





Statistical Analysis Plan

Date: 19 February 2021

Study title:	Impact of COVID-19 on Mental Health and Quality of Life: Is There Any Effect? A Cross-Sectional Study of the MENA Region	
Main investigator and corresponding author	Ayesha S. Al Dhaheri	Signature:  Date: 19 February 2021
Main investigator	Leila Cheikh Ismail	Signature:  Date: 19 February 2021
Co-investigator and biostatistician	Mo'ath F. Bataineh	Signature:  Date: 19 February 2021
Co-investigator and biostatistician	Maysm N. Mohamad	Signature:  Date: 19 February 2021

1. Objectives

To examine the impact of the COVID-19 outbreak on the mental health and quality of life among residents of the Middle East and North Africa region.

2. Sample size calculation

The minimum sample size (n=3246) was calculated using G*power software, version 3.1.9.4 (HHU, Germany) to detect a small effect size (0.10), with a power of 0.99, and alpha 0.05.

3. Inclusion criteria

- Age \geq 18 years old
- Residing in one of the eighteen countries included in the study (Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Republic of Yemen, Saudi Arabia, Sudan, Syria, Tunisia, and United Arab Emirates)
- Consenting to take part in the study

4. Measured variables retained for the analysis

Table 1: Sociodemographic

	Variables	Format	Description
1	Gender	Count	Gender: 1= Female; 2= Male
1	Age	Count	Age in years: 1=18-25 years; 2=26-35 years; 3=36-45 years; 4=>46 years
2	Marital status	Count	Marital status: 1= Married; 2= Single; 3= Divorced; 4= Widowed
3	Education level	Count	Level of education: 1= \leq College diploma; 2= University degree; 3= Post-graduate degree
4	Employment status	Count	Type of employment: 1= Full-time; 2= Part-time; 3= Unemployed
5	Working/Studying from home	Count	Working or studying from home: 1= Yes; 2= No; 3= Not applicable
6	Region of residence	Count	Region of residence: 1= Gulf region, 2= Levant region; 3= North Africa region

Table 2: Impact of Event Scale–Revised (IES-R)

	Variables	Format	Description
1	IES.1 Any reminder brought back feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
2	IES.2 I had trouble staying asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
3	IES.3 Other things kept making me think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
4	IES.4 I felt irritable and angry.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
5	IES.5 I avoided letting myself get upset when I thought about it or was reminded of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
6	IES.6 I thought about it when I didn't mean to.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

7	IES.7 I felt as if it hadn't happened or wasn't real.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
8	IES.8 I stayed away from reminders of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
9	IES.9 Pictures about it popped into my mind.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
10	IES.10 I was jumpy and easily startled.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
11	IES.11 I tried not to think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
12	IES.12 I was aware that I still had a lot of feelings about it, but I didn't deal with them.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
13	IES.13 My feelings about it were kind of numb.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
14	IES.14 I found myself acting or feeling like I was back at that time.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
15	IES.15 I had trouble falling asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
16	IES.16 I had waves of strong feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
17	IES.17 I tried to remove it from my memory.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
18	IES.18 I had trouble concentrating.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
19	IES.19 Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

20	IES.20 I had dreams about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
21	IES.21 I felt watchful and on-guard.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
22	IES.22 I tried not to talk about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

Table 3: IES-R scores with sociodemographic factors

	Variables	Format	Description
1	Gender	Count	Gender: 1= Female; 2= Male
1	Age	Count	Age in years: 1=18-25 years; 2=26-35 years; 3=36-45 years; 4=>46 years
2	Marital status	Count	Marital status: 1= Married; 2= Single; 3= Divorced; 4= Widowed
3	Education level	Count	Level of education: 1= \leq College diploma; 2= University degree; 3= Post-graduate degree
4	Employment status	Count	Type of employment: 1= Full-time; 2= Part-time; 3= Unemployed
5	Working/Studying from home	Count	Working or studying from home: 1= Yes; 2= No; 3= Not applicable
6	Region of residence	Count	Region of residence: 1= Gulf region, 2= Levant region; 3= North Africa region
7	IES.1 Any reminder brought back feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
8	IES.2 I had trouble staying asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
9	IES.3 Other things kept making me think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
10	IES.4 I felt irritable and angry.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
11	IES.5 I avoided letting myself get upset when I thought about it or was reminded of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

12	IES.6 I thought about it when I didn't mean to.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
13	IES.7 I felt as if it hadn't happened or wasn't real.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
14	IES.8 I stayed away from reminders of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
15	IES.9 Pictures about it popped into my mind.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
16	IES.10 I was jumpy and easily startled.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
17	IES.11 I tried not to think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
18	IES.12 I was aware that I still had a lot of feelings about it, but I didn't deal with them.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
19	IES.13 My feelings about it were kind of numb.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
20	IES.14 I found myself acting or feeling like I was back at that time.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
21	IES.15 I had trouble falling asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
22	IES.16 I had waves of strong feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
23	IES.17 I tried to remove it from my memory.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
24	IES.18 I had trouble concentrating.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
25	IES.19 Reminders of it caused me to have physical reactions, such as sweating, trouble	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

	breathing, nausea, or a pounding heart.		
26	IES.20 I had dreams about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
27	IES.21 I felt watchful and on-guard.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
28	IES.22 I tried not to talk about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

Table 4: IES-R scores with negative mental health indicators

	Variables	Format	Description
1	Negative.1 Are you experiencing increased stress from work?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
2	Negative.2 Are you experiencing increased financial stress from the outbreak?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
3	Negative.3 Are you experiencing increased stress from staying at home?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
4	Negative.4 Have you felt horrified due to COVID-19?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
5	Negative.5 Have you felt apprehensive due to COVID-19?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
6	Negative.6 Have you felt helpless due to COVID-19?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
7	IES.1 Any reminder brought back feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
8	IES.2 I had trouble staying asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
9	IES.3 Other things kept making me think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

10	IES.4 I felt irritable and angry.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
11	IES.5 I avoided letting myself get upset when I thought about it or was reminded of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
12	IES.6 I thought about it when I didn't mean to.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
13	IES.7 I felt as if it hadn't happened or wasn't real.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
14	IES.8 I stayed away from reminders of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
15	IES.9 Pictures about it popped into my mind.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
16	IES.10 I was jumpy and easily startled.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
17	IES.11 I tried not to think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
18	IES.12 I was aware that I still had a lot of feelings about it, but I didn't deal with them.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
19	IES.13 My feelings about it were kind of numb.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
20	IES.14 I found myself acting or feeling like I was back at that time.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
21	IES.15 I had trouble falling asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
22	IES.16 I had waves of strong feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
23	IES.17 I tried to remove it from my memory.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

24	IES.18 I had trouble concentrating.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
25	IES.19 Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
26	IES.20 I had dreams about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
27	IES.21 I felt watchful and on-guard.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
28	IES.22 I tried not to talk about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

Table 5: IES-R scores with impact on family and social support

	Variables	Format	Description
1	Support.1 Are you getting support from friends?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
2	Support.2 Are you getting support from family members?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
3	Support.3 Are you sharing feelings with family members?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
4	Support.4 Are you sharing feelings with others when feeling blue?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
5	Support.5 Are you caring for family members' feelings?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
6	IES.1 Any reminder brought back feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
7	IES.2 I had trouble staying asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

8	IES.3 Other things kept making me think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
9	IES.4 I felt irritable and angry.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
10	IES.5 I avoided letting myself get upset when I thought about it or was reminded of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
11	IES.6 I thought about it when I didn't mean to.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
12	IES.7 I felt as if it hadn't happened or wasn't real.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
13	IES.8 I stayed away from reminders of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
14	IES.9 Pictures about it popped into my mind.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
15	IES.10 I was jumpy and easily startled.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
16	IES.11 I tried not to think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
17	IES.12 I was aware that I still had a lot of feelings about it, but I didn't deal with them.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
18	IES.13 My feelings about it were kind of numb.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
19	IES.14 I found myself acting or feeling like I was back at that time.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
20	IES.15 I had trouble falling asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
21	IES.16 I had waves of strong feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

22	IES.17 I tried to remove it from my memory.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
23	IES.18 I had trouble concentrating.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
24	IES.19 Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
25	IES.20 I had dreams about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
26	IES.21 I felt watchful and on-guard.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
27	IES.22 I tried not to talk about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

Table 6: IES-R scores with lifestyle changes

	Variables	Format	Description
1	Lifestyle.1 Are you paying attention to your mental health?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
2	Lifestyle.2 Do you spend enough time to rest?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
3	Lifestyle.3 Do you spend enough time to relax?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
4	Lifestyle.4 Do you spend enough time to exercise?	Count	1=Much decreased; 2=decreased; 3=same as before; 4=increased; 5=much increased
5	IES.1 Any reminder brought back feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
6	IES.2 I had trouble staying asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
7	IES.3 Other things kept making me think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

8	IES.4 I felt irritable and angry.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
9	IES.5 I avoided letting myself get upset when I thought about it or was reminded of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
10	IES.6 I thought about it when I didn't mean to.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
11	IES.7 I felt as if it hadn't happened or wasn't real.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
12	IES.8 I stayed away from reminders of it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
13	IES.9 Pictures about it popped into my mind.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
14	IES.10 I was jumpy and easily startled.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
15	IES.11 I tried not to think about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
16	IES.12 I was aware that I still had a lot of feelings about it, but I didn't deal with them.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
17	IES.13 My feelings about it were kind of numb.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
18	IES.14 I found myself acting or feeling like I was back at that time.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
19	IES.15 I had trouble falling asleep.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
20	IES.16 I had waves of strong feelings about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
21	IES.17 I tried to remove it from my memory.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

22	IES.18 I had trouble concentrating.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
23	IES.19 Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
24	IES.20 I had dreams about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
25	IES.21 I felt watchful and on-guard.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely
26	IES.22 I tried not to talk about it.	Count	0=Not at all; 1=A little bit; 2=Moderately; 3= Quite a bit; 4=Extremely

5. Statistical methods

Normality of data was tested with the use of Kolmogorov-Smirnov test of normality.

Descriptive statistics for the sociodemographic characteristics were reported as numbers and percentages. The IES-R total and subscale scores were presented as Median and Interquartile Range (IQR). A Chi-square (χ^2) test was used to determine the association between IES-R categories (normal, mild, moderate, and severe) with categorical variables. A non-parametric Kruskal-Wallis H test was used to determine differences in IES-R, intrusion, avoidance, and hyperarousal scores between different regions. Followed by post-hoc pairwise comparisons with Bonferroni adjustment. A generalized linear model based on negative binomial distribution was used to assess the confounding effects of sociodemographic factors, negative mental health impact factors, social and family support indicators, and lifestyle factors on continuous IES-R total score. Variables included in the final model were selected using univariate general linear analysis and only factors with a cut-off value of $p < 0.2$ were selected. A p-value < 0.05 was considered to be statistically significant.

6. System and Software

All analyses were performed using the Statistical Package for the Social Sciences (SPSS) Version 26.0 (IBM, Chicago, IL, USA) running macOS Big Sur Version 11.2.1. Sample size was calculated using G*power software, version 3.1.9.4 (HHU, Germany).