

WHY DO PEOPLE HIGH IN COVID-19 WORRY HAVE MORE MENTAL HEALTH DISORDERS? THE ROLES OF RESILIENCE AND MEANING IN LIFE

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SUMMARY

Background: The existing literature has not adequately studied the influence of COVID-19 worry on mental health disorders. This study tested the mediating roles of resilience and meaning in life between COVID-19 worry and mental health disorders.

Subjects and methods: We recruited 284 Arabic speaking young adults (60.6% females; mean age = 26.25±7.57 years) to complete the COVID-19 Worry Scale, Brief Resilience Scale, Meaning in Life Measure, and Patient Health Questionnaire-9.

Results: Results showed that COVID-19 worry negatively predicted resilience and meaning in life and positively predicted mental health disorders. Furthermore, indirect effect of COVID-19 worry on mental health disorders via resilience and meaning in life was significant.

Conclusion: These results will contribute to find effective measures to prevent mental health disorders and promote reduced mental health disorders from the perspective of mitigating COVID-19 worry and increasing resilience and meaning in life.

Key words: COVID-19 worry – resilience - meaning in life - mental health disorders - Arab-speaking population

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INTRODUCTION

In late December 2019, a new type of coronavirus diseases (COVID-19) emerged in Wuhan city, the capital of Hubei Province in China and has exponentially spread throughout world. Recently, the World Health Organization (WHO) has declared the COVID-19 a public health emergency of global concern (WHO 2020). By 23 August 2020, the COVID-19 pandemic has spread across 188 countries and regions, with almost 23.2 million confirmed cases and 805.230 deaths. Iraq reported its first case of COVID-19 on 22 February 2020 and confirmed 201.050 cases and 6.353 deaths (Center for Systems Science and Engineering 2020). Due to the high infection rates of the virus and the necessity to protect the health of people, governments have implemented many measures to respond to reduce the spread of the virus. The COVID-19 can be considered as the first virus that drastically affect daily life of the general public across the globe since the 1918 Spanish flu pandemic. This study endeavoured to test the underlying mechanism between COVID-19 worry and mental health disorders by considering the role of resilience and meaning in life.

Despite its threat on physical health, the effects of COVID-19 on mental health have also been studied. The COVID-19 pandemic is likely to threaten not only people's lives and physical health, but also their mental health by leading to a wide range of psychological problems including depression, anxiety and stress (Arslan

et al. 2020a, Burke & Arslan 2020, Taylor et al. 2020), burnout (Yıldırım & Solmaz 2020), nervousness, xenophobia, uncertainty, panic attacks, depression, obsessive compulsory disorder (Anjum et al. 2020), and general mental health problems (Yıldırım & Güler 2020a). A high prevalence of symptoms of posttraumatic stress (7%) such as re-experiencing, adverse alterations in thoughts or mood levels, and hyper-arousal was reported on the general population in China due to COVID-19 quarantine (Liu et al. 2020) as well as high prevalence rates of 30% of anxiety and 17% of depression (Wang et al. 2020). Another study with more than 18,000 people in Italy reported high levels of depression, anxiety, stress, post-traumatic stress disorder, adjustment disorders, and insomnia during the COVID-19 and lockdown measures (Rossi et al. 2020). Similarly, Yıldırım and Güler (2020b) provided evidence from Turkey and showed that the general public experienced greater levels of death distress such as anxiety, depression, and obsession and lower levels of happiness and positivity.

Worry is a psychological factor that can trigger mental health problems during public health crisis like COVID-19 pandemic. Worry can be defined as continuous thinking about actual or possible future threats, risks, and uncertainties (Watkins 2008). During pandemic, the prevalence of psychological distress can be high due to worry about and fear of being infected with COVID-19 (Ahorsu et al. 2020, Šljivo et al. 2020). Increasing number of confirmed and suspected cases in

all over the world have resulted in public worry about being infected by the virus, which has increased anxiety (Bao et al. 2020). It is established in previous research that worry about economic influences and worry about academic delays were moderately related with the increased level anxiety among Chinese college students during COVID-19 pandemic (Cao et al. 2020). Evidence within the wider literature also suggests that worry is positively related with symptoms of depression and anxiety and negatively related with coping strategies (Hong 2007). A study with 788 survivors of the Wenchuan Earthquake showed that individuals with low level of trait resilience and worry about others was positively related with the symptoms of PTSD, while individuals with high level of trait resilience demonstrated little difference in PTSD symptoms as a function of worry about others (Ying et al. 2014).

Resilience refers to being capable of effectively “bounce back” from stressful situation in the face of adversity (Smith et al. 2008). With the capability of reframing their perspectives, resilient individuals tend to direct their attentions to positives, emphasise their strengths, and seek for opportunities to protect their mental health rather than negatives such as focusing on their weaknesses and vulnerability (Harrison 2013). Studies have reported that resilience strengthens our coping skills, which could increase well-being and flourishing (Kansky & Diener 2017, Yıldırım 2019, Yıldırım & Belen 2018) and reduce mental health problems (Florez et al. 2020, McDonnell & Semkowska 2020, Williams 2016). Resilience can facilitate an individual to cope with stressors associated with increased mental health problems including worry (Matthews et al. 2019). Resilience was associated with depression, anxiety and life satisfaction (Beutel et al. 2010) and a strong predictor of depression (Hjemdal et al. 2007). Promoting resilience could lead to better mental health and positive functioning (Yıldırım 2019). While earlier research reported that resilience mediated the relationship between risk perception, fear, depression, anxiety, and stress (Yıldırım et al. 2020), stress and burnout (Yıldırım & Solmaz 2020), and meaning in life, affect balance and psychological health (Arslan et al. 2020b) within the context of current pandemic, the role of resilience playing in the relationship between worry specific to COVID-19 and mental health disorders has not been explored. Investigating these relationships during pandemic could help to suggest alternative solutions to high mental health disorders, targeting mitigating role of resilience instead of directly address mental health disorders of individuals.

Meaning in life is another variable that is believed to be related to COVID-19 worry, mental health disorders and resilience. Meaning in life refers to individuals' beliefs that their lives are important, purposeful, coherent and seeking for worthwhile goals, and that are endowed with a sense of innate aim (Steger 2009). It is one of the key elements of psychological well-being

(Ryff & Keyes 1995). Although individuals differ in the degree to which they pursuit of meaning in life (Mascaro & Rosen 2008), those who have a sense of meaning in life are more likely to have better mental health. Previous studies have shown that meaning in life is negative associated with depression, anxiety and stress (Riichiro & Masahiko 2006) and positively related with mental health and psychological well-being (Alandete 2015). Longitudinal studies have demonstrated that meaning in life can predict changes in psychological distress like depressive symptoms (Mascaro & Rosen 2008). In addition, meaning in life is considered to be a mediator between stress and depressive symptoms in the context of COVID-19 pandemic (Arslan & Yıldırım 2020). Cultivating meaning in life can reduce symptoms of depression and stress in the face of adversity.

This study aimed to examine the mediating roles of resilience and meaning in life in the relationship between the COVID-19 worry and mental health disorders. As such, the findings obtained from the study were considered to contribute to the understanding of the relationship between the measured variables alongside facilitating mental health professionals to develop and implement mental health intervention programs to protect psychological health of individuals in the face of the COVID-19 pandemic. Based on the literature review above, we propose the following hypotheses: (1) COVID-19 worry can significantly and negatively predict resilience and meaning in life and positively predicted mental health disorders. (2) Resilience and meaning in life can significantly and negatively predict mental health disorders. (3) Resilience and meaning in life play mediating roles in the relationship between COVID-19 worry and mental health disorders. The hypothesised model of the study is presented in Figure 1.

SUBJECTS AND METHOD

Participants

The sample was composed of 284 Arabic speaking young adults (60.6% females) aged 18–57 years ($M=26.25$, $SD=7.57$) who were mostly university graduate (46.1%), single (60.9%), without any chronic disease (97.9%), non-smoker (90.9%), and with no confirmed or suspected COVID-19 including their first-degree relative (70.8%). Data were collected from those who have been confirmed or suspected with COVID-19 including their first-degree relative. All participants were imposed by government to quarantine at the designated places such as hotel and dormitories for 14 days following arrival from abroad.

Measures

Mental Health Disorders

Depressive symptoms were assessed with Patient Health Questionnaire-9 (Spitzer et al. 1999). The questionnaire comprises of 9 items and each item is an

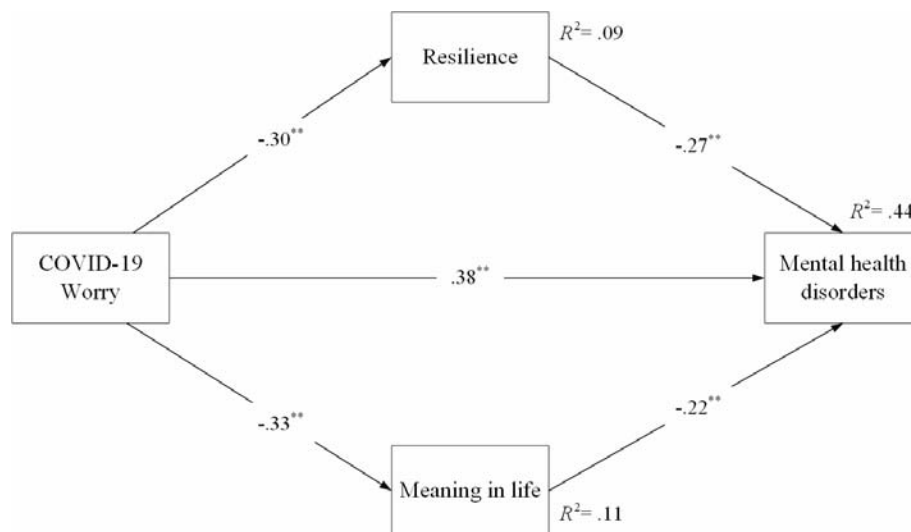


Figure 1. Structural model indicating the associations between the variables (** $p < 0.001$)

answered using a 4-point Likert type scale ranging from 1 (not at all) to 4 (nearly every day). Higher total scores reflect to more depressive symptoms while lower total scores reflect to better physical and psychological health. This scale has been used among Arab population (AlHadi et al. 2017). The internal consistency reliability was 0.81 in the present study.

COVID-19 worry

This variable was measured by the 3 statements generated for the purpose of this study. Each item is rated on a 5-point Likert scale, ranging from 0 (never) to 4 (very often). Higher scores indicate higher levels of worry related to COVID-19. Cronbach's alpha coefficient was 0.73 in the present study. Exploratory factor analysis yielded a one-factor solution explaining 65.37% of the variance.

Resilience

Brief Resilience Scale (Smith et al. 2008) was used to assess the ability to bounce back from stressful situation. There are 6 items scored on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores refer to higher levels of resilience. This scale has been used among Arab population (Younes & Alzahrani 2018). In the present study, Cronbach's alpha coefficient for the scale was 0.53.

Meaning in Life

Meaning in life was measured using Meaningful Living Measure (MLM; Arslan 2020). This scale includes 6 items answered using a 7-point Likert type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores indicate higher levels of meaning in life. In the present study, Cronbach's alpha coefficient was 0.89. Here, we further presented psychometric properties of the scale to enhance the utility of the scale in the target language.

Procedure

A cross-sectional web-based survey was adopted to collect data. All participants provided on-line consent. Participants were made aware about their right to terminate the survey at any time they want. The responses were anonymous, and confidentiality of given information was assured. Data collection were held between 18th May and 25th June 2020 using an on-line questionnaire distributed via the internet, using social networking sites such as WhatsApp. The on-line survey was developed using a free and secure software.

Data Analyses

Prior to testing the proposed mediation model, confirmatory factor analysis was first employed to examine factor structure of the Meaningful Living Measure (MLM) with the sample of the study, which was described in previous MLM validity study (Arslan 2020). After evaluating the structure validity of the measure, descriptive statistics and correlation analysis were conducted to explore the analysis assumptions and the association between the variables of the study. Normality was checked using skewness and kurtosis scores (Curran et al. 1996). Subsequently, the mediation model proposing the mediating role of meaning in life and resilience in the link of COVID-19 worry with mental health disorders was performed using the PROCESS macro (Model 4) for SPSS version 3.4 (Hayes 2018). Standardized regression estimate (β) scores and squared-multiple correlations (R^2) were examined to interpret the results of the mediation analysis, with the following effect sizes: 0.01-0.059 = small, 0.06-0.139 = moderate, and ≥ 0.14 = large (Cohen 1988). In addition to testing the model, the bootstrapping procedure with 10,000 resamples to estimate the 95% confidence intervals was employed to investigate the significance effect of indirect estimates (Hayes 2009, 2018, Preacher & Hayes 2008). All study analyses were performed using SPSS version 25.

RESULTS

Structure Validity of the MLM

We first examined factor structure of the MLM with the sample of the present study. Findings from the measurement model were evaluated using several data-model fit statistics and their cut points: The standardized root mean square residual ($SRMR \leq 0.05$ = good data-model fit and ≤ 0.08 = adequate) and the root mean square error of approximation ($RMSEA \leq 0.05$ = good data-model fit, ≤ 0.08 = adequate, and ≤ 0.10 = acceptable); Tucker-Lewis index and comparative fit index (TLI and CFI ≥ 0.95 = close data-model fit and \geq

0.90 = adequate) (Hooper et al. 2008, Hu & Bentler 1999). The measurement model, which structured the six items loading to meaningful living latent construct, provided good-data model fit statistics ($\chi^2=33.03$, $df=9$, $p<0.001$, CFI=0.97, TLI=0.95, RMSEA [95% CI] = 0.099 [0.064, 0.136], SRMR = 0.035). Factor loadings of the measure were strong and between 0.57 and 0.81, with robust indicator reliabilities, ranging from 0.32 to 0.65, see Table 1. The findings also showed that the MLM had strong latent construct reliability estimate ($H=0.89$). Taken together, these results provide initial evidence suggesting that the measure could be used to assess the sense of meaningful living in Iraq adults.

Table 1. Factor loadings of the MLM

Scale items	λ	ℓ^2
As a whole, I find my life meaningful	0.72	0.52
I find a meaning and purpose in the difficulties that I experience.	0.74	0.55
I have an ultimate purpose and meaning of my life.	0.81	0.65
I strive to achieve my goals.	0.80	0.64
I have meaningful social and intimate relationships.	0.75	0.57
My values and beliefs add more meaning to my life.	0.57	0.32

Table 2. Descriptive statistics and correlations

	Mean	SD	Skew.	Kurt.	α	1.	2.	3.	4.
COVID-19 Worry	8.27	2.82	0.07	-0.47	0.73	–	-0.33	-0.30	0.54
Meaning in life	33.78	7.95	-1.10	0.68	0.87	–	–	0.43	-0.46
Resilience	19.99	3.73	-0.19	0.19	0.53	–	–	–	-0.48
Mental health disorders	18.67	5.53	0.47	-0.17	0.80	–	–	–	–

Table 3. Unstandardized coefficients for the mediation model

Antecedent	Consequent M_1 (Resilience)				
		Coeff.	SE	t	p
X (COVID-19 worry)	a_1	-0.30	0.05	-5.25	<0.001
Constant	i_{M1}	23.98	0.79	30.39	<0.001
$R^2=0.09$; $F=27.52$; $p<0.001$					
		M_2 (Meaning in life)			
X (COVID-19 worry)	a_2	-0.69	0.12	-5.75	<0.001
Constant	i_{M2}	42.98	1.66	25.83	<0.001
$R^2=0.11$; $F=33.01$; $p<0.001$					
		Y (Mental health disorders)			
X (Coronavirus stress)	c'	0.56	0.07	7.76	<0.001
M_1 (Resilience)	b_1	-0.41	0.08	-5.34	<0.001
M_2 (Meaning in life)	b_2	-0.15	0.04	-4.23	<0.001
Constant	i_y	24.52	2.12	11.56	<0.001
$R^2=0.44$; $F=70.48$; $p<0.001$					

Note. SE = standard error; Coeff = unstandardized coefficient; X = independent variable; M = mediator variable; Y = outcomes or dependent variable

Table 4. Standardized indirect effects

Path	Effect	SE	BootLLCI	BootULCI
Total indirect effect	0.16	0.03	0.10	0.21
COVI-19 worry→Meaning→Mental health disorders	0.08	0.02	0.05	0.13
COVI-19 worry→Resilience→Mental health disorders	0.07	0.02	0.03	0.12

Note. Number of bootstrap samples for percentile bootstrap confidence intervals: 10,000

Mediation Analysis

Findings from descriptive statistics demonstrated that skewness ranged from -1.10 to 0.47, and kurtosis were between -0.47 and 0.68. these results suggested that all variables of the study had relatively normal distribution. Correlation results also indicated that COVID-19 worry had significant and negative association with meaning in life ($r=-0.33, p<0.001$) and resilience ($r=-0.30, p<0.001$), as well as was positively and significantly related to mental health disorders ($r=0.54, p<0.001$). Further, mental health disorders had negative and significant correlation with meaning in life ($r=-0.46, p<0.001$) and resilience ($r=-0.48, p<0.001$), as shown in Table 2.

We examined the mediating effect of meaning in life and resilience in the link between COVID-19 worry and mental health disorders using the PROCESS macro with Model 4 (Hayes 2018). Results from the analyses showed that COVID-19 worry was a significant predictor of resilience ($\beta = -0.30, p < 0.001$), meaning in life ($\beta = 0.33, p < 0.001$), and mental health disorder ($\beta = 0.39, p < 0.001$). Worry accounted for 9% of the variance in resilience and 11% of the variance in meaning in life. Subsequently, further results indicated that COVID-19 worry had indirect effects on mental health disorders through resilience ($\beta = -0.28, p < 0.001$) and meaning in life ($\beta = -0.22, p < 0.001$). Resilience and meaning in life partially mediated the effect of COVID-19 worry on mental health disorders. COVID-19 worry, resilience, and meaning in life, together, explained 44% of the variance in mental health disorders, as shown in Table 3 and Figure 1. The indirect effects of COVID-19 worry on mental health through resilience and meaning in life was significant. Standardized total and indirect effects with 95% bias-corrected confidence interval predicting mental health disorders scores are presented in Table 4.

DISCUSSION

The aim of this study was to test how extensively COVID-19 worry is associated with mental health disorders, and to evaluate whether resilience and meaning in life mediate the COVID-19 worry – mental health disorders association. Results showed a significant and positive association between COVID-19 worry and mental health disorders assessed in this investigation. In addition, there was equally consistent evidence that resilience and meaning in life mediated the association between COVID-19 worry and mental health disorders.

Although it is evident that worry is associated with an extensive range of mental health and behavioural problems (Anniko et al. 2015), investigation of COVID-19 specific worry within the context of pandemic has been neglected. Results from this study reveal that COVID-19 specific worry is associated with more mental health disorders. Although the positive associations between worry and mental health disorders have been previously documented within the wider literature (Young & Dietrich 2015), this association has rarely, if ever, been demonstrated in the context of COVID-19 pandemic, particularly in a community based sample of young adults who have been infected or suspected with COVID-19. This suggests consistent relationship between worry and mental health disorders in different contexts.

The assumption that COVID-19 worry is associated with mental health disorders because of resilience and meaning in life is well-supported by the findings from this study. COVID-19 worry was significantly associated with resilience. This is in accordance with the findings of Hrozanova et al. (2019) who documented that a significant negative association between worry and resilience. Resilience is a fundamental element well-being and mental health (Yildirim 2019). It is plausible to believe that why people with high levels of worry have poor ability to “bounce back” from stressful situations in the face of adversity. People who are able to manage their worry in times of crisis can effectively cope with difficulties arisen from the crisis. This study and those in the literature support the assumption that worry can hinder resilience (Hrozanova et al. 2019).

Second, COVID-19 worry was significantly negatively associated with meaning in life. That is, those who experienced more worry related to COVID-19 had a lower level of sense of meaning in life, confirming that worry is an important influencing factor of meaning in life (Negru-Subtirica et al. 2016). Our study also showed that resilience and meaning in life were associated with mental health disorders, meaning that individuals with high levels resilience and meaning in life tended to have lowered mental health disorders. These findings are in line with earlier research showing that those with a higher level of resilience tend to deal more effectively with depression (Elisei et al. 2013, Wingo et al. 2010). This finding is also in line with the notion that meaning in life is essential for offsetting the detrimental impact of traumatic life events on depressive symptoms (Krause 2007). As such, high resilience and meaning in life appear to play key mechanisms that explain why some people can cope with worry and depressive symptoms better than others in difficult times.

This study also found that resilience and meaning in life mediated the association between COVID-19 worry and mental health disorders. Specifically, higher worry related to pandemic was associated with decreased resilience and meaning in life, which partially explained why worry was positively associated with mental health disorders. This cross-sectional result is consistent with a conceptual model where resilience explains the link between negative life events and mental health (Gao et al. 2019) and a model where meaning in life mediated the relationship between coronavirus stress and depressive symptoms (Arslan & Yıldırım 2020). To gain more confidence in this model, future studies should use longitudinal analyses to test the causal chain that may lead COVID-19 worry to mental health disorders. It would be particularly informative to investigate individuals who have been infected with virus.

This study has important contributions. The current study, to the authors' knowledge, is the first study to empirically test a mechanism (i.e. resilience and meaning in life) that explains the association between COVID-19 worry and mental health disorders. It presents an empirical framework for the researchers by simultaneously testing resilience and meaning in life as mediators between COVID-19 worry and mental health disorders. Prior research has found a positive association between resilience, meaning in life, and psychological health within the context of COVID-19 pandemic (Arslan et al. 2020b). This study proposed that people worry during pandemic and their worries may generate mental health disorders. However, holding the ability to cope with stress or bounce back quickly from adversity and a sense of meaning in life can mitigate the impact of COVID-19 worry on mental health disorders. It is reasonable to assume that the more one is resilient and has a sense of meaning in life, the less chance they experience mental health disorders in difficult times. The fact that resilience and meaning in life partially mediated the association between worry and mental health disorders is a powerful evidence to the reduction of stressors in influencing mental health. In the light of these findings, mental health practitioners can take resilience and meaning in life into consideration when designing interventions aimed at reducing the impacts of pandemic specific stressors on mental health as here resilience and meaning in life have been found to be pivotal strengths for the promotion of mental health. Further, this study presents preliminary evidence regarding psychometric properties of MLS among an Arabic speaking population. This is beneficial for the comparison of research outcomes across cultures.

In this study, some limitations should be acknowledged. First, this study used a cross-sectional design, which cannot draw conclusions about a causal relationship among the measured variables. The emerging results of mediation analyses must be interpreted with caution on cross-sectional data. Future studies may test the hypothesised mediating model utilising longitudinal

or experimental studies. Second, all the measures used in the current study were self-report. As such, the relationships found in this study might be affected by common variance bias. Furthermore, using self-report measures might carry other biases such as recall bias and social desirability. Nevertheless, self-reports measures used in this study were advantageous in terms of providing low-cost and speedy data collection that are needed to respond in a timely manner to the demand of reaction toward COVID-19 during the pandemic. It would be useful that future research considers utilising other types of measurement approaches such as peer reports to corroborate the current study's findings. Third, the participants were those who were either infected or suspected with COVID-19 during the study period. As such, the current study's findings may not be generalized to those without such conditions. Finally, the participants were collected only from several institutions in Iraq. Considering that different countries have implemented different policies to prevent the spread and infection of COVID-19, people confirmed or suspected with COVID-19 may receive different levels of COVID-19 treatment. Thus, the current study's findings may not be replicated to other countries due to the adapting various policies toward the virus.

CONCLUSION

This study proposed a model to understand mental health disorders among a sample of individuals who were either confirmed or suspected with COVID-19 in Iraq. The results showed that COVID-19 worry was a significant factor explaining mental health disorders via resilience and meaning in life. More worry related to COVID-19 was associated with less resilience and meaning in life, which in turn led to mental health disorders. Therefore, healthcare providers may want to reduce worry related to COVID-19 among individuals confirmed or suspected with COVID-19 to mitigate mental health disorders via improving their ability to bounce back from adversity and sense of meaning in life.

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Consent was obtained from all participants included in the study.

Data availability statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of interest: None to declare.

Contribution of individual authors:

Murat Yıldırım: study design, literature review, method, discussion, approval of the final version.

Gökmen Arslan: study design, statistical analysis, results, approval of the final version.

Izaddin Ahmad Aziz: data collection, approval of the final version.

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