



# COVID-19 Quarantine-Related Mental Health Symptoms and their Correlates among Mothers: A Cross Sectional Study

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## Abstract

**Background** One of the strictest quarantines worldwide to limit the spread of coronavirus was enforced in Jordan during the COVID-19 pandemic.

**Objectives** This study investigated reported mental health and changes in lifestyle practices among Jordanian mothers during COVID-19 quarantine. The specific objectives included studying the level of depression, anxiety, and stress symptoms and their potential statistical associations with demographic and lifestyle variables. Furthermore, the study aimed to investigate differences in mental health between different demographic and socio-economic groups and to examine the major lifestyle changes that occurred on mothers during the quarantine.

**Methods** An online survey was developed and administered to 2103 mothers. Participants were asked to complete a socio-demographic data form, Depression, Anxiety, and Stress Scale (DASS-21), and a lifestyle section comparing the life of mothers before and during the quarantine. Reported scores of depression, anxiety, and stress were calculated and compared across different levels of demographics including income, education level, employment status, and city of residence.

**Results** This study found that mothers with lower income, lower education, not employed, or living in cities outside the capital of Jordan reported having more depression, anxiety, and stress symptoms ( $p < .005$ ). Changes in their lifestyle practices included weight gain, increased time allocated for teaching children at home, increased familial violence at home, and increased time allocated for caring for their family members (average increase of 5 hours daily).

**Conclusions for Practice** The unprecedented times of quarantine have put mothers in unprecedented reported mental health problems. Providing psychological support to this group might be a priority.

**Keywords** COVID-19 quarantine · Mothers · Mental health · Psychological symptoms · Lifestyle changes

## Significance Statement

The impact of COVID-19 quarantine on the mental health of several populations is well documented in recent literature. However, none of these studies focused on the mental health of mothers.

This study contributes to the understanding of maternal mental health during the restrictive quarantine. An increase in stress, depression, and anxiety was found among mothers with lower income, lower education, who are not employed, living in cities outside the capital city, as well as increasing time mothers dedicated to their children's care and education. These findings suggest that supportive interventions for mothers during home confinement times might be warranted.

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## Introduction

The novel coronavirus 2019 (COVID-19) has caused a rapidly emerging infection that has been classified as a pandemic by the World Health Organization (WHO) (WHO 2020) and rapidly spread throughout the world (Lu et al. 2020). The word quarantine refers to compulsory physical separation (including restriction of movement) of groups of healthy individuals who have been potentially exposed to a contagious disease such as COVID-19 (CDC 2017).

The Hashemite Kingdom of Jordan, or commonly known as Jordan, is a Middle Eastern Arab Muslim country, with a population, according to the latest statistics, of 9.9 million (The World Bank 2020), including about 2.9 million as non-citizens which include refugees, legal, or illegal immigrants. Women constitute 49.38% of the population, but only 17 percent of Jordanian women were economically active in 2017 (seeking work, whether employed or unemployed), compared with 59 percent of men (Jordanian Department of Statistics 2019).

The social structure of Jordan is related to the religious and ethnic background of the population, as most Jordanians are Arab Muslims. Islam recognizes family as the fundamental social unit. Along with the husband–wife relationship, the parent–child relationship is most important (Al-Hassan and Takash 2011). Societal beliefs also pigeonhole women. For example, the education sector is considered a socially acceptable job for females—a sector also known for low wages and limited opportunities. At the same time, Jordanian women are expected to be dependent on their spouse and comply with patriarchal tribal rules.

In response to continued coronavirus spread, the Jordanian government implemented an array of unprecedented containment measures to combat the spread of the disease. First, schools and universities were suspended, borders were closed, and social gatherings were banned (Kayed 2020). Later, a nationwide quarantine was announced on March 21 after a royal decree. The quarantine procedures in Jordan were described as the strictest around the world (Arraf 2020). It included banning people from moving outside their homes except for emergencies (Jordan Times 2020).

Previous studies examined the psychological effects of quarantine in response to several infectious diseases. The most recent related topics investigated the outbreak of the Severe Acute Respiratory Syndrome (SARS) and COVID-19. Brooks and colleagues (2020) reviewed 24 studies that examined the psychological effects of SARS quarantine. As a response to the predicted prolonged period of social distancing, people undergoing quarantine may experience unpleasant psychological consequences including feelings of boredom, anxiety, depression, and stress (Brooks et al.

2020). Recent research on COVID-19 revealed similar psychological effects of quarantine including symptoms of anxiety, depression, fear, stress, and sleep problems (Rajkumar 2020; Torales et al. 2020). One of the vulnerable groups that might be affected by quarantine is mothers. In fact, recent research showed that women are under higher risk to develop anxiety and depression symptoms during COVID-19 quarantine than men (Liu et al. 2020b; Ozdin and Bayrak Ozdin 2020).

Motherhood is reported to have a potentially negative psychological impact on mothers, regardless of being in quarantine or not. Some of these psychological consequences are shared with those reported to COVID-19; namely anxiety and depression. Factors contributing to mental health problems among mothers included mother's educational level, age, work status, child's age, and child care-taking responsibilities. Mother's lower educational level was reported to be correlated with higher levels of anxiety and depression symptoms (Mathiesen et al. 1999). Similarly, younger mothers reported more symptoms of anxiety and depression. Further, mothers lacking paying jobs were reported to be associated with more mental health problems (Mathiesen et al. 1999). Also, maternal symptoms of anxiety and depression were found to be influenced by changes associated child care-taking arrangements such as changes in support from spouse/partner and friends (Narde 2000). Finally, combining work and child care-taking was found to predict a higher risk for maternal mental health, particularly when the children are young (18, 30, and 50 months) (Narde 2000).

In a recent qualitative study conducted in Jordan about occupational disruption among Jordanians, mothers were found to have multiple new roles during the quarantine. For example, in addition to women domestic responsibilities, a new role emerged as a teacher for their children due to schools shut down (Malkawi et al. 2020). Another research suggested that the physical and psychological burden on parents have increased domestic violence incidents during the quarantine mainly against women and children (Bradbury-Jones and Isham 2020). Leading factors to increased domestic violence were attributed to economic hardship, feelings of isolation, depression, disruptions in sleep, and routine changing.

Several studies have examined the psychological impact of COVID-19 quarantine on several groups such as medical staff (Chung et al. 2020; Guo et al. 2020), college students (Cao et al. 2020; Liu et al. 2020c), parents of hospitalized children (Yaun et al. 2020), children (J. Liu et al. 2020a), and pregnant women (Lebel et al. 2020). However, none reported on the psychological impact of COVID-19 quarantine on the mental health of mothers. Therefore, the purpose of the current study is to understand the mental health and lifestyle changes during COVID-19 quarantine on Jordanian mothers. The specific research questions are:

1. What is the reported level of depression, anxiety, and stress symptoms among Jordanian mothers during the quarantine?
2. Are there any differences in the reported stress, anxiety, and depression levels among mothers of different demographic and socio-economic variables?
3. What are the major changes that have occurred on Jordanian mother's lifestyle due to quarantine?

## Methods

### Study Design and Participants

This cross-sectional study was conducted in March and April of 2020. The study was conducted using an online self-administered questionnaire distributed through social networking sites (SNS), mainly Facebook to different Jordanian mothers' groups, discussion forums, and pages. Invitation to fill the questionnaire was sent to Facebook group if it was: (1) open to public, (2) local from Jordan, (3) popular (have more than 40,000 followers), and (4) specialized in mothering and mothers. Also, the survey was distributed by phone to several WhatsApp groups by the research team members targeting mothers.

This study utilized Facebook as the major method for data collection. The decision was made because it is the most commonly used social network sites (SNS) in Jordan. As of January 2020, 6.78 million Jordanians have internet access, which accounted for 67% of the entire population (Kemp 2020). Moreover, around 6 million Jordanians have Facebook account where the majority of users were men (57.3%) and 42.7% were women (Napoleoncat Stats 2020). In addition, two of the largest mobile service providers in Jordan offer free access to Facebook (Freedom House 2019). According to the Inclusive Internet Index of 2019, a slight gender gap exists in internet and mobile phone access in Jordan. Women's access to the internet exceeds men's by 5.1 percent, while men's mobile phone access is 6.9 percent higher than women's (Freedom House 2019).

Data collection took two weeks; it started on April 2, 2020, and the survey was closed on April 16, 2020. The survey required about 10 minutes to be filled. The study was approved by the Scientific and the Ethics Committees of the School of Rehabilitation and the Deanship of Academic Research at the University of Jordan (IRB Number: 224-2020-19).

Inclusion criteria included the following: (1) mother who have at least one child between the ages of 4–18 years (grade KG1–12th grade), (2) mother's age range: 20–60 years, (3) living in Jordan, (4) could be of any nationality, and (5) able to read and write. Mothers were excluded from the study if they have a history of diagnosed mental health disease

confirmed by a physician report or did not live in Jordan at the data collection time. We aimed to get a representative sample for all Jordanian geographical areas and different socio-economic status. A sample size of 500 participants or more in a cross-sectional design is considered excellent (MacCallum et al. 2001). However, this study consisted of more than two thousand mothers as participants in the study.

### Outcome Measures

The survey questionnaire consisted of five main sections with a total number of 60 questions. The interface of the questionnaire explains the aim of the study and assures the participant on confidentiality and privacy and their right to withdraw from the study at any point if they wish. The four main parts of the questionnaire included the following aspects

- (1) Consent form where participants agreed to participate in the survey.
- (2) Socio-demographic data section: (18 questions) such as marital status, age, educational level, number of family members (in KG, in primary school, or secondary school), the socioeconomic status, nationality, area of living, work area (medical and non-medical), weight changes, and whether they undergone education on infection control prior to the pandemic.
- (3) Lifestyle change section: (20 questions) included self-reported responses to questions about life before and after the quarantine including sleeping hours, waking hours, smoking, physical, psychological health, sanitization practices, ordering food from restaurants, taking clothes to a dry clean.
- (4) Arabic version of depression, anxiety and stress scale (DASS-21): (21 question). DASS-21 evaluates mental health symptoms with sub-scale including stress, anxiety, and depression over the last week. DASS-21 normal cut-off scores are nine for depression, seven for anxiety, and 14 for stress, scores exceeding these cut-offs are labeled as mild, severe, or extremely severe on corresponding symptom with higher scores suggesting more severe symptoms (Crawford and Henry 2003). DASS-21 is validated for the Arabic language and has shown high validity, reliability, and internal consistency (Cronbach alpha range 0.78–0.91) (Brown et al. 1997; Ali et al. 2017; Almhdawi et al. 2018).

### Data Collection

The questionnaire was initially structured from a literature review done by the two faculty members with a Ph.D. in occupational therapy and an extensive experience in survey research. Then, the questionnaire was formatted into

Google forms, an internet-based software commonly used for data collection. Google forms was preferred for its convenience, efficiency, and high popularity especially in the current scenario where people in Jordan were under quarantine. After adding the questionnaire into Google forms, a link was generated and randomly distributed to mothers using social media networking sites such as Facebook and by phone on WhatsApp groups. Before distribution, the initial version was further reviewed by experts and was piloted on 10 mothers for clarity and language. All the feedback about the survey was positive and no changes were suggested and, subsequently, all piloted cases were included in the data analysis.

## Data Analysis

All data analyses were performed using the Statistical Package for Social Science (SPSS 23). For aim 1, the data analyses included calculating descriptive statistics (Frequencies and percentages or mean and standard deviation) of the sample demographics, and for DASS-21 sub-scale and total scores. Prior to the conduction of further (comparison and correlation) analyses, data normality was assessed for the DASS-21 sub-scale scores using Shapiro-wilk test. The normality assumption was not met as evidenced by having significant Shapiro-wilk test results for the depression, anxiety, and stress sub-scale scores indicating that these scores were not normally distributed. Hence, we elected to use non-parametric tests to perform comparisons of DASS-21 subscale scores.

For aim 2, a Mann-Whitney U test was used to compare the DASS-21 sub-scale scores between mothers based on their monthly income (more or less than \$700), educational level (more or less than high school diploma), city of residence (Amman vs other cities), and employment status (employed vs not employed).

For aim 3, we explored the statistical associations between DASS-21 sub-scale scores and the demographic characteristics of the sample (such as age, educational level, income, employment status, smoking status, and city of residence) using Spearman rank correlation analysis. The significance level for the comparison and correlation analyses was set at ( $\alpha$ ) = 0.05.

## Results

In total, 2103 Jordanian mothers successfully responded to the study survey. Table 1 presents the descriptive statistics of sample demographics. Participating mothers had a mean age of 36 years and an average of 5 ( $\pm$  1) family members within their household. The majority of participants were married (95%) and were living with their spouse in Amman (59%).

Additionally, most mothers were unemployed housewives (58%) even though most of them are holding a bachelors' degree or higher (62%).

## Mental Health Symptoms

The aim of this study was to assess levels of reported mental health symptoms during COVID-19 quarantine among mothers (see Table 2). The results indicated that mothers are reporting mild levels of depression (Mean = 11.5  $\pm$  SD = 9; Range 0–42), anxiety (Mean = 7.2  $\pm$  SD = 4; Range 0–42), and stress (Mean = 14.7  $\pm$  SD = 10; Range 0–42).

Mann-Whitney U tests compared between DASS-21 sub-scale scores on different demographic characteristics including monthly income, educational level, city of residence, and employment status during the COVID-19 pandemic (see Table 3). The results showed that mothers in our sample with lower household monthly income ( $\leq$  \$700) reported significantly higher depression sub-scale scores ( $U = 345839$ ,  $p < .000$ ), anxiety ( $U = 355753$ ,  $p < .000$ ), and stress ( $U = 337770$ ,  $p < .000$ ) compared to mothers with a household monthly income of more than \$700. Comparing between the DASS-21 sub-scale scores across educational level revealed that mother with high school diplomas or less reported significantly higher depression sub-scale scores ( $U = 315589$ ,  $p = .001$ ), anxiety ( $U = 319886$ ,  $p = .003$ ), and stress ( $U = 3123315$ ,  $p < .000$ ) than mothers with higher degrees.

Further comparison of DASS-21 sub-scale scores by the city of residence showed that mothers living in Amman (the capital city of Jordan) reported significantly lower anxiety sub-scale scores ( $U = 489874$ ,  $p = .020$ ) compared to mothers living in other cities in Jordan. Finally, a comparison of DASS-21 sub-scale scores by employment status showed that mothers who were still employed during the COVID-19 pandemic reported significantly lower depression sub-scale scores ( $U = 421686$ ,  $p = .002$ ) and stress ( $U = 422479$ ,  $p = .004$ ) compared to unemployed mothers.

Spearman correlation analyses revealed strong positive associations between the DASS-21 sub-scale scores (see Table 4). Depression subscale scores were significantly associated with anxiety ( $r_s = .68$ ,  $p < .01$ ) and stress ( $r_s = .78$ ,  $p < .01$ ) scores. The correlation analyses also revealed weak associations between sample demographics and DASS-21 sub-scale scores. There was a very weak negative association between age and depression ( $r_s = -.08$ ,  $p < .01$ ), anxiety ( $r_s = -.04$ ,  $p < .01$ ), and stress ( $r_s = -.11$ ,  $p < .01$ ) scores. There was also a weak positive correlation between having low monthly household income ( $<$  \$700) and higher depression ( $r_s = .11$ ,  $p < .01$ ), anxiety ( $r_s = .09$ ,  $p < .01$ ), and stress ( $r_s = .13$ ,  $p < .01$ ) scores. Additionally, there was a weak positive correlation between having a chronic physical condition and

**Table 1** Demographic and health characteristics of the sample (n = 2103)

Variable	Frequencies n (%)
Mean age	36.2 years
SD	6.4
Range	(20-60 years)
Age in years	
20–30	416 (19.8%)
31–40	1189 (56.5%)
41–50	458 (21.8%)
51–60	40 (1.9%)
Educational level	
Doctorate	36 (1.8%)
Master's degree	166 (7.9%)
Bachelor's degree	1114 (53.0%)
Community college diploma	368 (17.5%)
High school or less	418 (19.9%)
Marital status	
Married	2000 (95.1%)
Widow	29 (1.4%)
Divorced	74 (3.5%)
Annual income	
Less than 250	169 (8.0%)
250–500	597 (28.4%)
500–1000	594 (28.2%)
1000 or higher	452 (21.5%)
Missing value	209 (13.8%)
Participants' employment status before COVID-19 pandemic	
Employed	868 (41.3%)
Unemployed	1235 (58.7%)
Husband's employment status	1794 (85.3%)
Employed	
Unemployed	209 (9.9%)
Separated	100 (4.8%)
Chronic diseases	
Physical	410 (19.5%)
Mental	47 (2.2%)
Smoking status	
Smoke cigarettes	264 (12.6%)
Smoke hookah	422 (20.1%)
Received infection control training	
Yes	328 (15.6%)
No	1775 (84.4%)
City of residence	
Amman	1249 (59.4%)
Irbid	358 (17.0%)
Zarqa	159 (7.6%)
Balqa	88 (4.2%)
Karak	66 (3.1%)
Aqaba	43 (2.0%)
Maan	36 (1.7%)
Madaba	31 (1.5%)
Mafraq	25 (1.2%)
Jerash	20 (1.0%)

**Table 1** (continued)

Variable	Frequencies n (%)
Ajloun	18 (0.9%)
Tafila	10 (0.5%)
Children in schools	
Daycare	1107 (52.6%)
Elementary school	1622 (77.1%)
High school	437 (20.7%)
Mean number of family members	5 members
SD	1
Range	(2-15 members)
Mean number of sleep hours at night	6.6 h
SD	2.1
Range	(0-12 hours)
Mean number of sleep hours during the day	1.0 hours
SD	1.9
Range	(0-12 hours)
Mean hours of daily care for family before COVID-19 pandemic	8.1 h
SD	4.6
Range	(0-24 hours)

SD standard deviation, COVID-19 coronavirus disease 2019

**Table 2** Descriptive statistics of the DASS-21 sub-scale and total scores (N = 2103)

DASS domains	Mean score	Median	Range	SD
Depression	11.5	10.0	0–42	9.0
Anxiety	7.2	4.0	0–42	7.6
Stress	14.7	18.0	0–42	10.0
DASS total score	33.5	28.0	0–126	24.5

DASS depression anxiety stress scale, SD standard deviation

reporting higher depression ( $r_s = .10, p < .01$ ), anxiety ( $r_s = .15, p < .01$ ), and stress ( $r_s = .11, p < .01$ ) scores.

## Lifestyle Changes

Table 5 presents the descriptive statistics of factors related to COVID-19 pandemic and its impact on the participating mothers' lifestyle. About 11% of mothers have lost their jobs during the COVID-19 pandemic. Mother also reported changes in their health and lifestyle practices including weight gain (37%), increased time allocated for teaching children at home (63%), increased familial violence at home (27%), and increased time allocated for caring for their family members (average increase of 5 h daily).

## Discussion

### Mental Health Symptoms

This study investigated reported mental health and changes in lifestyle practices among Jordanian mothers during COVID-19 quarantine. Regarding reported levels of stress, anxiety, and depression during quarantine, this study found that mothers reporting mild levels of depression, anxiety, and stress. Furthermore, mothers with lower income, lower education, who are not employed, or living in cities outside the capital of Jordan reported more severe mental health symptoms.

Previous literature shows that individuals who undergo quarantine during SARS experienced several mental health symptoms (Brooks et al. 2020) and during COVID-19 quarantine (Rajkumar 2020; Torales et al. 2020). Similarly, mothers in this study reported mild levels of depression, anxiety, and stress. In general, women reported a three-fold higher anxiety level than that reported for men during the COVID-19 pandemic in a recent study (Wang et al. 2020).

In this study, the effects of different demographic and socioeconomic factors on the reported psychological health of mothers have been studied. During COVID-19 quarantine, mothers with lower household monthly income were found to have significantly higher reported depression, anxiety, and stress scores compared to mothers with higher income. This result is consistent with previous research (Narde et al. 2002; Michelson et al. 2016). Eleven percent of the mothers who participated in this study had to leave their paid job

**Table 3** Comparison of the DASS subscale scores by demographic characteristics (N = 2103)

DASS subscales by income		Mean rank	Sum of ranks	<i>U</i>	<i>Z</i>	<i>P</i>
Depression	≤ 700 USD	978.01	749157.5	345839.0***	− 4.99	.000
	> 700 USD	854.13	893420.5			
Anxiety	≤ 700 USD	965.07	739244.0	355.753.0***	− 4.11	.000
	> 700 USD	863.61	903334.0			
Stress	≤ 700 USD	988.5	757227.0	337770.0***	− 5.72	.000
	> 700 USD	846.4	885351.0			
DASS subscales by education		Mean rank	Sum of ranks	<i>U</i>	<i>Z</i>	<i>P</i>
Depression	≤ High school	1139.5	476311.5	315589.5**	−3.03	.001
	> High school	1030.2	1736044.5			
Anxiety	≤ High school	1129.2	472015.0	319886.0**	−2.93	.003
	> High school	1032.8	1740341.0			
Stress	≤ High school	1147.3	479569.5	312331.5***	−3.59	.000
	> High school	1028.3	1732786.5			
DASS subscales by city		Mean rank	Sum of ranks	<i>U</i>	<i>Z</i>	<i>P</i>
Depression	Amman	1030.6	1287275.5	506650.5	− 1.05	.290
	Other cities	1059.0	883210.5			
Anxiety	Amman	1017.2	1270499.5	489874.5*	− 2.32	.020
	Other cities	1079.1	899986.5			
Stress	Amman	1023.9	1278932.5	498307.5	− 1.67	.093
	Other cities	1069.0	891553.5			
DASS subscales by employment		Mean rank	Sum of ranks	<i>U</i>	<i>Z</i>	<i>P</i>
Depression	Employed	989.6	612576.0	421686.0**	− 3.05	.002
	Unemployed	1078.0	1599780.0			
Anxiety	Employed	1037.7	642386.5	450496.5	− .70	.484
	Unemployed	1057.9	1569969.5			
Stress	Employed	992.5	614369.0	422479.0**	− 2.90	.004
	Unemployed	1076.8	1597987.0			

DASS depression anxiety stress scale, *SD* standard deviation, *U* Mann-Whitney U test statistic, *Z* critical value of the Z distribution

\**p* < .05

\*\**p* < .01

\*\*\**p* < .001

due to the quarantine and this might have exacerbated the economic burden on the family and potentially affected their mental health. Our study found that twenty-seven percent of mothers reported an increase in familial violence at home. A future follow-up study on the topic is necessary. In fact, reports have been circulating that women and children are usually the victims of this violence (Bradbury-Jones and Isham 2020) during COVID-19 quarantine.

As expected, this study found that mothers with lower educational level reported significantly higher depression, anxiety, and stress. Similarly, Henderson et al. (2016) found that women with lower education experience reported higher levels of stress and anxiety, and lower levels of self-efficacy. The majority of participants were living with their families

in Amman (the capital city of Jordan). In fact, 38.6% of Jordan population live inside the capital (Jordanian Department of Statistic, 2019). Mothers living in Amman reported significantly lower anxiety compared to mothers living in other cities in Jordan. This can be explained by the general lifestyle of mothers in our sample. Mothers living in Amman had significantly higher education, higher socioeconomic status, and more likely to have a housekeeper at the house compared to mothers living in other cities. Moreover, the greater probability of access to services and information at the country's capital might make the mothers in Amman less susceptible to psychological symptoms.

This study reported mothers who were still employed during the COVID-19 pandemic reported significantly lower

**Table 4** Correlation matrix of associations among demographic factors and DASS sub-scales (N = 2103)

Variables	1	2	3	4	5	6	7	8	9	10	11
1 Age	1.00										
2 City (Amman)	.01	1.00									
3 Employment (Y)	.04*	.03	1.00								
4 Family members	.43**	-.14**	-.16**	1.00							
5 Education (HS)	-.02	-.16**	-.28**	.21**	1.00						
6 Income (< 700)	-.11**	-.31**	-.27**	.08**	.41**	1.00					
7 Physical conditions	.24**	-.01	-.01	.06**	.02	.03	1.00				
8 Smoking	.08**	.14**	-.00	-.06**	-.02	-.04	.06**	1.00			
9 Housekeeper	.07**	.18**	.04*	.01	-.12**	-.21**	-.01	.08**	1.00		
10 Depression score	-.08**	-0.02	-.06**	-.00	.07**	.11**	.10**	.04	-.03	1.00	
11 Anxiety score	-.04**	-.05*	-.01	.02	.06**	.09**	.15**	.05*	-.01	.68**	1.00
12 Stress score	-.11**	-.03	-.06**	.02	.07**	.13**	.11**	.03	-.06**	.78**	.73**

DASS depression anxiety stress scale, Y employed during COVID-19 pandemic, HS high school or less, < 700 monthly income of \$700 or less

\* $p < 0.05$

\*\* $p < 0.01$

depression and stress compared to mothers who are not employed. This is consistent with previous studies in normal situations where mothers who were engaged in paid work had lower mental health problems than ones who were not working (Mathiesen et al. 1999).

### Lifestyle Changes

This study investigated reported changes in lifestyle practices among Jordanian mothers' during COVID-19 quarantine. Mothers reported weight gain (37%), increased familial violence at home (27%), increased time allocated for caring for their family members, and increased time allocated for teaching children at home (63%). Mothers' lifestyle changes during quarantine were not investigated in previous studies.

In Jordan, the labor force participation of women is the lowest in the world for a country not at war (World Bank 2019b). This means that the majority of Jordanian women who are married and unmarried were not working and they bear the burden of household duties (such as cooking, cleaning and childcare) in typical situations. With quarantine, the burden probably increased as a result of greater numbers of family members staying at home for longer times than usual. A recent survey by the Information and research center in Jordan, which included 3555 participants (men and women) revealed a big increase to the time dedicated for home care, child care, and helping children in education for women, which was much more than the time dedicated by men in the same survey (King Hussein Foundation 2020).

This study found that the average household size of the Jordanian family is five members. This result is similar to other research which reported an average household size of 4.8 persons (CEIC data 2017).

As schools and daycares closed their doors across Jordan, this study found that Jordanian mothers allocated additional five hours caring for their family members. This trend is expected during the COVID-19 quarantine where mothers took more responsibilities than fathers regarding housework and taking care of children (Alone et al. 2020). Due to the current COVID-19 pandemic, Jordanian schools and universities, like many in the region and abroad, suspended face-to-face education rather abruptly, and have moved to online teaching overnight. The government decided to disseminate lessons through TV channels for the primary and secondary level students (Minister of education 2020) especially for some families who may not own smart devices due to economic hardship. The impact on Jordanian families, however, was tremendous. Suddenly, Jordanians' homes have become schools, and mothers were the teachers. This added more stress on mothers as we found that 63% of mothers reported increased time allocated for teaching children at home.

As per this study results, Jordanian mothers reported weight gain during the quarantine. This result is similar to a Kuwaiti study by ALMughamis and colleagues (2020) who found a significant increase in weight of respondents during the quarantine. Moreover, significant predictors of weight gain among the Kuwaitis included unhealthy diet pattern, excessive consumption of snacks and subjective feelings of anxiety (ALMughamis et al. 2020). Malkawi and colleagues found that cooking and eating was a theme in describing the most frequent occupations that Jordanians used to pass their time during quarantine. The reduced movement outside the house for shopping, work, and exercising during quarantine might explain the weight gain.



**Table 5** Descriptive statistics of Jordanian mothers' health-related factors during COVID-19 pandemic (N = 2103)

Variable	Frequencies n (%)
Current employment status after COVID-19 pandemic	
Employed working from home	487 (23.2%)
Employed working outside home	132 (6.3%)
Unemployed	1484 (70.6%)
Weight Changes during COVID-19 Pandemic	
Increased	786 (37.4%)
Decreased	283 (13.5%)
No changes in weight	1034 (49.2%)
Mean hours of care for family per day after COVID-19 pandemic	13.1 hours
SD	5.6
Range	(0-24 hours)
General health	
Excellent	693 (33.0%)
Good	1327 (63.1%)
Poor	83 (3.9%)
General diet	
Very healthy	182 (8.7%)
Relatively healthy	1698 (80.7%)
Not healthy	223 (10.6%)
Time allocated for cleaning the house during COVID-19 pandemic	
Increased	1331 (63.3%)
Decreased	54 (2.6%)
No changes in weight	717 (34.1%)
Time allocated for teaching children during COVID-19 pandemic	
Increased	1328 (63.1%)
Decreased	280 (13.3%)
No changes in weight	494 (23.5%)
Domestic violence and stress during COVID-19 pandemic	
Increased	577 (27.4%)
Decreased	495 (23.5%)
No changes in weight	1030 (49.0%)
Fear of being infected with COVID-19	
Always	687 (32.7%)
Sometimes	1126 (53.5%)
Never	289 (13.7%)

SD standard deviation, COVID-19 coronavirus disease 2019

Even though the sample size of this study is large, it is not representative of all mothers in Jordan. Our snowball sample represents only literate women with internet access. Consequently, the mental health status of mothers who are from lower socio-economic levels in Jordan can be worse than the levels detected in the sample of this study. In addition, the nature of the survey may have attracted mothers who are more likely to encounter mental health problems during the quarantine. Finally, our study is limited by being unable to control for the interaction of various demographical variables due to the

normality deviation of the data and high number of collected variables.

## Conclusions for Practice

Health care professionals should have a unique perspective that can be put into action during and after an international pandemic in dealing with the mental health of mothers. Moreover, understanding the changes that happen to the mothers' routines and roles and how environmental factors like a pandemic can interrupt daily lifestyle of mothers is

important. Efforts at the governmental level can assist mothers experiencing a pandemic to better navigate their daily lives using adaptive strategies both during and after such an event. Mental health services and other related rehabilitative services should be enhanced and encouraged among Jordanian women, particularly mothers. Formal governmental and societal campaigns encouraging establishment and utilization of such services among women must be encouraged to reduce the stigma associated with mental health diagnoses and treatment.

In addition, when consulting with health care providers, mothers may need to explore their time used for leisure activities such as exercise or hobbies (WHO 2020b). It has been found that many individuals experienced mental health concerns after quarantine including mothers (Brooks et al. 2020). Health care provider can have a significant role in helping mothers to readjust to post-quarantine life. This could include stress reduction strategies, reorienting to healthy routines and use of time (WHO 2020b), reducing unhealthy behaviors facilitated by isolation and exploring new gender role divisions (Alon et al. 2020).

In conclusion, our findings suggest that the COVID-19 pandemic quarantine affected the lifestyle of mothers and have increased their responsibilities around the house (caring for family members and teaching their children). In terms of maternal mental health, the quarantine was reported to have a greater effect on mothers with lower income, lower education, who are not employed, and/or living in cities outside the capital of Jordan. Providing psychological support for these groups might be a priority.

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## Compliance with Ethical Standards

**Conflict of interest** The authors declare no conflicts of interest.

**Ethical Approval** This work was approved by the Institutional Review Board at the University of Jordan (No: 224-2020-19).

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