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# Exploring the associations between resilience, dispositional hope, preventive behaviours, subjective well-being, and psychological health among adults during early stage of COVID-19

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## Abstract

During the pandemic, people may experience various mental health problems. Psychological strengths may help them to cope with emerging challenges and foster mental health and well-being. This study examined the associations between resilience, dispositional hope, preventive behaviours, subjective well-being, and psychological health among adults during early stage of COVID-19. A total of 220 participants from general public participated this study completing a battery of measures (134 men [$M_{age}$ = 42.36 years, $SD$ = 8.99, range = 18 to 60] and 86 women [$M_{age}$ = 36.73 years, $SD$ = 7.44, range = 18 to 51]). This cross-section study indicated that resilience mediated the relationship between hope and psychological health and subjective well-being. Results also showed that hope, and resilience had significant direct effects on psychological health, and subjective well-being while preventive behaviours did not manifest a significant effect on these two variables except on resilience. Preventive behaviours mediated the relationship between hope and resilience. The results suggest that we should more pay attention to hope and resilience for the development and improvement of well-being and psychological health during the times of crisis.

**Keywords** Hope · Resilience · Preventive behaviours · Subjective well-being · Psychological health · COVID-19

The emergence of the novel coronavirus pandemic (COVID-19) has been connected to the Wuhan city in the province of Hubei, China. The first case of patient suffering from COVID-19 dated back to 17 November 2019 (The Guardian, 2020). Since the number of cases have been exponentially increasing globally. Currently, the COVID-19 still lacks a vaccine and the estimation of its impact on public health is unpredictable. As of 28 September 2020, there were a total of 33.238.168 confirmed cases and 999.629 deaths of COVID-19 around the world, touching 188 countries/regions (Center for Systems Science and Engineering, 2020). On 11 March 2020, WHO announced that COVID-19 can be characterised as the first pandemic caused by a coronavirus which has serious psychological, social and economic consequences (WHO, 2020a). To control the risk of COVID-19 on public health, WHO (2020b) recommended some measures to be implemented both at the individual-levels (e.g., frequent handwashing, wearing a medical mask) and nation-levels (e.g., imposing strict lockdowns restricting movement of people, restricted entering of foreigners).

In Turkey, the first case of COVID-19 was reported on 11 March 2020 (Republic of Turkey Ministry of Health, 2020a). Since, the numbers of confirmed cases have rapidly escalated and as of 28 September 2020, the numbers have reached to 315.845 with a total of 8.062 deaths (Republic of Turkey Ministry of Health, 2020b). As in many other countries, the Turkish government implemented many COVID-19 measures that required citizens to stay at home except for necessities and urgencies. On 20 April 2020, government announced partial lockdown as a preventive action against COVID-19 covering the largest 30 cities as well as some smaller cities with higher rates of COVID-19 cases. Furthermore, the travel restriction in-and-out of these cities was implemented.

As a consequence of the exponentially increasing numbers of confirmed cases and deaths, people have been experiencing

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various psychological problems such as depression, anxiety, and stress (Burke & Arslan, 2020; Kang et al., 2020; Xiang et al., 2020; Yildirim, Ozaslan & Arslan, 2020), fear (Ahorsu et al., 2020; Yıldırım, Geçer & Akgül, 2020), death distress (Yıldırım & Güler, 2020a), burnout (Yıldırım & Solmaz, 2020), and PTSD and hostility (Wang et al., 2020a). A recent study on general population in China reported that people experienced high levels of anxiety (28.8%), depression (16.5%), and stress (8.1%) during the COVID-19 pandemic (Wang et al., 2020b). Several peer-review studies have also examined emotional distress related to COVID-19 among Turkish population. For example, using a cut-off value of 17 for the depression score, Karaşar and Canlı (2020) found that those with lower level of education, diagnosed with any psychological disorder, and university students reported high depressive symptoms (16.6%) related to COVID-19. Collectively, COVID-19 related stressors can affect well-being and psychological health of individuals during the outbreak. Exploring individuals' characteristics may be fruitful to understand the impact of preventive behaviours on psychological health.

To date, epidemiological data on health problems of people suspected or diagnosed with COVID-19 has not been available. Thus, it is unknown how to respond best to consequences of the virus during the outbreak (Xiang et al., 2020). Maintaining positive mental health can be challenging in the presence of psychological distress such as anxiety and depression (de Cates, Stranges, Blake, & Weich, 2015). However, positive psychological resources like resilience and hope can facilitate to promote well-being and psychological health of individuals (Arslan, 2016; Snyder, 2000). Thus, this study attempted to understand the associations between hope, resilience, preventive behaviours, subjective well-being, and psychological health among general public during the early stage of COVID-19.

## Hope

Hope is defined as an one's perceived ability and capacity to achieve a goal with positive motivational state (Snyder, 2000). According to hope theory (Snyder's et al., 1991), the motivational state is incurred by sense of successful agency and pathways, which are two related yet different constructs. Agency (will-power) reflects to one's motivation to initiate or maintain the routes toward goals whereas pathway thoughts (way-power) reflects to one's perceived ability to create routes toward achieving a desired goal. Hope is also defined as an emotional process of psychological force or buffer that strengthens individuals to be resilient and help them to cope with disturbances (Fredrickson, Tugade, Waugh, & Larkin, 2003).

Hope has been associated with better health outcomes, quality of life, and daily functioning. Existing research broadly supports the negative link between hope and psychological health challenges. Higher hope is related with lower stress and depressive symptoms (Waynor, Gao, Dolce, Haytas, & Reilly, 2012), better quality of life (Hawro et al., 2014), positive cardiovascular outcomes (Warber et al., 2011), and improvements in the daily functioning (Gelkopf, Hasson-Ohayon, Bikman, & Kravetz, 2013). Hope is found to have significant direct effect on satisfaction with life, positive affect and negative affect (Muyan-Yılık, & Demir, 2019). Another systematic review study (DuBois et al., 2015), wherein 30 studies ($n$ = 14,624) were analysed to examine the relationship between positive psychological constructs and following health outcomes, reports that positive psychological constructs (e.g., hope, optimism, subjective well-being) are prospectively linked with health-related outcomes (e.g., health-related quality of life, functional status, cardiovascular diseases) in most studies. Individuals with higher levels of hope are more creative and demonstrate greater determination in seeking for their goals, which in turn could lead to greater levels of subjective well-being by attaining more successful outcomes (Snyder, 2000) and less psychological health problems, such as depression, anxiety (Arnau, Rosen, Finch, Rhudy, & Fortunato, 2007).

## Subjective Wellbeing and Psychological Health

Subjective well-being (SWB) is one of the most studied variables in the field of positive psychology. The SWB is operationalized as a multifaceted construct, comprising of cognitive and affective components (i.e., satisfaction with life, positive affect, and negative affect; Diener, 1984; Diener, Oishi, & Lucas, 2009; Xu, & Roberts, 2010). As cognitive aspect of SWB, satisfaction with life refers to judgment processes. However, positive and negative affect represent the affective aspect of SWB, reflecting to the experience of emotional and mood states. There is loads of evidence to suggest that SWB predicts a wide range of successful outcomes including increased health longevity, and psychological functioning (Arslan & Coşkun, 2020; Belen & Yıldırım, 2020; Diener, & Chan, 2011). Happy people tend to be more successful across multiple life domains and have better social relationships, health, physical well-being and coping, engagement in prosocial behaviours, and problem-solving skills and creativity (Lyubomirsky, King, & Diener, 2005). In terms of the protective effect of resilience on well-being and ill-being, studies suggest a negative relationship between resilience and important variables such as loneliness, depression, and anxiety (Arslan, 2016; Leipold, & Greve, 2009), and positive relationship with life satisfaction among the families of

earthquake victims (Klohnen, 1996). With regard to hope, evidence suggests that hope has a significant direct effect on greater SWB, consequently, allows individuals to cope with a stressful situation such as improving the recovery process of people with serious mental health problems (Werner, 2012).

Psychological health is here defined as the development of a one's state of mind into an optimal state within the scopes of maintaining physical, mental, and emotional adaptation with others (Sun et al., 2020; Cohen, & Wills, 1985). Empirical findings show that there are various factors affecting psychological health. Anxiety and depression are the main indicators of poor psychological health (Walsh et al., 2017), whereas psychological capitals such as hope and resilience can facilitate better psychological and mental health (Hammond, 2004).

Another study on patients with heart failure found depressive symptoms as risk factors for poor health status. However, resilience was found to mediate the relationship between depressive symptoms and psychological health, suggesting that increased levels of resilience can promote psychological health status in patients with depression and heart failures (Liu, Chang, Wu, & Tsai, 2015). Adaptive coping strategies were also found to have a strong connection with psychological health (Yu, Hu, Efird, & Mccoy, 2013). Thus, it appears that psychological health is important for healthy functioning.

## Resilience

Resilience can be viewed as one's ability to "bounce back" or "recovery" from any disturbances, negative life events, resist to illness and flexibility to adapt new situations to maintain their psychological health (Ryff & Singer, 2003; Smith et al., 2008). Although resilience is a commonly used concept within different disciplines, there is no consensus among researchers with regard to underlying theoretical construct due to its varying definition and measurement. Previous research has supported that resilience has a positive impact on a wide range of mental health and well-being outcomes (e.g., Arslan, 2019; Yıldırım & Belen, 2019; Yıldırım & Çelik Tanrıverdi, 2020; Hu, Zhang, & Wang, 2015; McDonnell & Semkovska, 2020). In a study on Turkish adults, Yildirim (2019) found that resilience was positively related to satisfaction with life, positive affect, affect balance, and flourishing, and that negatively related with negative affect. It has also been suggested that resilience can buffer the negative impact of traumatic events on the development of posttraumatic stress disorders (Lee, Ahn, Jeong, Chae, & Choi, 2014). Furthermore, resilience has also been positively linked with well-being and mediated the relationship between coping strategies and well-being (Tomás, Sancho, Melendez, & Mayordomo, 2012). The positive links between resilience and hope, and their relationships with quality of life have widely reported in previous studies (Li, Yang, Liu, & Wang, 2016).

## Present Study

Given that the genesis of COVID-19 and its possible consequences have caused a variety of psychological distress such as fears, worries, and anxiety among people worldwide (Ahorsu et al., 2020), it is critical to understand the underlying mechanism between positive psychological resources such hope and resilience and psychological health of individuals during the times of crisis of COVID-19. Hope and resilience are components of psychological capital which is a resource that includes four individual strengths: optimism, self-efficacy, hope, and resilience (Avey, Luthans & Mhatre, 2008; Luthans, Avolio, Avey & Norman, 2007; Youssef-Morgan & Luthans, 2013). People high in psychological capital regain quickly from adversities and are less vulnerable to stressors in the first place (Youssef-Morgan & Luthans, 2013). Examination of the roles of personal psychological characteristics like hope and resilience in relation to the link between COVID-19 related stressors and psychological health would be important to help individuals how they can maintain their psychological health against detrimental effects of the crisis. Thus, this study aimed to examine the associations between resilience, dispositional hope, subjective well-being, and psychological health among adults during early stage of COVID-19. To this end, we generated the following hypotheses. First, hope would have a direct effect on resilience, preventive behaviours, subjective well-being, and psychological health. There is evidence suggesting that hope has a direct effect on development of resilience (Lu, Potts & Allen, 2020) and resilience was found to directly and indirectly affect well-being and mental health of individual in difficult times (Yildirim et al., 2020). Psychological capital like self-efficacy was also found to be positively associated with preventive behaviours during COVID-19 (Yıldırım & Güler, 2020b). Second, resilience would have a direct effect on subjective well-being and psychological health. There are numerous evidence showing the positive impact of resilience on well-being and mental health (Yildirim, 2019). Third, preventive behaviours would have a direct effect on resilience, and preventive behaviours and resilience would mediate the relationship between hope and subjective well-being and psychological health. Given the resilience frameworks available in the literature (e.g., compensatory and protective; Fergus & Zimmerman, 2005; Ledesma, 2014; Masten & Reed, 2015), resilience can serve as an important mediator. Similarly, preventive behaviours are theoretically identified as important factors that help to design behavioral interventions aimed at improving resilience and psychological health during the pandemic (e.g., social-cognition model; Lin et al., 2020; Yıldırım et al., 2020). For

example, in a recent study within the context of COVID-19 pandemic, Arslan, Yıldırım and Wong (2020) found that resilience mediated the association between positive and negative affect (components of subjective well-being) and psychological health. Figure 1 presents the hypothesised model concerning the associations between the study variables.

## Method

### Participants

A convenience sample of 134 men ($M_{age}$ = 42.36 years, $SD$ = 8.99, range = 18 to 60) and 86 women ($M_{age}$ = 36.73 years, $SD$ = 7.44, range = 18 to 51) was recruited from general population in Turkey. The most frequently reported demographic categories were married ($n$ = 186), university graduate ($n$ = 101), average economic level ($n$ = 152), and no diagnosed chronic disease ($n$ = 164). Table 1 presents participants" characteristics. There were no participants who refused to take part in the study or failed to complete the questionnaires due to the survey design where participants were required to answer all questions.

### Measures

**Preventive Behaviours Scale (PBS)** A list of preventive behaviours was created to assess the degree of engagement that people undertaken to protect themselves against COVID-19. The PBS includes 6 items and each item is scored based on 5-point Likert type scale, ranging from 1 (never) to 5 (always). Items included "I wash my hand frequently with soap and water", "I wear a mask when I go outside", "I avoid going to public places", "I avoid close contact with people", "I avoid using public transportation", and "I try to have a balanced diet." Higher scores indicate greater engagement in preventive behaviours. Two main steps were used to generate the items. Firstly, an extensive literature review on earlier infectious diseases like SARS and MERS was carried out. In light of relevant literature, the first author selected possible 10 items which were retained for further investigation. Secondly, those items were assessed by three psychology experts who presented their viewpoints regarding the content and expressions of the items. Based on the suggestions from the experts, some amendments were made on the content of the items. Final version of the items was used for the purpose of this study. The psychometric properties of the scale were presented in the results section. In this study, the Cronbach's alpha of PBS was .78.

**Hope** The Dispositional Hope Scale (DHS; Snyder et al., 1991) was administered to assess hope. The DHS comprises of 12 items and two dimensions; agency and pathways. Four of these items are filler items, and each dimension includes four items. Items can be rated using an eight-point scale (1 = definitely false, 8 = definitely true). Reponses to all items can be computed to generate a total score ranging from 8 and 64, with higher scores representing greater hope. The Turkish version of DHS achieves good levels of reliability and validity (Tarhan, & Bacanlı, 2015). The Cronbach's alpha of DHS in this study was .93 for overall, .90 for pathways, and .88 for agency.

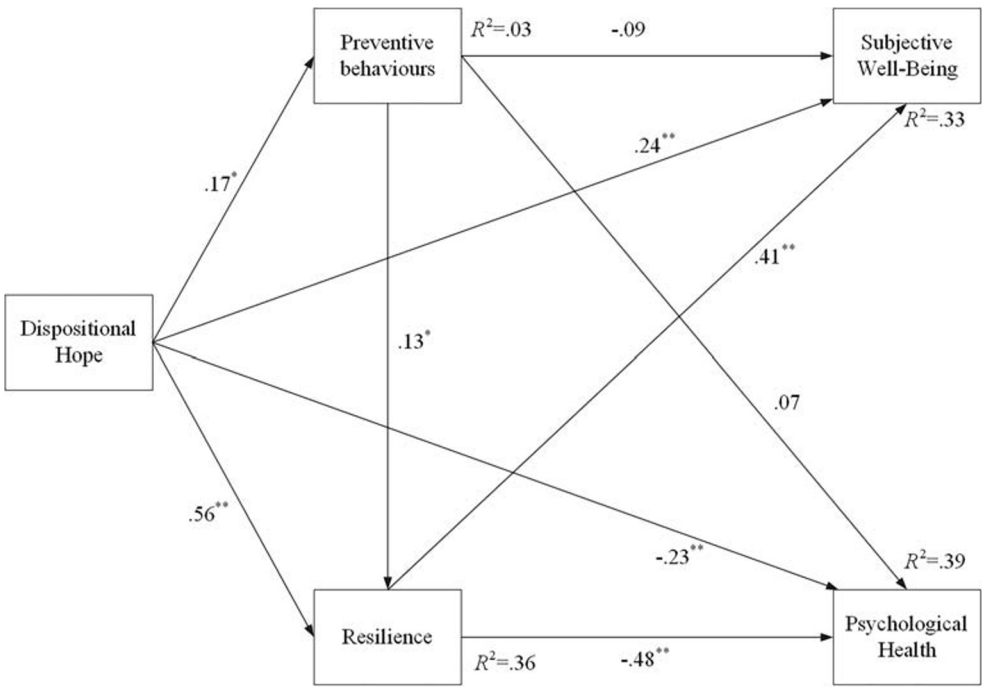


**Fig. 1** Conceptual model of the hypothesised assocaitions among the study variables

**Table 1** Participants' characteristics ($n = 220$)

| Variable | Level | Frequency | Percent |
|---|---|---|---|
| Gender | Male | 134 | 60.91 |
| | Female | 86 | 39.09 |
| Marital status | Single | 30 | 13.64 |
| | Married | 186 | 84.55 |
| | Divorced/Widowed | 4 | 1.82 |
| Education level | Secondary school or below | 6 | 2.73 |
| | High school | 21 | 9.55 |
| | Bachelor's degree | 101 | 45.91 |
| | Master degree | 60 | 27.27 |
| | Doctorate degree | 32 | 14.55 |
| Socioeconomic level | Below average | 47 | 21.36 |
| | Average | 152 | 69.09 |
| | Above average | 21 | 9.55 |
| Having a chronic disease (e.g. diabetes, asthma) | Yes | 41 | 18.64 |
| | No | 164 | 74.55 |
| | Don't know | 15 | 6.82 |

**Resilience** The Brief Resilience Scale (BRS; Smith et al., 2008) was used to measure resilience. The BRS consists of 6 items, which are rated using a five-point Likert scale response format from 1 (strongly disagree) to 5 (strongly agree). The score was used to generate a total score ranging from 6 to 30, with a higher score indicating greater resilience. The Turkish version of the BRS demonstrates good reliability and validity among undergraduate students (Doğan, 2015). The Cronbach's alpha of BRS in this study was .78.

**Subjective Well-Being** The World Health Organization Well-Being Index (WHO-5; Staehr, 1998) was used to measure subjective well-being. The WHO-5 is a generic scale that includes 5 items related to vitality, positive mood, and general interests. Each item is rated on a 6-point Likert type scale ranging from 0 (at no time) to 5 (all of the time). Summing all items can give a total score ranging from 0 to 25, with high scores referring to an increased well-being. Satisfactory psychometric properties of the scale were reported in Turkish language (Eser et al., 2019). In this study, the Cronbach's alpha coefficient of WHO-5 was 0.88.

**Psychological Health** The General Health Questionnaire – 12 (GHQ-12; Goldberg & Williams, 1991) was administered to assess psychological health. As a measure of both positive and negative aspects of mental health (Hu, Stewart-Brown, Twigg, & Weich, 2007), the GHQ-12 includes 12 items, and a two-factor structure: anxiety/depression and social dysfunction. Each item measures the severity of a mental health problem over the past few weeks. The GHQ-12 uses a four-point Likert scale response format (from 0 to 3). Summing all items can provide a total score ranging from 0 to 36, with higher scores referring to worse health conditions. A validated Turkish version of GHQ-12 was used in this study (Kilic et al., 1997). The Cronbach's alpha of GHQ-12 in this study was .86 for overall, .78 for anxiety/depression, and .82 for social dysfunction.

## Procedure

The study was conducted between 17 March and 31 April 2020 right after the first death from the COVID-19 in the Turkey reported on 17 March 2020. An online survey including information sheet, demographic questions, and the main questionnaires were created. Given that online recruitment might be best approach during pandemic and social/physical distancing, the survey was shared through a secure online data collection platform. The survey link was published on social networking sites which allowed us to reach out to a diverse population. Prior to involvement in the study, participants were instructed that their responses were confidential and anonymous, and the goal of the study was to investigate psychological factors that may be linked to general health and preventive behaviours during coronavirus pandemic. The questionnaires were presented to participants in the same order. Participation in the study was voluntary and participants were not compensated. The study was approved by a university ethic committee and, thus, has been conducted in accordance with the 1964 Helsinki Declaration.

## Data Analysis

The adequacy of the sample size is important to detect any effects occurred between the variables (Fritz & MacKinnon,

2007). For the mediation analysis, a sample between 115 and 285 participants is sufficient to detect an indirect effect among the employed variables (Fritz & MacKinnon, 2007). This study included 220 participants, meaning that the required sample size fell within the range of detecting an effect at power of .80. Following, preliminary analyses were conducted to examine observed scale characteristics, assumption of normality, and correlation estimates between the study variables. Normality was investigated using kurtosis and skewness scores and their cut-off values (Kline, 2015). Exploratory factor analysis (EFA) was used to identify the underlying factor structure on the preventive behaviours. Following, Pearson product-moment correlation analysis was conducted to explore the associations between the variables of the study. After examining the preliminary analyses, a mediation model was tested to analyse the mediating role of preventive behaviours and resilience in association between dispositional hope and subjective well-being and psychological health using the PROCESS macro (Model 6) for SPSS version 3.4 (Hayes, 2018). Results from the model were interpreted using standardized path estimate ($\beta$) scores and squared-multiple correlations ($R^2$), with traditional effect sizes:.01–.059 = small, .06–.139 = moderate, and ≥ .14 = large (Cohen, 1988). Considering the advantageous of bootstrapping procedure, the bootstrap method with 10,000 resamples to estimate the 95% confidence intervals (CI) was, moreover, investigated for indirect effect (Hayes, 2018; Preacher & Hayes, 2008). All analyses were conducted using SPSS version 25.

## Results

Findings from preliminary analysis revealed that kurtosis scores ranged from −.60 to 8.47, and skewness values were between −.70 and .52. These results suggested that all variables had relatively normal distribution. Kline (2015) has suggest that skewness and kurtosis recommend values of less than |3| and |10| respectively. Prior to the main analysis, the factor structure of the PBS was examined. EFA with principal axis factoring extraction method was performed on initial sets of 10 items to enhance the utility of the PBS. Eigenvalue greater than one rule, and scree plot suggested two factor solutions. After removing items with crossing loadings and with loadings below .4 (Kline, 2015), the analysis yielded a one-factor solution with an Eigenvalue of 3.07 and explained 51.14% of the total variance. The remaining 6 items loaded positively on this factor, with coefficients ranging between .45 and .77. Additionally, the internal reliability estimates of the scales were examined indicating that the scales had adequate–to-strong internal reliability estimates, ranging from .78 to .92, as shown in Table 2. Further, correlation analysis results showed that dispositional hope was positively and significantly associated with subjective well-being ($r = .47$, $p < .001$), preventive behaviours ($r = .17$, $p < .001$), and resilience ($r = .58$, $p < .001$), ranging from small to large effect sizes. Dispositional hope was also negatively and moderately correlated with psychological health of adults ($r = -.50$, $p < .001$). Psychological health was negatively and largely associated with resilience ($r = -.60$, $p < .001$) and subjective well-being ($r = -.60$, $p < .001$), and resilience had positive correlation with subjective wellbeing ($r = .53$, $p < .001$) and preventive behaviours ($r = .22$, $p < .001$), as shown in Table 2.

After examining the preliminary analyses, we investigated whether resilience and preventive behaviours mediated the effect of dispositional hope on subjective well-being and psychological health of adults. Findings from mediation analysis demonstrated that dispositional hope significantly and positively predicted resilience ($\beta = .56$, $p < .001$), preventive behaviours ($\beta = .17$, $p < .05$), and subjective well-being ($\beta = .24$, $p < .001$), accounting for 3% of the variance in preventive behaviours. Hope and preventive behaviours together explained 38% of the variance in resilience of adults. Hope was a significant and negative predictor of psychological health ($\beta = -.23$, $p < .001$). Psychological health was also predicted by resilience ($\beta = -.48$, $p < .001$) but was not significantly predicted by preventive behaviours ($\beta = .07$, $p = .189$). Hope, resilience, and preventive behaviours together accounted for 39% of the variance in psychological health of adults. Subsequently, dispositional hope significantly predicted adults'

**Table 2** Descriptive statistics and correlation results

| Scales | *M* | *SD* | Skew. | Kurt. | α | 1. | 2. | 3. | 4. | 5. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Hope | 50.58 | 8.54 | −.70 | .25 | .92 | 1 | .58** | .47** | −.49** | .17* |
| 2. Resilience | 20.47 | 3.95 | .50 | .03 | .78 | | 1 | .53** | −.59** | 22** |
| 3. Subjective well-being | 13.72 | 5.36 | −.27 | −.60 | .88 | | | 1 | −.60** | .04 |
| 4. Psychological health | 12.42 | 5.74 | .03 | −.26 | .86 | | | | 1 | −.07 |
| 5. Preventive behaviours | 26.91 | 3.68 | −2.39 | 8.47 | .78 | | | | | 1 |

* $p < .05$, ** $p < .001$

**Table 3** *Unstandardized coefficients for the mediation model*

| Consequent | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $M_1$ (Preventive behaviours) | | | | | $M_2$ (Resilience) | | | | | $Y_1$ (Psychological health) | | | | | $Y_2$ (Well-being) | | | |
| Antecedent | | Coeff. | *SE* | *t* | *p* | | Coeff. | *SE* | *t* | *p* | | Coeff. | *SE* | *t* | *p* | | Coeff | *SE* | *t* | *p* |
| *X* (Hope) | $a_1$ | .07 | .03 | 2.47 | .014 | $a_2$ | .26 | .03 | 10.13 | <.001 | *c'* | −.15 | .04 | −3.45 | .001 | | .15 | .04 | 3.50 | .001 |
| $M_1$ (Preven.) | | – | – | – | – | $d_{21}$ | .13 | .06 | 2.24 | .026 | $b_1$ | .11 | .09 | 1.32 | .189 | | −.13 | .08 | −1.56 | .121 |
| $M_2$ (Resil.) | | – | – | – | – | – | – | – | – | – | $b_2$ | −.69 | .10 | −7.16 | <.001 | | .55 | .09 | 5.79 | <.001 |
| Constant | $i_{M1}$ | 23.29 | 1.49 | 15.65 | <.001 | $i_{M2}$ | 3.67 | 1.90 | 1.92 | .055 | $i_y$ | 31.32 | 2.72 | 11.51 | <.001 | | −1.76 | 2.67 | −.66 | .511 |
| | | $R^2 = .03$ | | | | | $R^2 = .36$ | | | | | $R^2 = .39$ | | | | | $R^2 = .32$ | | | |
| | | $F = 6.10; p = .014$ | | | | | $F = 59.25; p < .001$ | | | | | $F = 45.64; p < .001$ | | | | | $F = 34.14; p < .001$ | | | |

*SE* standard error, *Coeff* unstandardized coefficient, *X* independent variable, *M* mediator variables, *Y* outcomes or dependent variables

resilience through preventive behaviours (β = .13, $p < .05$). Finally, the results indicated the mediating effect of resilience on the association between dispositional hope and subjective well-being (β = .48, $p < .001$). However, preventive behaviours did not mediate this association (β = .07, $p = .121$). Hope, preventive behaviours, and resilience together accounted for 33% of the variance in in subjective well-being, as shown in Fig. 1 and Table 3. Additionally, the indirect effect of dispositional hope on subjective well-being and psychological health was significant, see Table 4. These results indicated that resilience specifically mediated the association between dispositional hope and subjective well-being and psychological health. Preventive behaviours also mediated the effect of dispositional hope on resilience. Standardized indirect effects are presented in Table 3.

## Discussion

The present study examined the associations between resilience, dispositional hope, preventive behaviours, subjective well-being, and psychological health among adults during early stage of COVID-19. We first hypothesized that hope would have a direct effect on resilience, subjective well-being, and psychological health. Findings from the mediation model indicated that hope had a significant and positive predictive effect on resilience and subjective well-being as well as negatively predicted psychological health among adults. These findings suggest that adults with high hope are more likely to be capable of bouncing back from stressful situations, have greater subjective well-being, and better psychological health. The findings that hope can positively influence resilience, subjective well-being, and psychological health are consistent with those of previous studies (Hawro et al., 2014; Li et al., 2016; Muyan-Yılık, & Demir, 2019; Waynor et al., 2012). Hope is a positive psychological quality and individuals with higher dispositional hope are more likely to be motivated toward goals and create pathways for attaining a desired goal. This psychological force can help those individuals to deal with stressful situations, make them more resilient and promote their well-being and psychological health (Arslan, 2016; Fredrickson et al., 2003; Snyder, 2000).

Next, findings of the study provided evidence confirming the following hypothesis of the study and indicated that resilience had a significant and direct predictive effect on subjective well-being and psychological health. The effect of resilience on subjective well-being and psychological health has been also reported in previous studies (Burns, Anstey, & Windsor, 2011; Gao et al., 2017; Yildirim, 2019). Most importantly, resilience mediated the relationship between hope

**Table 4** Standardized indirect effects and 95% bias-corrected confidence interval

| Path | Effect | *SE* | Boot LLCI | Boot ULCI |
|---|---|---|---|---|
| Total indirect effect | −.27 | .05 | −.36 | −.18 |
| Hope–>Preventive–>Psychological health | .01 | .01 | .01 | .04 |
| Hope–>Resilience–> Psychological health | −.27 | .04 | −.37 | −.18 |
| Hope–> Preventive–> Resilience–> Psychological health | −.01 | .01 | −.02 | −.01 |
| Total indirect effect | .22 | .05 | .13 | .31 |
| Hope–>Preventive–>Well-being | −.02 | .01 | −.04 | .01 |
| Hope–>Resilience–> Well-being | .23 | .05 | .14 | .32 |
| Hope–> Preventive–> Resilience–> Well-being | .01 | .01 | .01 | .02 |

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

and subjective well-being and psychological health, suggesting that the underlying mechanism between hope and subjective well-being and psychological health can be explained by resilience. Resilience is the ability to bounce back from stressful situations (Smith et al., 2008). People with high levels of resilience can easily adapt to the changing environment (Frydenberg, 2004). As such, individuals with high hope possess high ability to recover from stressful situations which in turn allow them to have greater subjective well-being and psychological health. That is, individuals with high dispositional hope have a strong motivation and an ability to plan alternative routes when faced with difficulties and they may believe that the present situation and difficulties can be controlled and overcome. Holding such beliefs can ultimately allow individuals to have greater subjective well-being and psychological health.

Finally, the study findings showed that preventive behaviours had a direct effect on resilience but not on subjective well-being and psychological health. Insignificant results may be related to the time when data collection was undertaken. The present study has been conducted during early phase of COVID-19. Although the emerging trend is expected as people were imposed to engage in preventive behaviours in which people could have been practicing forcedly, the degree of engagement in preventive behaviours may not have been adequate to affect subjective well-being and psychological health of individuals. Although previous research highlighted that engagement in preventive behaviours such as social distancing and hand washing are vital to protect physical health (Wise, Zbozinek, Michelini, & Hagan, 2020), this may not be the case when it comes to subjective well-being and psychological health of individuals. The results also showed that the relationship between hope and resilience was mediated by preventive behaviours, suggesting that high levels of hope may help people to engage in preventive behaviours toward virus and that may lead to greater ability to cope with challenges. Hopeful people are better able to respond difficult situations with resilience ability through preventive behaviours.

## Implication and Limitations

People can be at the greater risk of developing various mental health problems following traumatic stress (Lee et al., 2014). Identifying protective factors focusing on preventing mental health problems plays a crucial role to improve well-being and psychological health of individuals when faced with difficulties. As protective factors hope and resilience therefore come into prominence in buffering the negative impact of disturbances in times of crisis and improving well-being and psychological health of individuals. The current findings suggest that positive psychological strengths such as hope and resilience appear to show some benefits to the subjective well-being and psychological health. However, it is important that longitudinal study and clinical practice should test whether promoting resilience and resilience can improve subjective well-being and psychological health over time. As one of the most important measures of minimising the spread of COVID-19 is to adopt a social distancing measure focusing on the least amount of physical contact by way of interrupting transmission, it is crucial to design online hope and resilience training programs, which have minimal amount of contact with people, to contribute to subjective well-being and psychological health of those who are under the risk of COVID-19. Given that technology has made life relatively easy, it can be conveniently used to deliver online psychological training programs focusing on improving psychological health with low-cost on a large scale in times of crisis.

This study suffers from several limitations. First, this was a cross-sectional study survey conducted at a single point in time. Thus, it is difficult to draw a conclusion about the associations between the study variables. Second, we used an online approach to collect data. Reponses of people without internet access, particularly elderly people (60 years or above, or

18 years or below) were underrepresented. Using convenience sampling approach for data collection was another limitation of this study. Thus, we cannot generalize the results of this study to the population. Random selection of participants is highly encouraged in future studies. In these studies, examining the effect of sample characteristics (e.g., gender) could also be helpful to develop intervention strategies for promoting psychological health. Despite this limitation, administering online surveys were the sole practicable way of data collection in times of outbreak. Furthermore, we were unable to track temporal changes of responses as the data were collected during the early stage of outbreak.

In conclusion, this study presents insights into the associations between resilience, dispositional hope, subjective well-being, and psychological health among adults during early stage of COVID-19 in Turkey. Dispositional hope and resilience had positive association with subjective well-being and psychological health by increasing the ability of an individuals to bounce back from stressful situations with high motivation and creative ways.

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## Compliance with Ethical Standards

**Disclosure of Potential Conflicts of Interest** The authors declared no conflicts of interest with respect to the research, authorship, and/or publication of this article.

**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.

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