

The Combined Outcomes of the COVID-19 Pandemic and a Collapsing Economy on Mental Well-Being: A Cross-Sectional Study

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Research Article

Keywords: COVID-19 pandemic, mental well-being, declining economy, fear of poverty, fear of COVID-19

Posted Date: August 26th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-34832/v2>

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Abstract

Objective: To examine the outcomes of COVID-19 and a collapsing economy on mental well-being (MWB) of the general Lebanese population.

Design/methods: This cross-sectional study enrolled 502 adults in May 2020.

Results: MWB had a mean of 14.80. Female gender, university education, fear of COVID-19, fear of poverty, verbal violence at home, and chronic disease were associated with lower MWB. Better family satisfaction and financial situation were correlated with better MWB. Among workers/looking for a job: physical exercise was associated with better MWB, while previous waterpipe smoking, being self-employed before the crisis, working from home, closure of the institution, and worrying about long-term effects of the crisis on employment status were associated lower MWB. The fear of COVID-19 was not associated with MWB.

Practical Implications: The Lebanese government should implement a reliable crisis management strategy that outlines stabilization and recovery measures to help people navigate through this period with minimal impact on mental, physical, and overall quality of life.

Background

The coronavirus disease outbreak or COVID-19 that first emerged in Wuhan, China, in December 2019, has rapidly become a global threat.^{1,2} It was declared a pandemic by the World Health Organization (WHO) in March 2020 and considered a public health emergency of international concern ever since.³

The COVID-19 is rapidly spreading in the population, primarily affecting patients' lungs, and causing mild to severe forms of respiratory illnesses, sometimes associated with intensive care unit (ICU) admissions and high mortality.²⁻⁴ To curb the spread of the virus and alleviate the burden on the healthcare system, governments across the globe deployed public health responses and imposed containment measures, including social distancing, self-isolation, quarantine, and local and international travel restrictions. On 25 March 2020, an estimated 2.6 billion people (one-third of the human population) were under some form of lockdown.⁴ As of 17 May 2020, the pandemic resulted in 4,534,731 confirmed cases of COVID-19 infections and 307,537 deaths worldwide.⁵

Throughout history, epidemics and pandemics have had manifold and profound long-lasting impacts on mental health and mental well-being (MWB).⁶ Thus, COVID-19 is expected to affect the MWB, described as a self-perceived positive outcome, translating by the presence of positive feelings (e.g., happiness), the absence of negative emotions (e.g., anxiety, depression), and good living conditions (e.g., housing, employment).⁷⁻¹² Several studies evaluated MWB related to the COVID-19 pandemic, but none considered the economic context.¹³⁻¹⁵

Indeed, another impact of the COVID-19 is the slowing down of major world economies with a higher risk for developing ones. Containment strategies of flattening the curve most countries adopted to avoid overwhelming the healthcare system, induced a global economic slowdown with layoffs and firms exits generating an abrupt increase in unemployment.^{16,17}

In Lebanon, the first COVID-19 positive case was confirmed on 21 February 2020. As of this date, the government implemented stepwise measures to curb the spread of the disease; one week after, schools were closed. Other escalating steps followed until the sanitary lockdown on 15 March.¹⁸ In parallel, awareness campaigns and electronic official platforms were launched to keep the public informed.^{18,19} On 21 May, the Ministry of Public Health (MOPH) reported a total of 961 cumulative positive COVID-19 cases, 26 deaths, and 53 positive cases. Urban regions are the most affected, mainly the capital city Beirut.¹⁹

In Lebanon, the COVID-19 outbreak coincided with an unprecedented economic crisis. This Middle-Eastern developing country was recently downgraded from a high-income to upper-middle-income country by the World Bank.²⁰ In 2011, the Lebanese population was estimated at 5,202,343 inhabitants and reached 6,848,925 in 2018.²¹ This dramatic increase that has largely affected its economy is mainly due to the inflow of Syrian refugees who fled their country upon the declaration of war in 2012.²⁰

Lebanon's economy is highly volatile; it is service-oriented and relies heavily on the diaspora's money inflows.²² Despite several periods of economic prosperity, Lebanon has been witnessing slow economic growth over the past few years that reached monetary tightening in 2019,²³ and resulted in an unprecedented crisis with massive demonstrations, strikes, and temporary bank closures.²⁴ Since then, banks have become unable to supply depositaries with money, whether Lebanese Pounds or US Dollars, the two currencies used in Lebanon. Furthermore, USD exchange rates have skyrocketed, making the paper money in that currency and other foreign currencies scarce or unavailable.²⁵ This economic frailty is mainly due to its non-productive structure coupled with corruption, political instability, and jostling, further aggravated by the significant influx of Syrian refugees.²³

Despite its dreadful situation and an immediate economic vulnerability, Lebanon ranked among the countries with the most prepared health system for the handling the COVID-19.²⁶ Given that this pandemic has already affected the major world economies, with some of them heading towards a sharp recession,¹⁷ it is expected that Lebanon will be no exception; the current health crisis will deepen the country's already collapsing economy, thereby altering MWB in the general population. Studies exploring this particular facet of the pandemic are lacking.

This study's hypotheses derive from the biopsychosocial model, which views health and well-being as products of biological characteristics (e.g., immune function, sex, disease vulnerability), behavioral/psychological factors (e.g., stress, coping mechanisms, health beliefs), and social conditions (e.g., cultural influences, family relationships, education, economic status, social support).²⁷ It was

hypothesized that the general population is at risk of low mental well-being, given that many of these conditions are affected: biological (disease vulnerability and family history of COVID-19), psychological (fear of COVID-19 and stress), and social (economic breakdown) factors. Therefore, the study aimed at examining the combined outcomes of the COVID-19 pandemic and a collapsing economy on the mental well-being of the general Lebanese population.

Methods

Study Design and Sampling

A cross-sectional study was conducted from 10-18 May 2020, using an online-based questionnaire created on Google forms. Due to the government-mandated sanitary lockdown, the survey was distributed to participants through social media platforms and WhatsApp groups, using the snowball sampling technique. All individuals over 18 years of age with access to the Internet were eligible. A total of 502 respondents filled out the questionnaire that required between 15 and 20 minutes to complete.

Ethics approval and consent to participate

The Institutional Review Board of the American University of Science and Technology approved this study protocol (AUST-IRB-20200527-01). The topic was explained to all participants in the introductory section of the survey and consent to participate was implicit. Anonymity of participants was guaranteed throughout the process of data collection and analysis.

Minimal sample size calculation

The minimum sample size was calculated using the G-Power software, version 3.0.10. The calculated effect size was 0.0526, expecting a squared multiple correlation of 0.05 (R^2 deviation from 0) related to the Omnibus test of multiple regression. The minimum necessary sample was n=454, considering an alpha error of 5%, a power of 80%, and allowing 25 predictors to be included in the model.

Questionnaire

The online questionnaire was available in Arabic, the native language in Lebanon. It consisted of three parts. The first part assessed the sociodemographic features of the participants, such as age, gender, marital status, educational level, employment status, region, household size, current household monthly income (divided into five levels, according to the official exchange rate: no income, low < 675,000 LBP (450 USD), moderate 675,000-1,500,000 LBP (450-1,000 USD), intermediate 1,500,000-3,000,000 LBP (1,000-2,000 USD), and high income >3,000,000 LBP (2,000 USD)); the socioeconomic status was assessed using quartiles of individual income (household income divided by the household size). Questions were also asked about medical coverage, smoking and alcohol consumption, self-perception of the financial situation, having been infected or in contact with people infected with coronavirus, and physical activity before and during COVID-19.

The second part of the questionnaire, addressed to working people and those seeking a job, consisted of a set of 20 questions related to current employment and how it was affected by either the economic crisis or the COVID-19. Examples of questions asked: Do you have to go out to make a living despite the sanitary lockdown? Are you able to apply social distancing while working (1.5-2m safety distance)? Did your company change the working hours because of the economic crisis or the COVID-19 pandemic? Has your salary/income been affected by the economic crisis or the COVID-19 pandemic? Are you worried about the long-term impact of the economic crisis or the COVID-19 pandemic on your business/job? Did the economic crisis or the COVID-19 pandemic result in decreasing the salaries of employees? Did the economic crisis or the COVID-19 pandemic cause the dismissal of some employees? What were the criteria used to lay-off employees?

The third part consisted of the several measures using validated scales, after obtaining the due permission from their copyright holders when necessary:

The World Health Organization-Five Well-Being Index (WHO-5)

The 5-item World Health Organization Well-Being Index (WHO-5) is among the most widely used questionnaires assessing subjective psychological well-being. Since its first publication in 1998, the WHO-5 has been translated into more than 30 languages and has been used in research studies all over the world.²⁸ This short self-reported tool is validated in Lebanon²⁹ and consists of five questions graded from 0 to 5 to evaluate mental well-being in the past month (feeling cheerful and in good spirits, calm and relaxed, active and vigorous, fresh and rested, daily life filled with things that interest the participant). The total score ranges from 0 to 25; higher scores indicate a better mental well-being ($\alpha_{Cronbach}=0.796$).

The fear of COVID-19 scale

This 7-item tool is used to measure the extent of fear of the COVID-19 in adult people.³⁰ It is scored on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The total score ranges from 1 to 35, with higher scores indicating a greater fear of COVID-19 ($\alpha_{Cronbach}=0.893$).

The InCharge Financial Distress/Financial Well-Being Scale (IFDFW)

This tool includes eight items that assess the perceived financial distress/financial well-being on a linear scale from 1 to 10.³¹ Lower scores reflect higher financial distress and lower well-being ($\alpha_{Cronbach}=0.925$). Since this tool is copyrighted, written permission was obtained from the authors for cross-cultural validation and use in Lebanon.

The Family APGAR Index

This short self-reported instrument evaluates the satisfaction with global family function.³² It consists of five questions, each corresponding to a component of family function, i.e., Adaptation, Partnership, Growth, Affection, and Resolve (APGAR). All items are scored on a 3-point Likert scale: 0 (hardly ever), 1

(some of the time), and 2 (almost always). The total score ranges from 0 to 10. Higher scores indicate higher satisfaction with family function ($\alpha_{\text{Cronbach}}=0.927$).

Translation Procedure and Piloting

All the scales used in this paper were translated into Arabic, except for the WHO-5, already validated and available in this language. Three authors performed the forward translation, and the other three, the back translation. Discrepancies between original English versions and translated ones were resolved by consensus.

The questionnaire was pilot-tested with ten people unfamiliar with the study to get to the final version; answers were not included in the final dataset.

Statistical Analysis

Data were collected using Google Forms and generated on an Excel sheet, then transferred to IBM SPSS® software, version 23.0 for analysis. The database was weighted according to gender, age, and region of residence, based on the Central Administration of Statistics,³³ before analysing it.

For the descriptive analysis, frequencies and percentages were used for categorical variables, and means and standard deviation for quantitative variables. For the dependent variable (WHO-5), the median and interquartile range were presented as well, for descriptive purposes. The distribution of the WHO-5 variable was considered normal using visual inspection of the histogram, while the skewness and kurtosis were both lower than 1. These conditions are considered compatible with normality in a sample size higher than 300.³⁴

For the bivariate analysis of continuous variables, the Student's T-test was used to compare the means between two groups and ANOVA between three groups or more, after checking for homogeneity of variances using Levene's test; when variances were not homogenous, the corrected T-Test and the Kruskal-Wallis test were used, respectively. Post-hoc analyses were conducted, after ANOVA and Kruskal-Wallis comparisons, using Bonferroni adjustment. The McNemar-Bowker test was used to compare categorical variables before and after the beginning of the economic crisis. A Spearman correlation coefficient was used to correlate between scale variables. In all cases, a p-value lower than 0.05 was considered significant.

As for the multivariable analysis, a multiple linear regression was conducted to assess the correlates of WHO-5 in the whole sample and adjust for potential confounding, after checking the residues normality, linearity of the relationship, absence of multicollinearity, and homoscedasticity assumptions; a stepwise method was used to reach the most parsimonious model. As for the workers/trying to work subgroup analysis, a linear regression using the Generalized Linear Model was used, since the additional variables related to work conditions were multinomial; the ENTER method was used to reach the appropriate model with appropriate assumptions. Independent variables included in the models had a p-value lower than 0.1

in the bivariate analysis, taking into account the allowed maximal number of variables to be included given the sample size. The beta coefficient, its 95% Confidence Interval (CI), and the p-value were reported in both models.

Results

Sociodemographic characteristics of participants

The sample included 502 participants, with 52.7% females, 57.8% married, and 88.5% university degree holders. The distribution over the regions was as follows: 16.7% in Beirut (the city capital), 44.2% in Mount Lebanon, 15.9% in the North, 13.8% in the South, and 9.5% in the Beqaa. Only 32% of participants lived in a household of less than four persons; 58.8% had one or more dependent child, and 33.2% were living in a house of fewer than five rooms. Moreover, 39.3% of participants never consumed alcohol, 66.6% never smoked cigarettes, and 72.3% never smoked waterpipe. Around 6% reported verbal violence at home, while other reported types of domestic violence accounted for less than 2%. Furthermore, 71.9% of the sample had an employment (61.9%) or were looking for one (10%), 10.3% were housewives or never worked, 9.9% were students, and 7.9% had retired (Table 1).

Mental well-being distribution

In this sample of the Lebanese general population, MWB had a mean of 14.80 (SD=4.93; 95% CI [14.37;15.24]), a median of 14 (IQR=11; 19), and a range between 2 and 25 (Figure 1).

Sociodemographic characteristics and MWB

A better mean MWB was associated with the male gender (15.61), an education below the university level (16.03), no consumption of alcohol (15.29), no smoking of waterpipe (15.10), and greater satisfaction with family life (APGAR). Occasional cigarette smokers (13.69) and participants who reported violence in their homes (11.37) had lower mean MWB. Additionally, a significant positive correlation was found for the APGAR family scale and the WHO-5 ($r=0.251$). Significant differences were not found for the rest of the characteristics (Table 1).

Economic characteristics and MWB

People who subjectively classified themselves as belonging to the middle class both prior to the economic crisis and the pandemic (15.02) and after (15.39) had a better MWB; the more people feared poverty, the lower their MWB ($r=-0.236$). On the contrary, the better their current financial situation, the better their MWB ($r=0.206$) (Table 2).

Figure 2 shows the sample's subjective assessment of the socioeconomic status before and after the COVID-19 pandemic; it revealed a significant decrease ($p<0.001$) of rich and middle classes self-classification, versus a notable increase in low and below poverty categories.

Professional characteristics and MWB

When comparing individuals who were employed and those looking for employment (looking for a job/licensed from work), the latter had a lower mean MWB (12.77) compared to those still working (mean MWB varies from 14-15). Since the beginning of the economic crisis (not the COVID-19 crisis), workers who were still employed (15.51) had the best MWB compared to all other categories (12 to 14). Employees who reported a current decrease in salary (25-50%), or were dismissed from work (25-75%) had significantly affected MWB compared to workers employed at companies that were not being affected by the crisis. Moreover, incremental concern that the current crisis would affect one's employment was inversely related to MWB ($r=-0.206$) (Table 3).

COVID-19 exposure, health characteristics, and MWB

As for health-related matters, only 0.6% of participants reported having been infected with COVID-19. Physical activity significantly improved MWB (15.23 vs. 14.05, with nearly 30% of the population reporting an increase in the time they dedicated to physical exercising), while having a chronic disease decreased MWB (13.90 vs. 15.04). In addition, the fear of becoming unable to supply themselves with their medications (13.67) and the fear of going out to receive treatment (13.16) were significantly associated with lower MWB. The higher the fear of COVID-19, the lower the MWB ($r=-0.228$) (Table 4).

Multivariable analyses: Correlates of WHO-5

The multivariable analysis (Table 5) showed that correlates of MWB differed between the full sample and the workers/looking for a job subsample. In the full sample, better satisfaction from family ($\beta=0.380$) and a better financial situation ($\beta=0.029$) were significantly correlated with better MWB. However, a lower MWB was significantly different among females ($\beta=-1.533$), participants who attended university ($\beta=-2.119$), participants who manifested fear of COVID-19 ($\beta=-0.131$), participants who manifested fear of poverty ($\beta=-0.232$), participants who reported verbal violence at home ($\beta=-3.464$), and the ones who had a chronic disease ($\beta=-1.307$).

In the subsample of workers/looking for a job, additional factors affected MWB: waterpipe smoking (current [$\beta=3.079$] or none [$\beta=2.297$] versus previous) and physical exercise ($\beta=1.318$) were associated with better MWB, while being self-employed before the crisis ($\beta=-1.22$), working from home since the economic crisis (-1.853), closure of the institution ($\beta=-1.2$), and worrying about the long-term effect of the crisis on one's employment status ($\beta=-0.433$) were associated with a lower MWB. It is noteworthy that the fear of COVID-19 was not significantly associated with MWB ($p=0.192$).

Discussion

This study shed light on the combined effects of the current economic crisis and COVID-19 pandemic on the MWB in the general population in Lebanon. It showed that during the pandemic, economic and other factors, directly or indirectly related to COVID-19, significantly affected MWB of the general population.

However, fear of COVID-19 lost its significance in the workers' group, who reported that the main factors negatively affecting their MWB were those directly related to their employment status and the already collapsing Lebanese economy. In all groups, individuals with a more favourable financial status seemed to be at lower risk of being affected by both the pandemic and the economic situation, since the IFDFW scores were positively correlated with a better MWB.

In the current context, fear of poverty is illustrated by the subjective economic assessment, showing a significant shift towards low and below poverty classes, thereby revealing the direct impact of difficult financial situations on their MWB. Prior to the COVID-19 outbreak, the World Bank had forecasted that by 2020, the proportion of Lebanese below the poverty line would increase from 30 to 50%.³⁵

Regarding the workers' group, individuals owning their businesses before the crisis, working from home since the beginning of the economic crisis, and worrying about the long-term effect of the crisis on their employment status experienced the worst MWB. The main impact was directly related to worrying about their work: those who worked remotely from home feared a wage cut-down or even dismissal if the situation persisted. Business owners feared a complete collapse in income, in the absence of governmental financial support, since budgetary policies are lacking in Lebanon.³⁶

Although "economic damage" can only be assessed when the pandemic subsides,³⁷ financial loss creates long-lasting socioeconomic distress with anger and anxiety that can last months after the pandemic. A recent report from the World Bank pointed out a substantial impact of COVID-19 on the Lebanese economy (11% decrease in GDP), especially with uncertainties about the duration of the pandemic and the drastic changes in the financial system.³⁶ In such a vulnerable system, workers were highly preoccupied with the wilting economy and outcomes of lockdown on their employment rather than fearing the virus itself.

In contrast, unemployed respondents (retired, students, and housewives) worried about contracting the virus and not being able to afford the treatment. Our results are different from those reported in China, where the helplessness feeling of participants was low, although more than half of them declared feeling horrified and apprehensive because of the COVID-19 pandemic.³⁸ A possible explanation is that China being the world's second-largest economy, people can afford to stop working and rest during the lockdown, without their MWB being affected.³⁸

Another significant aspect is the level of education. Our results showed that the higher the level of education, the lower the MWB. This outcome is not surprising since being unable to plan, face unforeseen expenses, and overcome any sudden deterioration in people's economic environment has an impact on their MWB.¹¹ Therefore, in our study, participants holding university degrees might have felt deceived and worried about their future in Lebanon due to the current challenging context.

In addition to the economic factors, our results showed that some sociodemographic factors also affected the MWB of Lebanese people; lower MWB was associated with the female gender, having a

chronic disease, and experiencing verbal violence at home, whereas a better family satisfaction was correlated with a better MWB. These associations can be explained by homeschooling led by mothers³⁹ and forced confinement with a violent partner,⁴⁰ while family support improves MWB.³⁸ A recent systematic review evaluating the impact of the COVID-19 pandemic on mental health outcomes, including MWB, concluded that a lower psychological well-being was noted among females and those who self-reported a poor health.¹⁵ In fact, vulnerable people, particularly those with chronic diseases, require special attention. Around 20% of our respondents had a chronic disease and exhibited a lower MWB in the whole group and the workers' subgroup. Lebanon has high percentages of vulnerable populations, such as elderly,⁴¹ and chronic diseases,⁴²⁻⁴⁴ considered at higher risk for COVID-19 and lower MWB.^{15,45} Reasons in this context could include panic due unreliable information for patients,⁴⁶ especially in an era of massive misinformation in the media,^{47,48} added to the economic situation itself. Furthermore, the healthcare system in Lebanon is mainly private,⁴⁹ while 10.5% of our population reported not having any health coverage. Consequently, patients with chronic diseases might fear not being able to afford medications and medical care, especially with the significant drop in the sizes of the rich and middle classes, in favour of a significant increase in poor and below poverty classes, as demonstrated by our results.

Finally, only in the workers' group, current smoking status was significantly associated with better MWB versus previous smokers. It is noteworthy that in Lebanon, behavioural/motivational factors for smoking cessation are mainly driven by health-related issues. Thus, this particular population of "previous smokers" might be at higher risk of vulnerability and chronic diseases (including pulmonary diseases), exposing them to lower MWB scores.⁵⁰ The positive correlation among current waterpipe smokers (regular and occasional) might seem surprising since tobacco exposure is known to be a major risk factor for decreased MWB.⁵¹ However, smokers might have felt some relief reducing their stress and anxiety towards hardship, through the already known "self-medication" hypothesis of smoking, postulating that individuals turn towards smoking to cope with stress and alleviate their depression and anxiety symptoms;⁵²⁻⁵⁴ this is added to the specificities of waterpipe smoking (positive and negative reinforcement, social aspect and conviviality).^{50,54}

Our study also revealed the beneficial effects of physical activity/exercise on overall MWB, particularly in the subgroup of workers, with almost 30% of them reporting an increase in the time allocated for exercise. Several reports have been published recently regarding the importance of physical exercise as a therapy to fight the mental and physical consequences of COVID-19 lockdown.^{55,56} Physical activity and exercise help also maintain immune system function in the current precarious environment and are particularly recommended in vulnerable populations such as those with chronic diseases⁵⁷ who scored a lower MWB in our study.

Overall, these results are compatible with the Biopsychosocial model that we had used to generate the hypotheses and build the questionnaire, and Lebanese mental wellbeing was related to biological characteristics (chronic disease and family history of COVID-19), behavioural/psychological factors

(health beliefs such as the fear of COVID-19), and social conditions (family relationships, education, economic status and social support).²⁷

Limitations and strengths

Some limitations could be noted in our study. Although our sample was weighted for gender, age, and regions, it mainly consisted of people with a university level of education with high computer literacy; thus, our results might not be generalized to the whole population. This outcome was expected since the survey used was online, and only computer literate people with Internet access were able to participate. However, this selection bias is not expected to affect the associations found in the multivariable analysis since the education factor was taken into account as a potential confounder, and all results were adjusted over the education factor. Moreover, although the questionnaire was piloted to improve its clarity, there is a probability of information bias, since the questionnaire was self-administered online, with no possibility to explain confusing questions to respondents, if any; however, the use of an online questionnaire is expected to decrease the subjectivity related to interviews. Furthermore, recalling difficulty and subjectivity bias related to some questions are also plausible. In all cases, the non-differential information bias would drive the results towards the null hypothesis, thus underestimating the real associations. An additional potential bias would be the residual confounding since not all confounders could be measured.

Nevertheless, and despite these limitations, to the best of our knowledge, this is the largest (sample size large enough to account for statistical power of main comparisons) and the first study evaluating the combined effect of the COVID-19 pandemic and the economic crisis on the MWB in the general population. Moreover, a standardized questionnaire with validated scales was used to evaluate MWB, economy or COVID-19-related factors. Finally, our study pilot-tested the validity of the questionnaires, and all used scales have shown very good to excellent reliability.

Clinical implications

In light of all these challenges, the Lebanese government should implement a reliable crisis management strategy that outlines stabilization and recovery measures to help people navigate through this period with minimal impact on mental, physical, and overall quality of life.^{2,58}

Several useful tips could also be applied to manage COVID-19 parenting challenges. In that context, the United Nations Children's Fund (UNICEF) published an article with a list of expert tips to help parents well interact with their children and families during this period.⁵⁹ Some of these tips are of particular interest in our population since they help parents, and women, in particular, cope with the financial stress, and involve children and teens in organizing family budgets. Such an approach would alleviate the tension within the family and build a model of “peaceful and loving relationships” where children feel more secure and loved.⁵⁹

Moreover, it is of paramount importance to promote strategies aiming at improving mental well-being of patients with chronic diseases. Such strategies would include measures to protect them against the COVID-19, educate them on the importance of communicating with their healthcare providers and adhering to treatments, in addition to developing strategies for telemedicine and remote consultation if the lockdown persists⁶⁰. Specific recommendations have already been developed in Lebanon for the geriatric population⁴⁶ and cancer patients⁶¹⁻⁶³, even if their implementation could face obstacles due to the reluctance of patients to change⁶⁴.

Finally, this period could be the opportune moment to quit smoking^{65,66}, especially in a country reporting the highest smoking rates (waterpipe/cigarette) in the Middle East; people should be encouraged to overcome their boredom by choosing “healthier” options such as physical exercise. However, it is imperative to ensure that safety precautions are followed to reduce the risk of spreading the infection and preferably exercise at home^{55,57}.

Conclusion

This study shed light on the combined outcomes of the current economic crisis and COVID-19 pandemic on the mental well-being in a developing country. It showed that during the pandemic, economic and other factors, directly or indirectly related to COVID-19, significantly affected mental well-being. The fear of COVID-19 and fear of poverty mainly impacted the MWB of the general population; however, the fear of COVID-19 lost its significance among workers, who reported that factors negatively affecting their MWB are directly related to their employment and the already collapsing economy in Lebanon.

Decision makers should be aware that economic hardship can surpass COVID-19 fear in relation with mental well-being; this leads to the hypothesis that people would work on relieving their mental stress through economic activity rather than respecting COVID-19 restrictions, which may increase the risk of contracting the infection. Further research is necessary to confirm this paradigm.

Declarations

Ethics approval and consent to participate

The Institutional Review Board of the American University of Science and Technology approved this study protocol (AUST-IRB-20200527-01). The topic was explained to all participants in the introductory section of the survey and consent to participate was implicit. Anonymity of participants was guaranteed throughout the process of data collection and analysis.

Consent for publication: Not applicable.

Availability of data and materials: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests: None declared.

Funding: None.

Authors' contributions: All authors had full access to all data in the study and take responsibility for the integrity of the data and accuracy of analysis. HS and AH contributed in literature search, study design, data collection, and drafting the manuscript. DB, CAS and RA contributed in literature search, data collection, and drafting the manuscript. PS designed the study, analysed the data and contributed in data collection and drafting the manuscript.

Acknowledgements: The authors would like to thank all the persons who helped distribute the questionnaire.

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Tables

Table 1. Sociodemographic characteristics and MWB

Characteristic	Frequency (%)	Unadjusted MWB Mean (SD)	p-value
N=502(100%)			
Gender			<0.001 ^a
Male	237(47.3%)	15.61(5.02)	
Female	265(52.7%)	14.08(4.74)	
Marital status			0.243
Single	189(37.6%)	15.26(5.08)	
Married	290(57.8%)	14.57(4.78)	
Widowed/Divorced	23(4.6%)	14.01(5.44)	
Level of education			0.044 ^a
Less than university	58(11.5%)	16.03(4.97)	
University degree	445(88.5%)	14.64(4.90)	
Dwelling region			0.115
Beirut (capital)	84(16.7%)	14.06(4.45)	
Mount Lebanon	222(44.2%)	14.62(4.70)	
South Lebanon	69(13.8%)	15.93(5.15)	
Beqaa plain	47(9.5%)	14.34(4.50)	
North Lebanon	80(15.9%)	15.40(5.90)	
Household size			0.113
Lower than 4	161(32.1%)	14.79(4.64)	
4 persons	137(27.2%)	14.05(5.18)	
5 persons	122(24.2%)	15.10(4.37)	
6 and more	83(16.5%)	15.63(5.69)	
Number of dependent children			0.163
None	207(41.2%)	15.35(5.07)	
1 child	46(9.1%)	14.37(5.25)	
2 children	132(26.3%)	14.17(4.54)	
3 or more	118(23.4%)	14.73(4.94)	
Number of rooms other than the kitchen and bathrooms			0.775

< 5 rooms	167(33.2%)	15.05(4.84)	
5 rooms	138(27.6%)	14.72(4.86)	
6 rooms	109(21.8%)	14.87(4.79)	
7 or more	87(17.4%)	14.39(5.43)	
Alcohol consumption			0.018 ^a
Previous	14(2.8%)	11.52(2.72)	Ref
None	197(39.3%)	15.29(5.23)	0.035
Occasional	248(49.3%)	14.47(4.72)	0.176
Regular	44(8.7%)	15.51(4.80)	0.051
Cigarette smoking			0.040 ^a
Previous	21(4.1%)	14.15(5.99)	0.905
None	334(66.6%)	14.93(4.88)	0.847
Occasional	87(17.4%)	13.69(4.82)	0.038
Regular	60(11.9%)	15.95(4.77)	Ref
Waterpipe smoking			0.009 ^a
Previous	27(5.3%)	12.41(3.88)	Ref
None	363(72.3%)	15.10(4.99)	0.038
Occasional	79(15.7%)	13.87(4.96)	1.000
Regular	33(6.7%)	15.66(4.22)	0.066
Violence at home^b			
Verbal violence vs no	30(5.9%)	11.37(4.52)	<0.001 ^a
Physical violence vs no	8(1.6%)	11.35(5.27)	0.301
Sexual violence vs no	7(1.4%)	11.94(4.99)	0.727
Other violence vs no	8(1.6%)	11.35(5.27)	0.324
No violence	472(94.1%)	15.07(4.91)	Ref
Professional status			0.075
Works/looking for a job	361(71.9%)	14.60(4.75)	Ref
Housewife/never work	52(10.3%)	15.12(4.42)	1.000
Student	50(9.9%)	16.44(5.60)	0.081
Retired	40(7.9%)	14.21(5.94)	1.000

	Mean (SD)	Unadjusted Correlation (r)	p-value
Age in years	42.47(14.06)	-0.057	0.219
APGAR family	7.81(2.72)	0.251	<0.001 ^a

^aStatistically significant result; ^bMore than one option is possible.

Table 2. Economic characteristics and MWB

Characteristic	Frequency (%)	Unadjusted MWB Mean (SD)	p-value
N=502(100%)			
Subjective assessment before COVID crisis			0.009 ^a
No answer	5(1.0%)	12.31(4.42)	1.000
Rich	30(6.1%)	13.93(5.26)	0.222
Middle class	448(89.2%)	15.02(4.92)	0.015
Middle to low	11(2.1%)	13.42(3.74)	0.859
Below poverty line	8(1.6%)	9.49(1.84)	Ref
Subjective assessment after COVID crisis			0.007 ^a
No answer	14(2.8%)	13.80(5.05)	1.000
Rich	5(1.1%)	15.54(4.27)	1.000
Middle class	327(65.1%)	15.39(5.09)	0.007
Middle to low	137(27.2%)	13.69(4.32)	Ref
Below poverty line	19(3.8%)	13.29(5.00)	1.000
Current Health Coverage			0.213
No health coverage	53(10.5%)	14.31(4.69)	
Private insurance	205(40.8%)	15.03(5.06)	
Social security	155(30.9%)	14.41(4.77)	
Other public coverage	90(17.8%)	15.61(5.17)	
Household income			0.370
Less than 675,000LP	15(2.9%)	13.74(4.40)	
675,000-1,500,000LP	64(12.8%)	14.10(4.63)	
1,500,000-3,000,000LP	149(29.7%)	14.67(5.01)	
More than 3,000,000LP	274(54.5%)	15.10(4.93)	
Socioeconomic quartile			0.733
Quartile 1	134(26.6%)	15.02(4.75)	
Quartile 2	142(28.3%)	14.85(5.44)	
Quartile 3	119(23.7%)	14.39(4.81)	
Quartile 4	101(20.1%)	15.02(4.68)	

	Mean (SD)	Unadjusted Correlation (r)	p-value
Fear of poverty	6.90(2.65)	-0.236	<0.001 ^a
IFDFW financial wellbeing scale	39.9(17.33)	0.206	<0.001 ^a

^a*Statistically significant result.*

Table 3. Professional characteristics and MWB

Characteristic	Frequency (%)	Unadjusted MWB Mean (SD)	p-value
N=361(100%)			
Public sector work	65(17.9%)	14.62(4.58)	0.866
Private sector work	296(82.1%)	14.50(5.53)	
Income basis			0.116
Own business	81(22.4%)	14.84(4.11)	
Project basis	11(3.1%)	16.97(4.37)	
Monthly income	246(68.1%)	14.58(4.97)	
Daily wages	23(6.4%)	12.90(4.29)	
Healthcare profession			0.359
No	173(48.0%)	14.84(4.85)	
Yes	187(37.3%)	14.38(4.66)	
Work before economic crisis^b			
Works on his/her own versus no	130(35.9%)	14.00(4.41)	0.076
Owns an enterprise versus no	93(25.7%)	13.93(4.35)	0.100
Managerial position versus no	155(42.8%)	14.78(4.93)	0.519
Employee versus no	208(57.7%)	14.53(4.87)	0.764
Looking for a job versus no	41(11.3%)	13.25(4.35)	0.052
Work during COVID crisis^b			
Goes to work now versus no	197(54.6%)	14.63(4.99)	0.903
Has absolutely go out versus no	176(35.1%)	14.93(4.89)	0.193
Applies social distancing versus no	142(39.3%)	15.15(4.72)	0.003 ^a
I was licensed from work versus no	16(4.4%)	12.60(4.73)	0.086
Job cannot be done from home versus no	70(13.9%)	14.22(4.76)	0.457
Current position after COVID crisis^b			
Works on his/her own versus no	125(34.7%)	14.08(4.28)	0.113
Owns an enterprise versus no	87(24.0%)	13.95(4.53)	0.144
Managerial position versus no	145(40.1%)	15.07(4.89)	0.119
Employee versus no	205(56.7%)	14.67(4.89)	0.731

Looking for a job versus no	50(13.9%)	12.77(4.66)	0.009 ^a
Change since economic crisis start			0.001
No change	135(37.4%)	15.51(4.81)	Ref
Permanent closure	11(3.05%)	12.00(3.98)	0.013
Temporary closure	53(14.7%)	14.07(4.38)	0.020
Work from home	20(5.5%)	12.86(4.42)	<0.001
Decrease shifts	80(22.2%)	14.59(4.43)	0.070
Does not apply	61(16.9%)	14.09(5.25)	0.039
Change since COVID crisis			0.343
No change	46(12.7%)	16.31(5.80)	
Permanent closure	21(5.8%)	13.94(3.96)	
Temporary closure	63(17.5%)	14.35(4.08)	
Work from home	79(21.9%)	14.00(4.50)	
Decrease shifts	106(29.4%)	14.43(4.60)	
Does not apply	46(12.7%)	14.94(5.37)	
Current personal income change			0.310
No change in income	152(42.1%)	15.29(5.03)	
Decrease by 25%	48(13.3%)	14.76(5.18)	
Decrease by 50%	77(21.3%)	13.94(4.63)	
Decrease by 75%	53(14.7%)	13.39(3.23)	
Temporary no salary	22(6.1%)	13.76(3.80)	
Was licensed	9(2.49%)	14.97(5.21)	
Current enterprise salary change			0.050
No change in salaries	153(42.4%)	15.40(5.34)	Ref
Decrease by 25%	58(16.1%)	13.63(4.23)	0.007
Decrease by 50%	74(20.5%)	13.90(3.89)	0.036
Decrease by 75%	13(3.6%)	13.31(4.97)	0.138
Temporary no salary	14(3.9%)	14.83(5.24)	0.509
Does not apply	49(13.6%)	14.57(4.12)	0.588
Current enterprise employees licensing			0.004 ^a

No change	231(64.0%)	15.11(4.92)	Ref
Licensing by 25%	36(10.0%)	13.54(4.21)	0.067
Licensing by 50%	19(5.3%)	12.44(4.63)	0.005
Licensing by 75%	7(1.9%)	11.05(3.16)	0.037
Licensing all employees	7(1.9%)	17.59(3.95)	0.165
Does not apply	61(16.9%)	13.95(4.16)	0.130
	Mean (SD)	Unadjusted Correlation (r)	p-value
Years of experience	16.81(10.30)	-0.032	0.556
Years current position	12.88(10.19)	-0.020	0.347
Worry that the crisis would affect the job	7.80(2.51)	-0.206	<0.001 ^a

^aStatistically significant result; ^bMore than one option is possible.

Table 4. COVID-19 exposure, health characteristics, and MWB

Characteristic	Frequency (%)	Unadjusted MWB Mean (SD)	p-value
N=502(100%)			
Had COVID-19 infection			0.990
Yes	3(0.6%)	14.77(2.32)	
No	499(99.4%)	14.80(4.94)	
Contact with COVID-19			0.257
Yes (work, family, store)	18(3.5%)	16.11(4.26)	
No	484(96.5%)	14.76(4.95)	
Knows someone infected			0.164
Yes	145(28.8%)	15.27(4.57)	
No	357(71.2%)	14.62(5.06)	
Visiting/receiving friends			0.517
Yes	109(21.8%)	15.08(4.46)	
No	393(78.2%)	14.73(5.06)	
Visiting/receiving family			0.103
Yes	311(61.9%)	14.52(4.73)	
No	191(38.1%)	15.26(5.22)	
Physical activity			0.010 ^a
Yes	321(64.0%)	15.23(4.93)	
No	181(36.0%)	14.05(4.85)	
Chronic disease			0.036 ^a
Yes	103(20.5%)	13.90(4.96)	
No	399(79.5%)	15.04(4.90)	
Regular treatment			0.009 ^a
Yes	127(25.4%)	13.67(4.77)	
No	40(8.0%)	15.99(5.19)	
Does not apply	334(66.6%)	15.09(4.90)	
Fear no access to treatment			<0.001 ^a
No	153(30.5%)	16.03(4.85)	

Yes	136(27.0%)	13.14(4.59)	
Does not apply	213(42.4%)	14.98(4.93)	
Fear to go get treatment			0.003 ^a
No	217(43.2%)	15.09(4.98)	
Yes	77(15.4%)	13.16(4.77)	
Does not apply	208(41.4%)	15.12(4.85)	
Family member has chronic disease			
No	199(39.6%)	14.96(4.84)	0.605 ^b
Yes	261(52.1%)	14.72(4.99)	
Does not apply	42(8.3%)	14.55(5.06)	
Worried family member			0.204 ^b
No	96(19.1%)	15.15(4.80)	
Yes	268(53.4%)	14.40(5.02)	
Does not apply	138(27.4%)	15.35(4.81)	
	Mean (SD)	Unadjusted Correlation (r)	p-value
Fear of COVID-19	11.35(6.03)	-0.228	<0.001

^aStatistically significant result; ^bYes versus no modalities comparison.

Table 5. Multivariable analyses: Correlates of WHO-5

Model	Unstandardized beta	p-value	95%CI of Unstandardized beta
Correlates of WHO-5 (All sample)^a			
APGAR score	0.380	<0.001	0.235; 0.525
Fear of Poverty score	-0.232	0.007	-0.402; -0.063
Verbal violence in the home	-3.464	<0.001	-5.137; -1.790
Fear of COVID score	-0.131	<0.001	-0.199; -0.063
Female gender	-1.533	<0.001	-2.324; -0.743
University education	-2.119	0.001	-3.353; -0.885
Chronic disease	-1.307	0.009	-2.283; -0.330
IFDFW financial wellness score	0.029	0.027	0.003; 0.055
Correlates of WHO-5 (Workers)^b			
Female gender	-1.516	0.001	-2.429; -0.603
University education	-2.806	0.002	-4.552; -1.060
Verbal violence in the home	-2.579	0.027	-4.866; -0.292
Waterpipe Current vs previous	3.079	0.024	0.412; 5.747
Waterpipe sometimes vs previous	2.426	0.046	0.039; 4.813
Waterpipe none vs previous	2.297	0.044	0.061; 4.533
Physical activity	1.318	0.006	0.370; 2.265
Chronic disease	-1.411	0.017	-2.573; -0.249
Having its own work before crisis	-1.220	0.016	-2.208; -0.231
Work from home vs no change	-1.853	0.048	-3.692; -0.013
Temporary closure of institution	-1.201	0.094	-2.607; 0.204
IFDFW financial wellness score	0.041	0.013	0.009; 0.072
APGAR score	0.604	<0.001	0.447; 0.760
Worried about work	-0.433	<0.001	-0.650; -0.216
Fear of COVID score	-0.054	0.192	-0.136; 0.027

^aStepwise Likelihood ratio method; linear regression, assumptions checked. Included in first step: Age, gender, education, alcohol, cigarette, waterpipe, verbal violence, APGAR score, fear of poverty score, IFDFW, physical activity, chronic disease, fear of COVID score.

^bENTER method; linear regression using GEE, assumptions checked; Included in first step: Age, gender, education, alcohol, cigarette, waterpipe, verbal violence, APGAR score, fear of poverty score, IFDWF, physical activity, chronic disease, fear of COVID score; working on its own, being jobless, professional change since the crisis started; salary changes in the enterprise, licensing employees in the enterprise, worrying about long-term crisis effects on its job.

Figures

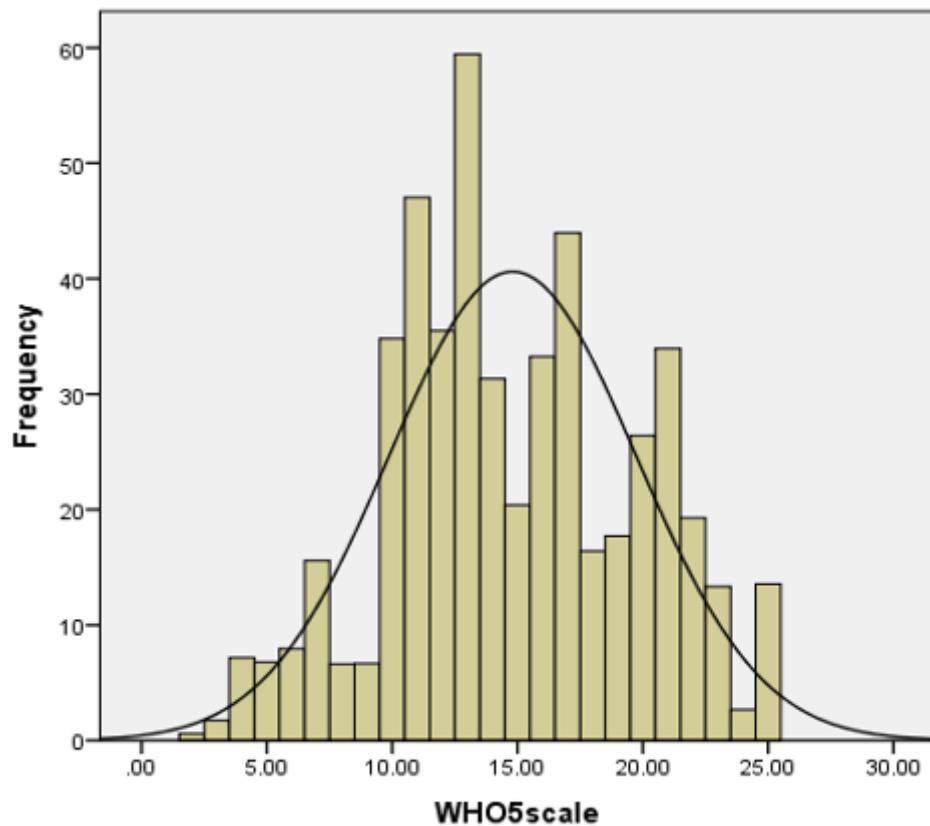


Figure 1

Histogram of Mental Well-Being in the Lebanese Population (n=502)

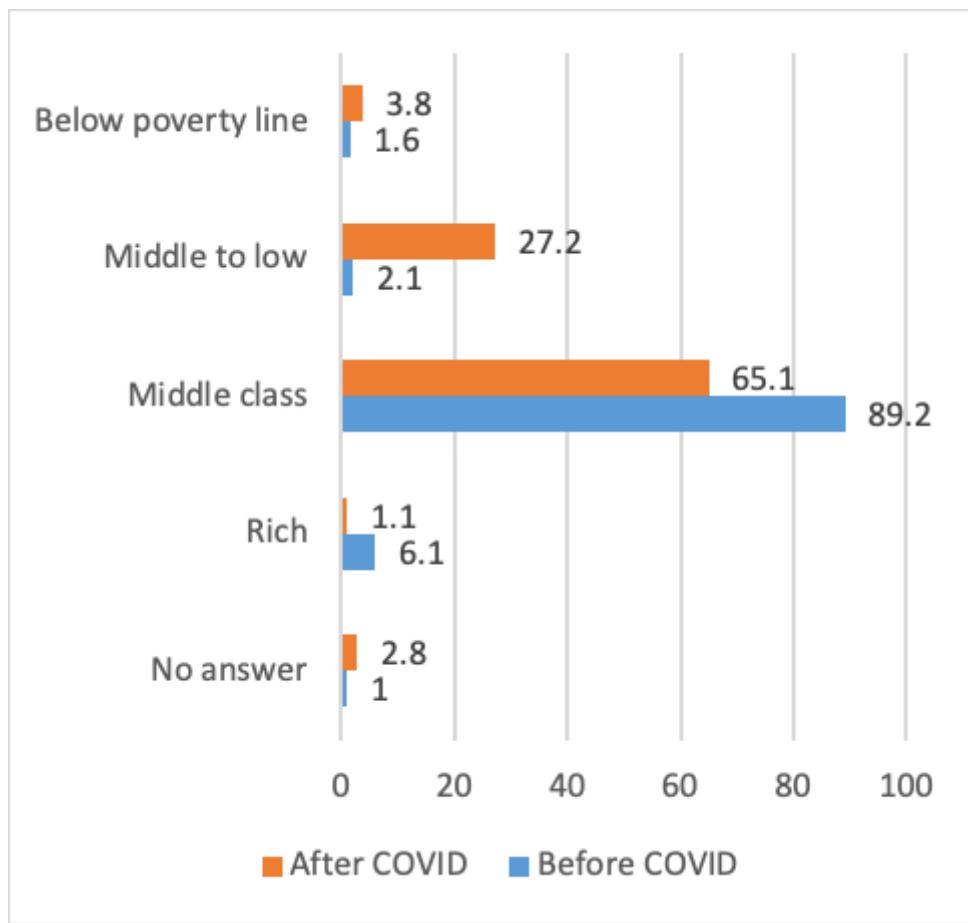


Figure 2

Subjective Economic Status Assessment of Lebanese Population Before and After COVID-19 crisis.
Percentages are shown; P-value for McNemar-Bowker test <0.001