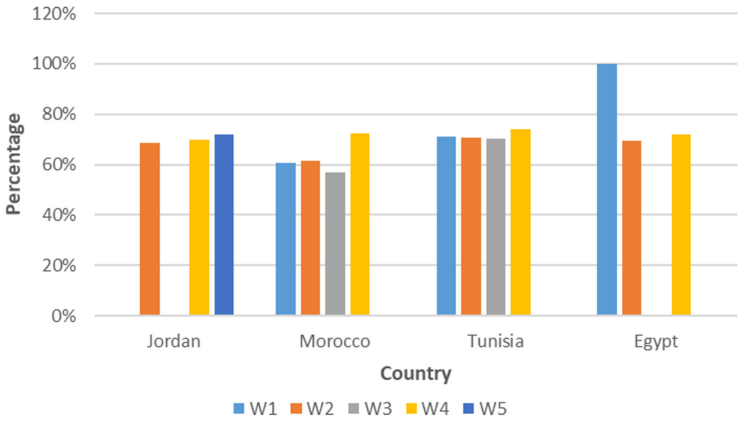


Figure 1.
Poor mental health prevalence by income, anxiety and food insecurity

Source(s): Prepared by the author



Source(s): Prepared by the author

Figure 2.
Poor mental health prevalence across different countries by wave

Sagar *et al.*, 2022). This might be explained by the over crowdedness, high levels of pollution, reduced access to green areas, increased economic stressors and reduced social support in urban areas (Srivastava, 2009). In camps, refugees are more prone to suffer from poor mental health due to past trauma and ongoing stress accompanied with social isolation, language and employment barriers and financial hardships in addition to poor access to health care services including mental health services (Nowak *et al.*, 2023; Van de Wiel *et al.*, 2021).

Regarding the level of education, an improvement was witnessed in mental health as the educational level increased, since having a secondary or higher education increased the mental score by 1.8 and 1.4% points respectively compared to those who had a less than basic level of education in accordance with previous studies (Boden *et al.*, 2021; Qiu *et al.*, 2020). This might be due to the positive impact of attaining higher levels of education on physical health and improved health behavior and knowledge in addition to the increased level of awareness about the pandemic among individuals with higher levels of education and their better ability to adopt suitable coping strategies due to their greater economic and social resources (Di Crosta *et al.*, 2020; Kondirolli and Sunder, 2022).

Marital status did not have a significant impact on mental health in line with previous studies (Al-Dhaheri *et al.*, 2021; Cayo-Rojas, 2021). Being employed enhanced the mental health score by around 1.6% points compared to those who are non-employed similar to Barsoum and Majbouri (2021) and Xiong *et al.* (2020). This might be explained by the reduced anxiety about suffering from financial distress due to having a secure source of income (Lu and Lin, 2021).

Mental well-being was not affected by the irregular social assistance provided during the pandemic, which illustrates that the assistance might have been insufficient in coverage or scope in addition to the short-term nature of the assistance schemes that might have affected the capability of detecting any effects of the irregular assistance on mental health (Asaad *et al.*, 2022; Sieverding *et al.*, 2023). Also, social care work carried out by women did not have a significant impact on their mental health. The extra work carried out by women might have been outweighed with the positive impact of care work represented in family appreciation and cohesion in addition to gaining a sense of self-worth and accomplishment (Boye, 2010; Krantz *et al.*, 2005; Noor, 1997).

The decline in income compared to February 2020 had a negative impact on mental well-being which might be explained by the financial insecurity associated with uncertainty about

Variable	Coefficient	S.E.
Gender (reference category: male)		
Female	−3.935	3.347
Age	−0.0295	0.027
HH size	−0.117	0.116
Place of residence (reference category: urban)		
Rural	1.560**	0.617
Camp	−8.585**	4.240
Educational level (reference category: less than basic education)		
Basic	1.217	0.802
Secondary	1.840***	0.652
Higher Education	1.360*	0.717
Marital status (reference category: never married)		
Currently married	0.243	0.742
Widowed/divorced	−0.840	1.412
Employment (reference category: non-employed)		
Employed	1.628***	0.604
Income (reference category: stayed the same)		
Decreased by more than 25%	−3.334***	0.677
Decreased by 1–25%	−1.162*	0.674
Increased by 1–25%	1.066	1.201
Increased by more than 25%	1.453	1.644
Anxiety (reference category: not worried about being infected with COVID-19)		
A little worried	−1.892***	0.680
Rather worried	−1.905***	0.718
Very worried	−3.998***	0.770
Had been infected	−6.285***	1.110
Food security (reference category: no limitations/no change)		
1 limitation	−7.757***	0.875
2 limitations	−10.955***	0.816
3 limitations	−12.727***	0.862
4 limitations	−13.559***	0.940
5 limitations	−17.579***	1.007
Social support (reference category: did not receive irregular social support)		
Received support	0.0101	1.093
Care work (reference category: no care work)		
Carrying out care work	4.884	3.332
Country (reference category: Jordan)		
Morocco	3.183***	0.909
Tunisia	2.160**	0.846
Egypt	0.507	0.710
Wave (reference category: wave 1–2020)		
Wave 2 (Feb-21)	−0.940	0.953
Wave 3 (Apr-21)	0.473	1.083
Wave 4 (Jun-21)	−2.904***	0.937
Wave 5 (Aug-21)	−3.892***	1.214
Constant	50.745***	1.783

Note(s): ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Source(s): Prepared by the author

Table 4.
Pooled OLS model estimation

the pandemic's future economic consequences in addition to its impact on food insecurity, limited access to health-promoting goods and services and loss of control over the individuals' lives (Lu and Lin, 2021; Spinardi *et al.*, 2022; Yang *et al.*, 2022). Also, limitations in access to food negatively affected the mental well-being which worsened as the number of limitations experienced increased in accordance with the results reached by Shepherd (2022) regarding increased depression in South Africa due to anxiety about food access and shame of the methods adopted in access to food such as relying on others. Anxiety about being infected with COVID-19 worsened mental health especially if the individual had been infected by the pandemic which is consistent with the results reached by Xie *et al.* (2022).

Furthermore, mental health well-being declined during waves 4 (June 2021) and 5 (August 2021) compared to wave 1. This might be due to the increase in the number of infected individuals in addition to the decline in the economic performance of the studied countries during those waves compared to the pre-pandemic period.

Living in Tunisia and Morocco enhanced the mental well-being by around 2.2 and 3.2% points compared to living in Jordan, respectively. Extensive infrastructure for the delivery of public health services, including mental health, has been developed by Morocco, Tunisia and Jordan, yet resource constraints still prevail especially in the latter. Tunisia and Morocco had a score of 3 out of 5 on a summary scale of mental health integration in primary health care services while Jordan scored 2. The mental health facilities have reached 0.11 and 0.10 with 9.35 and 5.86 beds and 88.11 and 59.82 admissions per 100,000 population in Tunisia and Morocco respectively compared to 0.04 facilities, 3.70 beds and 28.62 admissions per 100,000 population in Jordan in 2019. Also, the mental health workforce per 100,000 population has reached around 8 in Tunisia and 6 in Morocco compared to 4 in Jordan. Morocco was also successful in reaching the six targets of the comprehensive mental health action plan [1] set out by the World Health Assembly in contrast to 4 and 2 targets achieved by Jordan and Tunisia, respectively (Economist Impact, 2023; World Health Organization, 2022).

In addition to that, the number of refugees and asylum seekers in Jordan has reached around 757,805 from Syria (88.5%), Iraq (8.8%), Yemen (1.7%) and other countries (1%) in 2021. Moreover, Jordan hosts more than 2 million Palestinians due to the Palestinian-Israeli conflict. Those traumatized individuals were found to suffer from mental health problems due to financial and structural barriers in access to mental health care services and widespread stigma in the community against mental illnesses. This has been exacerbated during COVID-19 due to isolation, social distancing, and loss of income (World Health Organization, 2023).

Furthermore, Morocco witnessed a growth rate of around 8% compared to 4.3% in Tunisia, 3.3% in Egypt and 2.2% in Jordan in 2021 (World Bank, 2023). Also, the unemployment rate declined in Morocco from 30% in November 2020 to 22% in April 2021 before rising to 28% in June 2021 due to seasonal changes in the agricultural sector. Similar reductions were witnessed in Tunisia where unemployment reduced from 38% in November 2020 to 28% in June 2021 (Krafft *et al.*, 2022; Marouani *et al.*, 2022). This might be explained by the adoption of both countries for a mix of support policies to firms and workers through emergency plans, extension of loan guarantees to firms, provision of interest rate subsidies, deferral of tax payments and social insurance contributions which might have had a positive impact on reducing mental disorders during the pandemic. Moreover, the Moroccan government adopted an action plan that included the provision of economic and social support to the population and was successful in targeting the poorest quartiles (Krafft *et al.*, 2021).

Discussion and conclusion

Being ranked as the ninth cause of the global burden of disease in 2017, global mental health disorders are a growing concern, and the MENA region is not an exception since it suffered from a higher than the global average burden of mental health prior to the outbreak of

COVID-19 (Ibrahim, 2021). Thus, the study explored the association between different socio-economic factors and mental health in selected MENA countries during the pandemic. Mental health was found to have worsened among individuals who are less educated, non-employed, whose income decreased, who faced a larger number of limitations to food access, who lived in camps, who had been infected with COVID-19, during waves 4 and 5 and who lived in Jordan compared to Morocco and Tunisia. However, no significant impact was found for gender, age, household size, marital status, care work and social support.

Based on the study's results, a number of policies are recommended. Suitable financial, physical, and human resources should be directed towards the provision of mental health care services in the region since only 2% of the government's health budget is currently allocated to mental health. Mental health services should be accessible to different population groups, with a special focus towards the most vulnerable, such as the less educated individuals, the non-employed and those who reside in camps since they are more prone to mental illnesses, especially during health crises and economic shocks. This should be accompanied by increasing awareness about the provided services and reducing stigma against mental illnesses (Ibrahim, 2021; Economist Impact, 2023; Witteveen *et al.*, 2022; World Health Organization, 2010). Also, policies related to food security should be adopted through the provision of in-kind food and vouchers for food purchase as well as increasing investment in social safety net programs. Support programs for businesses and individuals during disruptions and crises shall reduce the risk of job loss and decline in income and hence lessen the level of uncertainty and anxiety (Hoogeveen and Lopez-Acevedo, 2021; Spinardi *et al.*, 2022).

Similar to previous studies that investigated mental health during the pandemic, a key limitation of the study is utilizing self-reported questionnaires which might lead to respondent's bias or misreporting of data. Also, the survey data was collected based on representatives of mobile phone users aged (18–64) years and hence individuals aged less than 18 and greater than 64 might have had different experiences during the pandemic.

The study has analyzed the association between different socio-economic factors and mental health in selected MENA countries during COVID-19, where it adds to the previous literature in providing a comprehensive analysis regardless of the gendered roles. This shall assist the selected countries in drawing up policies related to enhancing mental health in general and in case of disruptions that affect the population's health. However, further research is needed to investigate the causality between different factors and mental health to gain a better understanding of the determinants of poor mental health in the region and in the studied countries.

Note

1. https://www.emro.who.int/mnh/mental-health-action-plan/index.html

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