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Social Support and Health Anxiety during COVID-19 Pandemic

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Abstract: Social support is regarded as a mediator to alleviate health anxiety in general. However, during the COVID-19 pandemic, anxiety was widespread, and the role of social support in the increasing health anxiety for the general population has not yet been studied. This study sought to identify the effect of social support on health anxiety in adult students during the pandemic. This online survey assessed 93 participants from May 1st to June 12th, 2020, which including questionnaires on health anxiety, sleep quality, fear of COVID-19, perceived and multi-dimensional social support. A repeated-measures ANOVA revealed a significant increase in health anxiety, safety behaviors (i.e., seeking avoidance and reassurance) and sleep problems for respondents during the pandemic. Through correlation and mediation analysis, the results has shown that, in the context of the pandemic, the relationship between social support and health anxiety was significant and negative, but safety behaviors and sleep quality were not significantly associated with social support quality. Also, social support still acted as a mediator to buffer the effect of fear of the virus on health anxiety. These findings suggested that during the COVID-19 pandemic, although participants` health anxiety increased significantly, social support still played a role of mediator between fear of virus and health anxiety.

Keywords: Social support; Health anxiety; COVID-19 pandemic; The mediation effect

1. Introduction

COVID-19 spread widely and rapidly, affecting countries across the world since its outbreak in December 2019. Due to COVID-19 with its high predicted morbidity and mortality rates (Sohrabi et al., 2020), its declaration as a pandemic and as a global health crisis, it has had a considerable impact on mental health (Bao et al., 2020). Recent studies showed that the COVID-19 pandemic was associated with an increase in psychological distress,

especially anxiety relating to health (Asmundson & Taylor, 2020; Jungmann & Witthöft, 2020; Liu et al., 2020; Wang et al., 2020; Xiao et al., 2020). A survey of 1615 participants in Germany indicated that half of the respondents suffered from moderate anxiety about illness, and in particular, 25 % of participants had severe health anxiety in the context of the pandemic (Jungmann & Witthöft, 2020). In the same vein, recent studies among young adults (N = 898) in the U.S also found respondents reporting high levels of depression (43.3 %) and anxiety symptoms (45.4%) during the COVID-19 epidemic (Liu et al., 2020). Consequently, research studies have attempted to address the problems in mental health that the pandemic caused and the role of social support in the reduction of worries related to health.

Within prior literature, social support has had different definitions. In general, social support referred to the mental or materially supportive help that individuals receive from social networks (Cullen, 1994; Malecki & Demaray, 2002), and it differentiated two types: structural and functional support (Uchino, 2004). Structural support referred to the extent of social ties for individuals in the social network, and was also referred to as social integration (Seeman, 1996). Functional support referred to the quality of perceived support that social relationships provided (Taylor, 2011). Extensive existing literature has consistently suggested that social support was significantly associated with mental health, but its role was different in specific mental illnesses (Huang et al., 2010; Stice et al., 2002; Torgrud et al., 2004). On the other hand, most respondents reported an increase in anxiety related to illness and more safety behaviors such as panic purchasing during pandemic especially after lockdown announcement (Asmundson & Taylor, 2020). Generally, health anxiety involved symptoms of excessive concern and fear of bodily sensation currently or in the future, and such symptoms were on a continuous spectrum, with the extreme including hypochondriasis, that is, persistent, intense health-related fears (Salkovskis et al., 2002; Starcevic, 2013). Moreover, Mertens et al. (2020) further identified that the fear of COVID-19 as triggering the increase in health worries, and social media accelerated the spread of such fear during the pandemic. The relationship between social support and health anxiety in the context of the pandemic was explored.

Previous studies consistantly suggested a significant negative correlation between social support and health anxiety in patients with illness, especially chronic diseases, and suggested that family support can reduce patients` safety behaviors that anxiety cause (Hipkins et al., 2004; Jones et al., 2012; Mehnert et al., 2010). Moreover, research about past pandemics such as SARS suggested that family support was able to enhance individual`s self-efficacy and decrease anxiety to illness, and was helpful to long-term recovery in mental health (Mak et al., 2009). Recently, some studies have shown that perceived social support quality was significantly associated with mental health during the COVID-19 pandemic (El-Zoghby et al., 2020; Rajkumar, 2020). A study among medical staff in China revealed that, in the link between social support and health anxiety, sleep problems were significant involved (Xiao et al., 2020b). El-Zoghby et al. (2020) conducted an investigation of 510 participants which indicated that, during the pandemic, vulnerable groups such as female patients with illness and low-income groups might need more supports from family and friends. Accordingly, in the context of the COVID-19 pandemic, the findings that social support was significantly correlated with health anxiety were consistent with previous studies.

Nevertheless, there were some limitations in existing studies. First, in general, health anxiety (hypochondriasis) was common with other mental disorders, hence, most of the previous studies found the role of social support in comorbid mental illness rather than only in health anxiety (Taylor, 2011; Uchino, 2004). For example, recent studies commonly focused on the effects of social support quality on multiple mental disorders including hypochondriasis, depression, and post-traumatic stress disorders etc. during COVID-19 pandemic (Jungmann & Witthöft, 2020). Next, there was still a lack of literature on the mediation of social support between stressors (e.g. fear of virus) and health anxiety, because the mechanism model of social support in mental health was dynamic (Seeman, 1996), and mediation analysis considering more influence factors were beneficial to assess the specific role of social support during a virus outbreak. Additionally, the effect of specific social support on health anxiety during the pandemic was not clear. Hence, there were some gaps that need addressing.

Therefore, the purpose of this study was to explore the contribution of social support to health anxiety for university students during COVID-19 pandemic. Based on this aim, three hypotheses were proposed: a. there might be a significant increase in health anxiety, safety behaviors and sleep distresses; b. social support and health anxiety might be significantly negatively correlated; c. social support might be the mediation between stressors (fear of COVID-19) and health anxiety. Thus, this study was going to attempt to examine such assumptions to achieve the goal.

What follows is a summary review of literature on social support and health anxiety including definition, theoretical model, influencing factors, relationship to each other, and effect of COVID-19 pandemic on both as well. Then, the method and results are described in detail, and three hypotheses are examined by repeated measures of variance, bivariate correlation analysis and mediation analysis respectively. Thereafter, based on the summary of results, the author compares the findings of this research and previous studies, and discusses the potential implications for theory and practice.

2. Literature Review

2.1 Social Support

Social support was considered as a complex system that contains many concepts, models, and theories. A review of the literature related to social support, its definition, effects on mental health including health anxiety, influencing factors, and influence from COVID-19 pandemic follows.

The definition of social support. The concept of social support originally came from the research of psychiatry in the 1960s (Taylor, 2011), up to now, the definition of such a concept remained highly controversial. Sarason et al. (1991) suggested that social support was the individual's perceived cognitive adaptation in the stressful situation, while Malecki and Demaray (2002) used the examples of adolescents as evidence that social support was the general or specific supportive behaviour from others, and Cullen (1994) further pointed out that social support was the individual receiving material or mental help from the family, friends and community. However, Uchino (2004) argued that social support as a multidimensional concept, its definition depended on how to measure it. Generally, the extent of integration in social networks and specific functions that network members provide were commonly assessing criteria (Chen, 2013), from such perspective, social support included structural and functional support. Specifically, structural social support referred to extent of social ties for individuals, and the indicator of measurement included the network size, connection density, multiplicity of social relationship and congruence in social support (Taylor, 2011). Functional support focused on the various specific functions that network members might serve such as the emotional, instrumental, informational, esteem and companionship support (Uchino, 2004). On the other hand, Barrera (1986) held the view that social support was confirmed by individual subjective perception, but Paulsen and Altmaier (1995) argued that the concrete action was the indicator of assessment on social support. Hence, according to two theories, researchers commonly classified social support as perceived and received (also called enacted) support.

However, considering the role of social support in health psychology, these definitions and classifications were still limited. The structural support overly focused on the importance to the interaction between individuals and social situations (Cohen et al., 2000), and functional support was utilized mainly from "a cognitive perspective in a context of stress appraisal" (Chen, 2013, p. 3). In the same vein, perceived social support was criticized for relying much on self-report (Dahlem et al., 1991), although the assessment of received social support was more objective, such support was limited in specific situations or groups (Paulsen & Altmaier, 1995). Therefore, the conceptualization of social support was still a difficult problem because different measuring approaches might lead to evaluating linking theories to health outcomes difficulty or lead to conflicting results (Uchino, 2004). Hence, the scale to measure social support commonly was multidimensional, which aimed to remain a balance between different definitions and considered more factors that might influence mental health (Hefner & Eisenberg, 2009).

The effect of social support on mental health. Numerous prior studies consistently suggested that social support was beneficial to the individual`s physical and psychical health (Uchino, 2004). More precisely, social support was helpful to reduce mental

problems (Taylor, 2011). Hence, the population with low social support reported more clinical symptoms of major mental disorder such as depressive and anxious disorders (Cohen & Wills, 1985), panic disorder (Huang et al., 2010), social phobia (Torgrud et al., 2004), dysthymic disorder (Klein et al., 1988), eating disorder (Stice et al., 2002) and post-traumatic stress disorder (Brewin et al., 2000; Lin et al., 1999). Additionally, the individual that received less support from social network suffered from more alcohol and drug problems (Stice et al., 1998) even had higher rates of suicide (Casey et al., 2006). Moreover, similar findings have also been found among children (Chu et al., 2010). Thus, these results demonstrated a strongly significant correlation between social support and mental health, while specific interaction mechanism was not clear.

There were two typical mechanisms of social support: the main effect model and the buffering model. The main effect model was also called the direct effect model, the effect of social support was independent of the stressful situation. Hence, regardless of the degree of stress, social support had a direct promotion on individuals` health (Cohen, 2004). The buffering model was also regarded as an indirect model. It can buffer the negative impact of stress on physical and mental health and can maintain or improve the level of health for individuals (Cobb, 1976). Specifically, in the buffering model, as a mediator between stressful events and individuals` evaluation on stress, social support can reduce adverse effects of stress through improving subjective perception and providing problem-solving strategies (Cassel, 1976; Schwarzer & Knoll, 2007).

Nevertheless, the main effect and the buffering effect model did not explain the mechanism of social support to mental health completely. Monroe and Steiner (1986) proposed the dynamic effect model, from this perspective, there were complex interactions between social support, stressful events and mental health, and this link was a curve rather than a straight, which revealed that the effect of social support will change over time. Therefore, owing to the effect of social support on mental health might be influenced by various variables, in the explanatory of action mechanism between social support and mental health, it might need comparing different models (Chen, 2013).

The relationship between social support and health anxiety. Due to health anxiety commonly with other mental disorders such as bipolar disorder, depressive disorder, and panic disorder (Sunderland et al., 2013), most of the literature focused on the role of social support in comorbid mental illness rather than only in health anxiety (Taylor, 2011; Uchino, 2004). Moreover, researchers tended to analyse the relationship between social support and health anxiety in patients especially with cancers such as breast cancer (Jones et al., 2012), prostate cancer (Mehnert et al., 2010), ovarian cancer (Hipkins et al., 2004), etc.. To examine this issue, Jones et al. (2012) carried out a series of surveys, and found that enough social support might reduce patient`s health anxiety during cancer diagnosis and treatment because more seeking reassurance behaviors can alleviate illness-related worries, however, some supports from friends or families might intensify patient anxiety especially when talking about coping strategies (Chantler & Mortimer, 2005). Mehnert et al. (2010) also investigated a total of 511 patients to reveal the detrimental interaction with other social members might predict higher health anxiety, and informational support might be more important than emotional support for males. The recent study has confirmed the earlier conclusion that lung cancer patients with higher social support might have lower anxiety related to illness, and support from the social network might affect the level of health anxiety through the mediation of resilience (Hu et al., 2018). Based on previous studies, it seemed to have a negative correlation between social support and health anxiety, and some variables acted as the mediator in the interaction mechanism.

However, these studies might have some weaknesses. For instance, the sample size might cause the possible bias (Mehnert et al., 2010); the difficulty to identify health information from using self-report; the lack of examination of health anxiety and some factors of social support (Jones et al., 2012). The biggest limitation was the lack of investigations relevant to general samples, which lead to the unclear relationship between social support and health anxiety in the population without the illness. Fortunately, a number of studies confirmed the positive effect of social support on generalized anxiety disorder in the general group. Hefner and Eisenberg (2009) noted that college students with lower perceived social support may have higher risks of developing anxiety disorders.

Additionally, prior research also identified that social support can reduce mental illness such as depression, anxiety even post-traumatic stress disorders (Lin et al., 1999). These studies might further fill the gap in the research area of social support and health anxiety.

Factors that influence social support. In the discussion of the relationship between social support and mental health, the characteristic of the stressor was an important factor (Taylor, 2011). Due to the different stressors faced by individuals, the types and degrees of social support they chose might different (Horowitz et al., 2001). Additionally, the duration of stress might affect the role of social support in mental illness. For example, chronic stress might allow people often to need emotional support from others, once their needs cannot be satisfied, it might cause new emotional problems (Matt & Dean, 1993). Moreover, the second factor is situational uniqueness of social support. The coordination between individuals` expectation and actual social support depended on the stressful situation(Leavy, 1983). For instance, for the patient with cancer, during diagnosis and treatment, the same informational support might play a different role (Chen, 2013). In addition, the personality (Norlander et al., 2000), cultural background (Huff, 2001) and economic status (Taylor, 2011) even heritable factors (Naliboff et al., 2004) might influence the quality of social support.

These potential factors commonly were regarded as independent variables that can influence the relationship between social support and mental health, especially, the characteristic of stressful events was an important variable to affect the benefit of social support. As a global health crisis recently, the COVID-19 pandemic might have a significant impact on the role of social support in mental illnesses especially health anxiety (El-Zoghby et al., 2020).

The effect of COVID-19 on social support. Previous studies have shown that in stressful events, social support can help the individual to reduce mental problems that stress pose (Chao, 2012; Mehnert et al., 2010). In the same vein, Mak et al. (2009) concluded experience relevant to caring severe acute respiratory syndrome (SARS) survivors` mental health and suggested that support from individuals ` social network such as family and friends can enhance patients` self-efficacy, which was beneficial to long-term recovery. This result also was examined by recent studies relating to COVID-19. El-Zoghby et al. (2020) further highlighted the importance of family support for the most affected groups during coronavirus pandemic. The investigation for U.S young adults showed that respondents with high family support were associated with low levels of anxiety, depression and PTSD (Liu et al., 2020). Moreover, health anxiety, sleeping quality and social support were closely linked. Through the survey for medical staff, social support was significantly correlated with sleep quality but was negatively associated with health anxiety, and "anxiety, stress, and self-efficacy were mediating variables associated with social support and sleep quality" (Xiao et al., 2020, p. 1). Overall, these studies indicated that there was an effect of social support on anxiety during COVID-19 pandemic.

Nevertheless, since the long-term impact of COVID-19 on mental health might take several weeks even months to become apparent fully, the availability of recent studies might be relatively low (Rajkumar, 2020). Thus, based on prior similar studies (i.e. research on SARS), as extreme stressful events, COVID-19 pandemic might increase people` health anxiety but might do not affect the role of social support in mental health.

2.2 Health Anxiety

This section critically reviews literature related to health anxiety using keywords: concept, diagnosis, causes, COVID-19 effect and role of social support in treatment.

The concept and diagnosis of health anxiety. Owing to an ambiguous definition and unreliable diagnostic criteria, the concept of health anxiety always has been a controversy (Starcevic, 2013). Generally, health anxiety was also called health anxiety disorder (HAD), referred to excessive concern and fear of body health status in current or future, and it was a continuous spectrum of symptoms, ranging from a slight somatosensory concern to persistent, intense health-related fears (Salkovskis et al., 2002). From this perspective, hypochondriasis might be regarded as an extreme form of health anxiety (Abramowitz et al., 2007). However, Starcevic (2013) argued that there was a significant difference in psychopathology between hypochondriasis and health anxiety disorder because the core component of hypochondriasis was abnormal cognition that disease conviction trigger,

while the health anxiety focused on a multiplicity on worries about illness, characterized by high arousal at an emotional level (Fergus & Valentiner, 2010). Hence, health anxiety might be a type of anxiety disorder because its cognitive features and process were similar to other anxiety disorders such as GAD, PTSD and OCD. (Gerolimatos & Edelstein, 2012). To some extent, the definition of health anxiety disorder was similar to the concept of illness anxiety disorder in the *Diagnostic and Statistical Manual of Mental Disorders* (fifth edition) (DSM-5) (Starcevic, 2013), namely, " if the individual has extensive worries about health but no or minimal somatic symptoms, it may be more appropriate to consider illness anxiety disorder " (American Psychiatric Association, 2013, p. 314). However, not only the definition of HAD was controversy, but there were also different criteria for measuring or diagnosing health anxiety.

The prior studies proposed several questionnaires to assess health anxiety status, for instance, the Whitely Index (WI) (Pilowsky, 1967), Illness Behaviour Questionnaire (IBQ) (Pilowsky & Spence, 1975), Illness Attitudes Scale (IAS) (Kellner et al., 1987), Minnesota Multi-phasic Personality Inventory (MMPI) (Butcher et al. 1989), Health Anxiety Inventory (HAI) (Warwick & Salkovskis, 1989). Especially, HAI developed the short version (SHAI), which was most commonly utilized to assess samples` perceived illness likelihood and negative consequences (Salkovskis et al., 2002), because of high internal consistency, sensitivity and specificity, and short self-evaluation time (Hedman et al., 2015). Furthermore, compared to another commonly used scale, Health Anxiety Self-Assessment Whitely Index (i.e., WI), SHAI has shown better differences between healthy anxiety disorders and non-healthy anxiety disorders (Taylor, 2004).

There were no accurate diagnostic criteria for health anxiety disorder currently, while in the DSM-5, the term illness anxiety was equal to health anxiety (HA) (Bass & Pearce, 2016). Hence, as a special form of anxiety disorder, HA needed to study clinically (Tyrer & Tyrer, 2018), the clinical features of patients with typical health anxiety were outlined: a. the typical somatic symptoms were nausea, vomiting, palpitations etc.(Olatunji, 2009); b. patients often excessively worried over body health, especially, fear of having a serious illness in the future due to hypervigilance in somatic symptoms (Ferguson, 2008); c. in terms of behaviour, and patients with health anxiety showed avoidance, repeatedly checking, seeking treatment and reassurance (Fergus & Valentiner, 2009); d. consistently worry, fear and restlessness were common emotional symptoms (Nolen-Hoeksema, 2011).

Nevertheless, as "health anxiety is enmeshed with the contentious and heterogeneous group called somatoform disorders" (Tyrer & Tyrer, 2018, p. 67), the research to date has not convincingly confirmed the accurate diagnosis criteria and clinical features(Rachman, 2012; Starcevic, 2013; Taylor & Asmundson, 2004). For example, owing to individual and environmental differences, people with health anxiety did not necessarily develop a sustained and intense concern for illness (Ferguson, 2008). Thus, it was reasonable to define health anxiety as a continuum of symptoms. One end was a slight focus on somatosensory concerns, and the other end was a persistent and intense health-related fear.

Causes of health anxiety. The main causes of health anxiety were biological and psychological (Nolen-Hoeksema, 2011). From the biological perspective, increased proinflammatory cytokine activity can exacerbate health anxiety (HA) symptoms during day time (Ferguson, 2008), and the genetic contribution to HA was probably moderate, with heritability estimated around 10-37% (Rask et al., 2012).

On the other hand, "psychology also appear to help determine who develops this disorder " (Nolen-Hoeksema, 2011, p. 127). To date, prior studies explored different variables that might trigger health anxiety, such as cognitive biases (Shafran & Rachman, 2004; Taylor & Asmundson, 2004), the nature of safety behaviors (Rachman et al., 2008) and effects of intrusive images (Philips, 2011). Especially, cognitive biases played an important role in the cause of health anxiety. There was a cognitive model to widely explain health anxiety: a. focused on changes in bodily sensation closely; b. did cognitive misinterpretations to these sensations; c. engaged in catastrophic thinking and deteriorating consequences (Craske & Waters, 2005; Rachman, 2012). This cognitive bias of worrying somatic symptoms that can lead to bad consequences was known as anxiety sensitivity (McNally et al., 1999). Overprediction of fear to illness (Rachman and Arntz, 1991), overprediction of pain from the

body (Bourgault-Fagnou & Hadjistavropoulos, 2009), and searching disturbing information about illness (Handelzalts et al., 2016) were common causes that exacerbated cognitive bias relevant to illnesses. For example, that people search for information about COVID-19 from social media might increase health anxiety even develop to hypochondriasis during pandemic(Wiederhold, 2020). Additionally, when it comes to the health anxiety, safety behaviors such as repeatedly seeking reassurance, checking bodily symptoms and avoiding expected illness were not helpful to treatment but strengthened maladaptive behaviour (Rachman et al., 2008). Furthermore, Philips (2011) reported that intrusive images related to illness might trigger intensive emotional action of those with health anxiety.

Although the cognitive model was widely employed to explain health anxiety, it was still controversial currently. Barsky et al. (2001) compared self-reports of hypochondriasis and non-hypochondriasis groups and found that some patients with health anxiety did not regard themselves as having cognitive biases for disease (e.g., excessive fear of illness). However, CBT treatments based on cognitive models have widely been shown to be effective in health anxiety. It seemed to confirm this model indirectly (Taylor & Asmundson, 2004). In light of Craske and Simos`s (2013) genetic vulnerability - stress model, the explanation for health anxiety might be integrated biological and psychological factors. Thus, patients with health anxiety might have a genetic vulnerability to illness, for instance, with the slight stimulus, they might have strong dysregulation performance (e.g., breathing faster and palms sweating), which might cause catastrophizing thinking about their physical symptoms, hence, this anxiety triggers more anxious behaviour and the cycle continues.

The effect of COVID-19 on health anxiety. COVID-19 pandemic has had huge impacts on the mental health of the general population, which caused several mental problems for individuals, especially anxiety being the commonest (Xiao, 2020). Surveys from different countries showed that during pandemic the samples with health anxiety increased significantly (Jungmann & Witthöft, 2020; Özdin & Bayrak Özdin, 2020; Roy et al., 2020; Sun et al., 2020). Specifically, the cause of health anxiety in the context of the pandemic was discussed by numerous studies. Mertens et al. (2020) employed the online survey to assess fear of coronavirus for 439 samples, and analysis results confirmed that COVID-19 pandemic caused an increase to fear of coronavirus and worries to health (Lee, 2020). A cross-sectional study further suggested that chronic disease and psychiatric history were also considered as risky factors that lead to more health anxiety symptoms during pandemic (Özdin & Bayrak Özdin, 2020). Moreover, Rajkumar (2020) emphasised that during a pandemic, a lot of inaccurate and exaggerated information about COVID-19 from social media might cause individuals to become excessively anxious about their health status, and recent studies also showed excessive search of information about coronavirus on social media was a common safety behaviour that increased health anxiety (Gao et al., 2020; Jungmann & Witthöft, 2020). However, Wiederhold (2020) argued that the significant influencing factor of health anxiety during a pandemic was cognition (e.g., fear of virus) rather than social media. Conversely, social support from social media can alleviate anxiety.

It was an obvious fact that during COVID-19 pandemic, the levels of health anxiety in the general population increased. Current research attempted to explore the role of different variables such as cognitive bias, safety behaviour and triggering events in the development of health anxiety in the context of the virus outbreak. Nevertheless, the common limitations of quantitative studies also might affect the conclusion. For example, most of the studies used the online survey, which might lead to that the sample limited to the educated population (Roy et al., 2020), hence, it was not representative to the general population (El-Zoghby et al., 2020). Additionally, as the COVID-19 pandemic continues, the long-term impact of a pandemic on health anxiety was not fully clear. Thus, conclusions from such studies might need to be confirmed further.

The role of social support in health anxiety treatment. Compared to drug therapy, psychotherapy was more effective for health anxiety (Tyrer et al., 2015), and cognitive behaviour therapy (Seivewright et al., 2008), mindfulness-based CBT (Williams et al., 2011), stress management (Hedman et al., 2014), acceptance and commitment therapy (Eilenberg et al., 2016), family therapy (Hart & Björgvinsson, 2010) were common treatments. Due to these psychotherapies

needing patients with health anxiety to interact with other social members, social support indeed contributed to the treatment. For instance, generally, all psychological treatments for health anxiety involved in information support from counsellors and doctors, during CBT, patients needed to change negative patterns through specific training, and the whole process was associated with many dimensions of social support (Tyrer & Tyrer, 2018; Taylor & Asmundson, 2004; Taylor, 2004). Additionally, family therapy was a typical sample to treat health anxiety by utilizing family support (Hart & Björgvinsson, 2010), because the family therapy focused on the interaction and relationship among family members. Thus, based on the reliable evidence that social support was significantly correlated with health anxiety (Hipkins et al., 2004; Jones et al., 2012; Mehnert et al., 2010; Taylor, 2011; Uchino, 2004), the contribution of social support in the treatment of health anxiety was confirmed.

3. Gaps that Need Addressing

Understanding the relationship between social support and health anxiety during COVID-19 pandemic is a particularly important issue. As mentioned earlier, a lot of prior research found that social support had a significant effect on health anxiety for the general population, and virus pandemic also affected social support and health anxiety respectively, however, it remained unclear how the pandemic affects the relationship between social support and health anxiety, hence, there was still a gap needs addressing. Therefore, this study attempted to deal with this issue. Specifically, there are three questions that need addressing. First, what is the impact of the COVID-19 pandemic on health anxiety? The hypothesis is that compared to the previous pandemic, participants might report an increase in health anxiety including relevant safety behaviors during the pandemic. Second, what is the relationship between social support and health anxiety in the context of virus pandemic? It is hypothesised that although variable gender is considered, the negative correlation between social support and health anxiety might be still significantly during the epidemic. Third, what is the role of social support in health anxiety during virus pandemic? The hypothesis is that in the time of virus outbreak, social support might play a mediator to buffer effect of the stressor in the pandemic (fear of COVID-19) on health anxiety.

4. Method

4.1 Participants

Ninety-three participants completed this study. Of these participants, 58.1 % were female (N = 54), 41.9 % were male (N = 39). Concerning education, forty-five participants were international students, accounting for 48.4 %, and the number of home students including EU students was forty-eight, and its proportion was 51.6 %. In particular, undergraduate students (N = 27) made up 29.0 % of all students, while postgraduate students (N = 66) accounted for 71.0 %. In terms of marital status, 80 % of participants reported themselves as single, 10.8 % as married, 3.2 % as preferring not to say. Among all participants, 43.0 % lived near their family (less than 10 miles), and 83.9 % had close friends living nearby (less than 10 miles). As a nationality, 41.9 % of participants were British, 21.5 % Chinese, 12.8 % other countries in European Union citizens, 11.8 % Asian, 3.2 % Latinos, 2.2 % African, 4.4 % other countries citizens, and 2.2 % prefer not to say.

4.2 Materials

Health anxiety. The Short Health Anxiety Inventory (SHAI; Salkovskis et al., 2002) was adopted to assess health anxiety of participants. Specifically, the SHAI measured health anxiety (i.e., hypochondriasis) and contained two versions which measured health anxiety over a week and a month. To assess participant's health anxiety before social distancing due to the COVID-19 pandemic (i.e., 3 months before March 23, 2020) participants completed the month version of the SHAI. To assess participants' health anxiety whilst social distancing was in place (i.e., after March 23, 2020) participants completed the week version and as such were asked to report their feelings over the past week.

There were four sections in the SHAI. The main section was composed of symptoms of health anxiety. The second section was aimed to measure people`s attitude to a negative consequence. The third and the fourth section were designed to quantify variables related to safety behaviors of health anxiety: avoidance behaviour and reassurance seeking. (Salkovskis et al., 2002). In the first and second section, items were rated on a 0-3 basis and then all scores were summed, but in other sections, each item scored on a nine-point

scale, every two points were anchored. Additionally, the SHAI was one of the well-known tools to diagnose anxiety health (hypochondriasis) because of good validity in previous studies (Fergus & Valentiner, 2009; Hedman et al., 2015).

Sleep quality. To assess sleep quality, participants were administered the Sleep Quality Scale (SQS; Yi et al., 2006), a 28 item scale which measured six factors of sleep quality: daytime disfunction, recovery after sleep, difficulty in falling asleep, difficulty in getting up, satisfaction with sleep, and awakening during sleep (Howell et al., 2008). Each item was rated on a four-point Likert scale. Responses were scored by summing participants' ratings and scores can range from 0 to 84, with higher scores indicating worse sleep quality. Responses on items related to recovery after sleep and satisfaction with sleep were reverse coded before calculating the overall score for each participant. Participants completed this questionnaire twice to assess their sleep quality before March 23, 2020, and during the period in which social distancing was implemented (i.e., after March 23, 2020). Additionally, previous studies demonstrated that SQS was a widely used measurement tool with good validity in assessing sleep quality (Howell et al., 2008; Westerlund et al., 2016).

Fear of COVID-19. As this study was carried out during the period when social distancing was implemented it was important to assess participants' feelings towards COVID-19. Therefore, participants were administered the Fear of COVID-19 Scale (FCV-19S; Ahorsu et al., 2020). The FCV-19S was designed to quantify fear of COVID-19 and consisted of 7 questions rated on a five-point scale with scores ranging from 7-35, with a higher score denoting increased fear. Although FCV-19S had limitations at some point, "it has a stable unidimensional structure with robust psychometric properties" (Ahorsu et al., 2020, p. 5). Thus, this scale was reliable and valid to access individuals' fear of coronavirus.

Perceived social support. The shortened version of the Interpersonal Support Evaluation List (ISEL; Cohen & Hoberman, 1983) was employed to assess participants` perceived social support. This measure was composed of 12 statements regarding social support resources and was designed to assess three dimensions: appraisal support (i.e., availability of suggestions or evaluation from someone), belonging support (i.e., possibility of doing things with others) and tangible support (Cohen & Hoberman, 1983). Hence, each item was rated on four-point scale ranging and six items were reverse-scored before calculating each participants' overall scores. Additionally, several previous pieces of the literature suggest that ISEL including the shortened version was a reliable scale to measure social support that individuals perceived (Cohen & Hoberman, 1983; Cohen et al., 2000).

Multidimensional social support. Participants completed the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) which measured participant's perception of three sources of social support (i.e., a significant other, family and friends). The MSPSS comprises 12 items, with 4 items for the three sources of social support rated on a seven-point scale (Zimet et al., 1988). Additionally, it was advisable to calculate mean scores directly (i.e., total scores were divided by many items) due to more validity. Hence, the high mark showed a high level of perceived social support. Additionally, there was enough evidence that the MSPSS had good internal and test-retest reliability, good validity, and a fairly stable factorial structure (Dahlem et al., 1991; Zimet et al., 1990).

4.3 Procedure

Data was collected between May 1st to June 12th, 2020, utilising an online platform (i.e., Google Forms which is part of the University of Sheffield's Google Suites platform). The questionnaire took approximately 40 minutes to complete. As a small honorarium, after testing all participants entered into a prize draw interface to win one of 7 Amazon vouchers valued at £10 each. Participants were recruited through social media platforms (e.g., Facebook) and the survey sharing website Survey Cycle.

4.4 Ethical consideration

This study received ethical approval from the University of Sheffield's Ethics Review Procedure as administered by the School of Education. All data will be stored on an electronic database on the University of Sheffield's secure Google drive as stipulated by the University of Sheffield's Cyber Essentials Assured Computing Policy. Access to the project's folder on Google Drive will be limited to the researcher and his

dissertation supervisor.

5. Results

5.1 Comparisons of health anxiety before and during COVID-19 pandemic

Table 1. Descriptive statistics for measures of health anxiety including safety behaviors and sleep quality before and during COVID-19 ($N = 93$)

	Before COVID-19		During COVID-19	
Variables	M	SD	M	SD
SHAI				
Symptoms	11.28	4.88	15.30	7.90
Negative consequences	3.87	2.22	5.27	2.64
Total [a]	15.15	5.81	20.57	9.35
Avoidance	30.58	15.56	40.54	15.80
Reassurance	28.39	10.20	30.73	11.71
Sleep quality	34.26	12.21	38.22	13.40

Note. [a] The total score of SHAI is equal to the sum of symptoms and negative consequences.

(**Table 1**) shows the participants` health anxiety, safety behaviors and sleep quality by the self-report measures SHAI and SQS before and during COVID-19 pandemic. Based on a meta-analysis on the SHAI, the mean total score is 12.41 ($SD = 6.81$) in non-clinical studies (Alberts et al., 2013). In general, no matter before and during the pandemic, average scores of total SHAI in respondents ($M_{before} = 15.15$, $SD = 5.81$; $M_{during} = 20.57$, $SD = 9.35$) were higher than previous studies. Additionally, the scores of safety behaviour (i.e., avoidance reassurance) in the context of pandemic ($M_{avoidance} = 40.54$, $SD = 15.80$; $M_{reassurance} = 30.73$, $SD = 11.71$) were also obviously higher than the previous criteria in control groups ($M_{avoidance} = 9.2$, $SD = 8.8$; $M_{reassurance} = 14.9$, $SD = 7.9$; Salkovskis et al., 2002). These results seemed to indicate that the majority of participants were anxious to health and with strong safety behaviors.

According to previous studies on SQS (Yi et al., 2006), normal participants` score was 15.8 ($SD = 9.06$), hence, in this study, an average score before the pandemic ($M = 34.26$, $SD = 12.21$) and during the pandemic ($M = 38.22$, $SD = 13.40$) were always higher, which suggests that participant had low sleep quality in last three months.

Furthermore, from Table 1, the mean in all variables increased during COVID-19, which means that participants report more health anxiety, safety behaviors and sleep problems in the past week. Hence, time would be analyzed as an important factor in inferential statistics.

Table 2. Effects of time on the variation of health anxiety, safety behaviors and sleep quality

Assessment types	*df*	MS	F	*p*
SHAI				
Symptoms	1	725.01	27.33	.000
Negative consequences	1	90.86	37.29	.000
Total [a]	1	1365.68	37.94	.000
Avoidance	1	4610.09	35.34	.000
Reassurance	1	255.51	7.63	.007
Sleep quality	1	728.09	23.340	.000

Note. [a] The total score of SHAI is equal to the sum of symptoms and negative consequences.

In order to test the hypothesis that an increase in health anxiety, safety behaviors and sleep problems, time was acted as a within-subject factor, and six repeated-measures ANOVA were designed and conducted. Hence, results from six analyses were reported in (**Table 2**).

Firstly, symptoms of health anxiety were measured before and during COVID-19. The repeated-measures ANOVA determined that the mean scores differed significantly across two points (F (1, 92) = 27.33, $p < .001$), and a Post hoc test using the Bonferroni correction indicated that scores increased by an average of 4.02 points during pandemic ($p < .001$). Moreover, in the measurement of attitude to illnesses (negative consequences), a statistically significant difference between initial assessment and follow-up assessment was evident, F (1, 92) = 37.29, $p < .001$, and an increase in mean scores did reach significance, the mean difference (MD) was 1.40, $p < .001$. Furthermore, in term of the total score, a significant difference between the mean score of two assessments (before and during a pandemic) was found, F (1, 92) = 37.94, $p < .001$, and the increase of 5.42 points also was statistically significant ($p < .001$). Generally, for the measures of health anxiety, there was a significant main effect of time, and the growth of mean scores between two conditions also was statistically significant.

Additionally, in the test of avoidance seeking in illness-related situations, the observed F value was statistically significant, F (1, 92) = 35.34, $p = .000$, and an increase in the score between the first and

second assessment (30.58 vs 40.54, respectively) was statistically significant (p = .000). Moreover, in the seeking reassurance, there was a significant increase (MD = 2.34) among two measures, F (1, 92) = 7.63, p = .007. Accordingly, a significant increase in safety behaviors was found in Table 2. Overall, during COVID-19 pandemic, safety behaviors closely related to healing anxiety were increased, which was proved by statistics analysis.

Finally, the results of analysing sleep quality were as follow: F (1, 92) = 23.34, p < .001, and MD = 3.96, this suggested that the main effect of time on sleep quality was significant, namely, participants experienced the decrease in sleep quality significantly during the pandemic. Overall, the hypothesis that participants` health anxiety, safety behaviors and sleep problems might increase during COVID-19 epidemic was examined through comparing and analysing scores of different scales under two conditions.

5.2 Correlation between social support and health anxiety during the pandemic

In this section, the correlation between social support and health anxiety is analyzed. Due to participants completing the scales of social support in the time of the pandemic, only scores on scales related to health anxiety and sleep quantitative during COVID-19 were selected for statistics analysis by SPSS.

Table 3. Descriptive statistics for social supports by gender

	Female		Male		Total [a]	
Variables	M	SD	M	SD	M	SD
Perceived support						
Appraisal support***	8.98	2.66	6.64	2.23	8.00	2.74
Belonging support**	7.78	2.07	6.26	2.65	7.14	2.44
Tangible support***	8.70	2.37	6.85	1.95	7.92	2.38
Total [b] ***	25.46	6.01	19.74	5.96	23.06	6.60
Multidimensional support						
Family support*	5.38	1.21	4.81	1.04	5.14	1.17
Friends support*	5.63	1.03	5.09	1.06	5.40	1.07
Significant other support***	5.73	.97	4.78	1.29	5.33	1.20
Total [c] ***	5.58	.85	4.89	.99	5.29	.97
Fear of COVID-19*	18.19	5.62	20.82	8.34	19.29	6.97

Note. Asterisk indicates that mean scores of females and males on the social support scales varies significantly (independent-samples T-test), *p < .05, **p < .01, ***p < .001.
[a] A total of 93 samples, 54 females and 39 males
[b] A total score is the sum of the three subscales scores
[c] A total score is the sum of all items divided by 12 (number of items)

From the data in (**Table 4**), according to original scoring information (Cohen & Hoberman, 1983; Dahlem et al., 1991), in the social support, most of the samples were at the moderate level, the majority of the subject were in the same level of the multidimensional social support as well. However, the difference between female and male on two social support scales was apparent. An independent-samples t-test was conducted to compare scores of assessments in females and males, and scores of females significantly differed from males (p < .05). Conversely, men were more afraid of the coronavirus than women because of a significant difference between mean scores of male and female groups (p < .05) on the fear of COVID-19 scale. Thus, considering the difference of gender in the assessments, the correlations between social support and health anxiety in female and male were also analyzed by bivariate correlation.

Table 4. Correlation between social support and health anxiety, safety behaviors, sleep quality by different genders

	Symptoms	Negative consequences	SHAITotal	Avoidance	Reassurance	Sleep Quality
Appraisal	-0.29**	-0.23*	-0.31**	-0.08	0.01	-0.13
Appraisal (F)	-0.18	-0.09	-0.18	0.02	0.01	0.02

Continuation Table

	Symptoms	Negative consequences	SHAITotal	Avoidance	Reassurance	Sleep Quality
Appraisal (M)	-.017	-0.42**	-0.24	-0.21	0.14	-0.31
Belonging	-0.52***	-0.36***	-0.54***	-0.23*	-0.02	-0.29**
Belonging (F)	-0.32*	-0.12	-0.31*	-0.21	0.07	0.08
Belonging (M)	-0.58***	-0.64***	-0.64***	-0.25	-0.05	-0.66***
Tangible	-0.37***	-0.19	-0.36***	-0.11	-0.07	-0.13
Tangible (F)	-0.21	-0.08	-0.21	-0.07	-0.09	0.06
Tangible (M)	-0.37*	-0.30	-0.38*	-0.14	0.06	-0.39*
Perceived support	-0.45***	-0.29**	-0.46***	-0.15	-0.03	-0.21*
Perceived support (F)	-0.27*	-0.11	-0.27	-0.09	-0.01	0.06
Perceived support (M)	-0.44**	-0.54***	-0.50**	-0.24	0.05	-0.54***
Family	-0.37***	-0.30**	-0.40***	-0.13	-0.10	-0.13
Family (F)	-0.22	-0.21	-0.25	-0.10	-0.06	0.07
Family (M)	-0.45***	-0.44**	-0.48***	-0.17	-0.11	-0.40*
Friends	-0.46**	-0.32**	-0.48**	-0.27**	-0.09	-0.06
Friends (F)	-0.23	-0.25	-0.28*	-0.16	0.13	0.30*
Friends (M)	-0.59***	-0.40*	-0.60***	-0.43**	-0.39*	-0.51**
Significant other	-0.41***	-0.21*	-0.40***	-0.03	-0.04	-0.21*
Significant other (F)	-0.25	-0.01	-0.21	0.11	-0.05	0.05
Significant other (M)	-0.36*	-0.42**	-0.41**	-0.15	0.06	-0.44**
Multidimensional support	-0.49***	-0.34**	-0.51***	-0.17	-0.09	-0.16
Multidimensional support (F)	-0.30*	-0.22	-0.33*	-0.08	0.00	0.16
Multidimensional support (M)	-0.53**	-0.48**	-0.56***	-0.28	-0.15	-0.52**

Note. F = Female, M = Male; Asterisk indicates correlation is significant (two-tailed), *$p < .05$, **$p < .01$, ***$p < .001$.

Table 4 presented findings on the relationships between health anxiety, safety behaviors, sleep quality, perceived social support and multidimensional social support. In general, a significant negative correlation was found between social support and health anxiety. Specifically, the variables that perceived social support and health anxiety were found to be moderately negatively correlated, r (93) = -.46, $p < .001$, and multidimensional support and strongly negatively correlated, r (93) = -.51, $p < .001$. However, negative correlations between perceived support and safety behaviors was not strong and significant ($r_{avoidance}$ (93) = -.15, p = .14; $r_{reassurance}$ (93) = -.03, p = .78, respectively), and the associations between multidimensional support and seeking safe behaviors also were weak and non-significant ($r_{avoidance}$ (93) = -.17, p = .10; $r_{reassurance}$ (93) = -.09, p = .39). Additionally, strong evidence of the negative correlation between social support and each sub-factors of health anxiety (symptoms and awfulness attitude to illness) were found, and the higher level of social support was associated with the significantly ($p < .01$) lower symptoms and negative attitude to illness. Moreover, most of the variables in social support were presented to be significantly negatively correlated ($p < .05$), and only the association between tangible support and attitude to negative consequences was not significant, r (93) = -.19, p = .08. Furthermore, there was a significantly negative correlation between perceived support and sleep quality, r (93) = -.21, p = .05, by contrast, the relationship between multidimensional support and sleep quality was not significant, r (93) = -.11, p = .11. Contrary to expectations, increased social support seemed to not be strongly associated with reduced sleep problems.

Nevertheless, once considering the factors of gender, the correlation between social support and health anxiety was somewhat counterintuitive. In the female group, only the moderate negative correlation between multidimensional support and health anxiety was significant (r (54) = -.33, p = .02), specifically, high level of belonging and friends support were associated with

low scores of SHAI significantly ($r_{belonging}$ (54) = -.31, p = .03; r friends (54) = -.28, p = .05). Interestingly, there was a significant positive association between friends support and sleep quality, r (54) = -.30, p = .03. From males, there were significant negative associations between variables in social support, health anxiety, sleep quality (p < .05), but friends support and safety behaviors were negatively significantly correlated ($r_{avoidance}$ (39) = -.43, p = .01; $r_{reassurance}$ (39) = -.39, p = .01). Overall, compared with entire samples, for female, the relationships between social support, health anxiety, safety behaviors and sleep quality were not strong and significant, while such relationships were significant in male.

Finally, although the relationships in different variables were examined through statistical analysis, such correlation is not causation. Based on previous studies, social support might be as a moderator that contributes to buffering in stress events (Holt & Espelage, 2005; Zhou et al., 2013), accordingly, the mediation of social support between stressors (fear of COVID-19) and health anxiety (SHAI) have to be considered.

5.3 Mediation of social support between the stressor and the health anxiety

To examine the hypotheses that social support plays as a mediator between fear of COVID-19 and health anxiety, the PROCESS macro in SPSS (Hayes, 2012) was employed in this section. In mediation analysis, scores of measures on health anxiety, fear of COVID-19, perceived and multidimensional social support during pandemic were used.

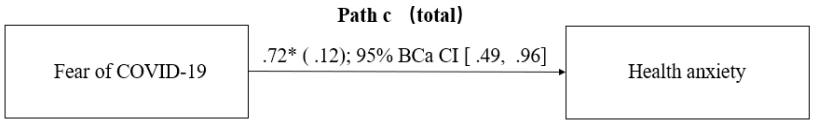

Figure 1. Schematic model depicting the total effects of fear of COVID-19 on health anxiety without any mediator. Standardized regression coefficients are significantly based on 95% BCa CI. Note: * p < .05; BCa CI = bias-corrected bootstrap confidence intervals.

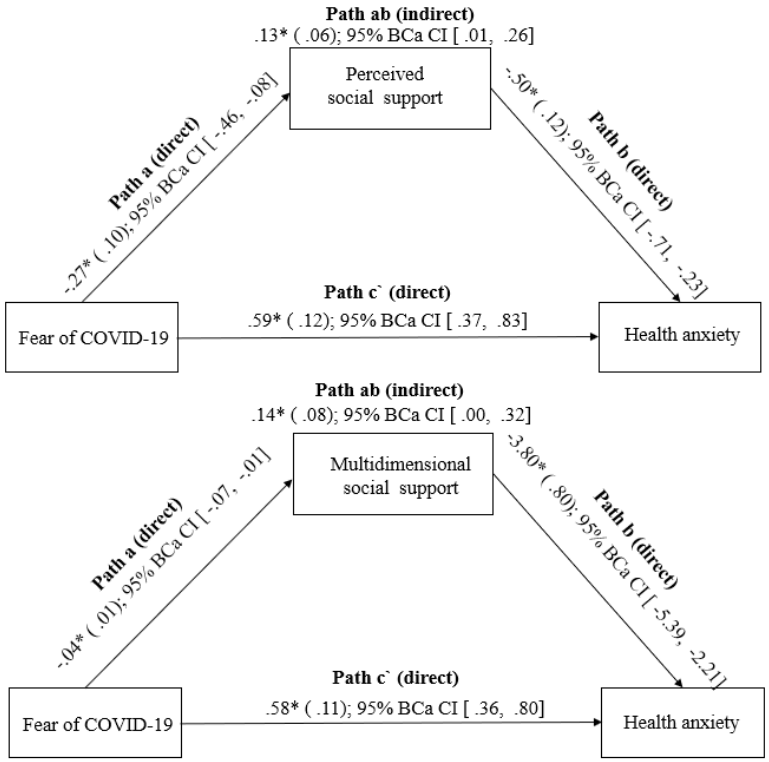

Figure 2. Schematic model depicting direct, indirect and mediating effects of social support (e.g., perceived and multidimensional support) on health anxiety. Standardized regression coefficients are significantly based on 95% BCa CI. Note: * p < .05; BCa CI = bias-corrected bootstrap confidence intervals.

Through mediation analysis, there was a difference between the direct effect of fear of COVID-19 on health anxiety and the indirect effect accounting for social support. As **Figure 1** showed, the total effect of fear of virus on health anxiety was examined to be significant (B = .72, $p < .001$). The mediation analyses were illustrated in (**Figure 2**). Specifically, both perceived and multidimensional social support was a significant and partial mediator between fear of coronavirus and health anxiety, and contribution of mediation to the total effect was 18.0 % and 19.4 % in the relation respectively. Overall, social support can act as a mediator to buffer the impact of fear of COVID-19 on health anxiety during the pandemic.

6. Discussion

6.1 Summary of results

This study set out with the aim of assessing changes in health anxiety before and during COVID-19 pandemic, and the relationship between social support and health anxiety during the epidemic. A total of ninety-three sets of data were analyzed, and three hypotheses in this research were supported. At first, compared to previous COVID-19 outbreak, levels of health anxiety for respondents increased significantly during the pandemic, and scores of safety behaviors (i.e., avoidance, reassurance) showed a significant increase as well. Moreover, in the period of the pandemic, students reported more sleep problems significantly. Next, during COVID-19 pandemic, a significant negative association between social support and health anxiety was found, while the relationship between social support and safety behaviors was not significant. Additionally, perceived support and sleep quality significantly negatively correlated, while multidimensional support was not associated with sleep quality significantly, hence, contrary to expectations, increased social support seemed to not be strongly associated with reduced sleep problems generally. Interestingly, through analysis by different genders, males' results were similar to the overall, but different from females` mostly, because, for females, social support quality was not significantly correlated with health anxiety, safety behaviors and sleep quality. For the latter, during the pandemic, variables fear of COVID-19, social support and health anxiety during pandemic were significantly correlated, hence, the mediation of social support between stressor (fear of the virus) and health anxiety was examined by mediation analysis. Specifically, both perceived and multidimensional support acted as a partial mediator in the relationship between fear of coronavirus and health anxiety.

6.2 Interpretation of results related to existing literature

The finding that health anxiety increased during COVID-19 pandemic are consistent with recent research relevant to the effect of the pandemic on mental health (El-Zoghby et al., 2020; Rajkumar, 2020; Zhang & Ma, 2020). More precisely, in a survey aiming to German general population (N = 1615), the participants reported a significantly increasing health anxiety during a virus outbreak, especially comparing previous months (Jungmann & Witthöft, 2020). More investigations were conducted in other countries such as Canada (Asmundson & Taylor, 2020), China (Wang et al., 2020), India (Roy et al., 2020), Turkey (Özdin & Bayrak Özdin, 2020) etc., and these studies all revealed the similar results. Moreover, some studies suggested that participants' sleep quality decreased significantly, which might be related to anxiety and stress (Wang et al., 2020; Xiao et al., 2020b), and this conclusion was confirmed by the finding in this study that participants reported more sleep problems in time of virus pandemic. However, there is a gap in the previous studies regarding safety behaviors in health anxiety such as seeking avoidance and reassurance during COVID-19 pandemic. Existing literature focused on the impact of the pandemic on symptoms of health anxiety while ignoring the effect of safety behaviour on maintaining health anxiety (Jungmann & Witthöft, 2020; Lee, 2020). In this study, the result suggest that participants with health anxiety report more safety behaviors obviously during a virus outbreak, this seems to explain panic purchasing, excessive hand washing and social withdrawal for the public in the context of the pandemic.

Previous studies suggested that there was a negative significant correlation between social support and health anxiety (Hipkins et al., 2004; Jones et al., 2012; Mehnert et al., 2010; Taylor, 2011), consistent with these pieces of literature, this research found that participants with high social support quality have

relatively low levels of health anxiety. Nevertheless, prior literature paid attention to the vulnerable population such as patients with chronic illness, even cancer, and it was not representative of the general population (Hefner & Eisenberg, 2009). Hence, this finding further examines that this negative significant relationship between social support and health anxiety still exists in general groups such as college students. Additionally, in this study, during a stressful environment such as COVID-19 pandemic, the link between social support and health anxiety is enhanced. Such finding is also confirmed by recent studies. Adults with high family support reported fewer symptoms of health anxiety (Liu et al., 2020). Similarly, a study from China indicated that for medical staffs, perceived social support and anxiety related to illness especial coronavirus were strongly negatively correlated (Xiao et al., 2020b).

In addition, some findings contradict expectations based on previous studies. Specifically, Xiao et al. (2020a; 2020b) suggested that increased levels of tangible and family support were positively associated with increased sleep quality during COVID-19 pandemic. However, findings in this study are not consistent with this result, namely, these both items in social support are not significantly correlated with sleep quality in a time of the epidemic. Moreover, as maintaining factors of health anxiety, safety behaviour such as avoidance and reassurance (Rachman et al., 2008), they are not significantly associated with social support during a virus outbreak, which is also contrary to the results of existing studies. A study by Mehnert et al. (2010) showed that information support from doctors can help reduce safety behaviors such as repeatedly checking bodily sensation in patients with cancer, and Liu et al. (2020) also suggested that in the U.S, young adults with high social support had less maladaptive safety behaviors during the pandemic. Finally, in this research, although males reported low levels of perceived social support, the effect of social support on their health anxiety is more significant compared to females. From prior studies, available evidence shown that the gender might affect choosing types of social support for individuals (Reevy & Maslach, 2001), for example, male tended to receive tangible support, while female liked to receive emotional support, additionally, compared to male, the pandemic might have a greater effect on female (El-Zoghby et al., 2020; Özdin & Bayrak Özdin, 2020).

Recent studies have revealed that fear of COVID-19 is a major cause of increased health anxiety for the general population during the pandemic (Liu et al., 2020; Mertens et al., 2020). This conclusion is confirmed by the finding that the correlation between fear of virus and levels of health anxiety is strongly positive and significant in this research. Moreover, numerous previous literature identified social support as a mediator between stress, trauma, fear and anxiety (Holt & Espelage, 2005; Huang et al., 2010; Zhou et al., 2013). Hence, the result that social support plays a mediation between fear of coronavirus and health anxiety during pandemic not only extends the scope of interpretation of the previous conclusion but also fills in the gaps in current research on the mediation effect of social support in the epidemic.

6.3 Implications for research and practice

The implication of this study is the possibility that more potential research for social support and health anxiety should be conducted in the future. First, the effect of specific social support (e.g., belonging, appraisal, family and friend support) on health anxiety for the general population should be confirmed by further studies. Specifically, based on recent literature relevant to COVID-19, the focus of future studies needs to be to identify which types of social support are effective to alleviate health anxiety during a pandemic. Next, the relationship between safety-seeking behaviors closely relevant to health anxiety and social support might be explored by more studies. For instance, during the virus pandemic, whether information support from social media increases avoidance behaviors such as social withdrawal for the public still is controversial (Gao et al., 2020; Jungmann & Witthöft, 2020). This study has established the mediation of social support between fear and anxiety during a pandemic, accordingly, more variables such as sleep quality, safety behaviors and gender also ought to be considered in the mediation analysis in following research. In short, from a theoretical perspective, the findings of this study confirm previous studies, while some gaps (e.g., a lack of research on safety behaviour) are found and need addressing in the future.

From the practical view, the combination of findings

might provide support for the implementation of measures to reduce health anxiety of college students during COVID-19 pandemic. Firstly, the university may develop improved mental health policies that target vulnerable students such as international students. Currently, most of the universities have adopted the same mental health measures for both international and home students during the pandemic, which might ignore the fact that compared to home students, international students had higher health anxiety and received less social support after the lockdown announcement (Chen et al., 2020). Hence, sophisticated therapy services for vulnerable groups in the university is necessary (Zhai & Du, 2020). For example, the university provides more information support, such as policy about academic assessment and tangible support like an extra subsidy to those who are vulnerable to the effects of the pandemic. Moreover, it is also important to reduce the fear of the coronavirus for individuals in the context of the pandemic, because fear is an essential cause of increased health anxiety. More precisely, the mass media should provide accurate and reputable information relevant to the pandemic and avoid fear-inducing language to the public (Jungmann & Witthöft, 2020). Considering the mediation of social support between fear and anxiety, authorities might be careful to provide information support through social media platforms, as improper social support can only increase health anxiety for individuals.

Importantly, the enhancement of social support to individuals is vital. The government should ensure adequate resources and infrastructures for mental health services that are accessible to the population, and develop psycho-educational materials to the public through alternative channels such as websites, apps and telephones. For individuals, they should maintain their current social networks, like keeping in touch with friends and family and developing a feeling of belonging to the collective care process (even if with virtual activities). However, such measures to improve mental health during pandemics depend on the availability of trained manpower and infrastructure (Rajkumar, 2020).

6.4 Limitations

The first limitation of this study is the non-representativeness of the sample. A total of ninety-three samples were collected and analyzed. In such samples, female and male accounted for 58.1% and 41.9% respectively, and 29.0% of participants were undergraduate students, 71.0% of those were postgraduate students. The demographic profile of this study is different from the population distribution of university students in the UK; hence, this might be not representative of the general population. To solve this problem is to expand the sample size according to demographics in future studies.

Another threat to this research is the limitation of the sampling method. The recruitment was online including social media and survey websites. Such participants who are familiar with the Internet might have the high possibility in cyberchondria (Jungmann & Witthöft, 2020), which might influence the evaluation of health anxiety for them. Additionally, using self-reported measures to assess the level of different variables is limited potentially, especially, the health anxiety and sleep quality before COVID-19 pandemic is retrospectively reported. As a result, the findings might be influenced by memory bias or current situation. Such problems are also in measures of social support, personality traits also influence results. The way to deal with the limitation of self-report is using measures from the perspective of third-parties or the longitudinal studies (Hefner & Eisenberg, 2009). This might be a potential direction for further research.

The largest challenge for this study is post hoc interpretation in explaning the relationship between social support and health anxiety. Although findings that social support is negatively significantly associated with health anxiety are consistent with previous literature, it is not possible to draw causal conclusions through mediation analysis. As the influencing factors of social support are dynamic, the real social situation may change after the completion of research, and the validity of such results will be affected. For instance, during the pandemic, whether a poor social support quality leads to an increase in health anxiety, or if individuals with hypochondriasis find it difficult to receive support from other members in the social network, such problems still cannot be answered by existing studies including this study. A prior study suggested that combinations of the longitudinal study and the cross-sectional research might be employed to solve this problem (Korabik et al., 2003; Seeman, 1996). Specifically, the longitudinal study aimed to

understand and confirmed the mechanism and degree of other variables such as gender (Taylor et al., 2000), culture (Taylor et al., 2004), and personality (Reevy & Maslach, 2001) on specific social support (e.g., family support), while the purpose of cross-sectional research was to simultaneously focus on multiple supports and analyse the effect of social support on relevant dependent variables. Thus, this is an important direction in further studies and might reduce the limitations of post hoc interpretation in drawing a causal conclusion.

7. Conclusion

This study set out to examine the relationship between social support and health anxiety for students studying in the UK during COVID-19 pandemic. The results have shown that in the context of a virus epidemic, the sample`s health anxiety increased significantly, and those who had higher social support quality reported lower levels of health anxiety. Specifically, fear of COVID-19 was the core cause of increased health anxiety, while social support acted as a mediator to buffer the effect of fear relating to the virus on health anxiety, and this kind of indirect effect was identified to be significant.

Taken together, these findings not only confirmed previous studies but also narrowed the gaps in this research area. Moreover, this study provided support for the development of policies to improve college students` mental health during a pandemic, in particular, it can help university administrators and mental health service teams to effectively identify vulnerable students in health anxiety and provide individually targeted interventions to address this growing health issue. Nonetheless, some limitations in this study were found such as small sample size, use of convenience sampling, and insufficient evidence collected. Overall, although the results might be limited, the research presented an exploration of issues in social support and health anxiety during the COVID-19 pandemic.

References

Abramowitz, J. S., Olatunji, B. O., & Deacon, B. J. (2007). Health Anxiety, Hypochondriasis, and the Anxiety Disorders. *Behavior Therapy, 38*(1), 86–94.
https://doi.org/10.1016/j.beth.2006.05.001

Alberts, N. M., Hadjistavropoulos, H. D., Jones, S. L., & Sharpe, D. (2013). The Short Health Anxiety Inventory: A systematic review and meta-analysis. Journal of Anxiety *Disorders*, *27*(1), 68–78.
https://doi.org/10.1016/j.janxdis.2012.10.009

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: Author.

Asmundson, G. J. G., & Taylor, S. (2020). How health anxiety influences responses to viral outbreaks like COVID-19: What all decision- makers, health authorities, and health care professionals need to know. *Journal of Anxiety Disorders, 71*, 102211.

Bao, Y., Sun, Y., Meng, S., Shi, J., & Lu, L. (2020). 2019-nCoV epidemic: address mental health care to empower society. *The Lancet, 395*(10224), 37–38.
https://doi.org/10.1016/S0140-6736(20)30309-3

Barrera, M. (1986). Distinctions between social support concepts, measures, and models. *American Journal of Community Psychology, 14*(4), 413–445.
https://doi.org/10.1007/BF00922627

Barsky, A. J., Ahern, D. K., Bailey, E. D., Saintfort, R., Liu, E. B., & Peekna, H. M. (2001). Hypochondriacal patients' appraisal of health and physical risks. *American Journal of Psychiatry, 158*(5), 783–787.
https://doi.org/10.1176/appi.ajp.158.5.783

Bass, C., & Pearce, S. (2016). Severe and enduring somatoform disorders: recognition and management. *BJPsych Advances, 22*(2), 87–96.
https://doi.org/10.1192/apt.bp.115.014589

Bourgault-Fagnou, M. D., & Hadjistavropoulos, H. D. (2009). Understanding health anxiety among community dwelling seniors with varying degrees of frailty. *Aging and Mental Health, 13*(2), 226–237.
https://doi.org/10.1080/13607860802380664

Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*(5), 748–766.
https://doi.org/10.1037/0022-006X.68.5.748

Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A. & Kaemmer, B. (1989).

Minnesota Multiphasic Personality-2: Manual for administration and scoring. University of Minneapolis Press: Minneapolis, MN.

Casey, P. R., Dunn, G., Kelly, B. D., Birkbeck, G., Dalgard, O. S., Lehtinen, V., Britta, S., Ayuso-Mateos, J. L., Dowrick, C., Ballesteros, J., Børve, T., Costello, M., Cuijpers, P., Davies, I., Diez-Manrique, J. F., Fenlon, N., Finne, M., Ford, F., Gaite, L., … Sohlman, B. (2006). Factors associated with suicidal ideation in the general population Five-centre analysis fromthe ODIN study. *British Journal of Psychiatry*, 189(NOV.), 410–415.
https://doi.org/10.1192/bjp.bp.105.017368

Cassel, J. (1976). The Contribution of the Social Environment To Host Resistance: the Fourth Wade Hampton Frost Lecture. *American Journal of Epidemiology, 104*(2), 107–123.
https://doi.org/10.1093/oxfordjournals.aje.a112281

Chantler, M., & Mortimer, Y. P.-S. J. (2005). Change in Need for Psychosocial Support for Women with Early Stage Breast Cancer. J*ournal of Psychosocial Oncology, 23*(2–3), 65–77.
https://doi.org/10.1300/J077v23n02

Chao, R. C.-L. (2012). Managing Perceived Stress Among College Students: The Roles of Social Support and Dysfunctional Coping. *Journal of College Counseling, 15*(1), 5–21.

Chen, J. H., Li, Y., Wu, A. M. S., & Tong, K. K. (2020). The overlooked minority: Mental health of International students worldwide under the COVID-19 pandemic and beyond. *Asian Journal of Psychiatry, 54*, 102333.

Chen, S. (2013). *Social Support and Health: Theory, Research, and Practice with Diverse Populations*. Nova Science.

Chu, P. Sen, Saucier, D. A., & Hafner, E. (2010). Meta-analysis of the relationships between social support and well-being in children and adolescents. *Journal of Social and Clinical Psychology, 29*(6), 624–645.
https://doi.org/10.1521/jscp.2010.29.6.624

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine, 38*(5), 300–314.
https://doi.org/10.1097/00006842-197609000-00003

Cohen, S. (2004). Social relationships and health. *American Psychologist, 59*(8), 676–684.
https://doi.org/10.1037/0003-066X.59.8.676

Cohen, S., & Hoberman, H. M. (1983a). Positive Events and Social Support as Buffers of Life Change Stress. *Journal of Applied Social Psychology, 13*(2), 99–125.

Cohen, S., & Hoberman, H. M. (1983b). Positive Events and Social Supports as Buffers of Life Change Stress. *Journal of Applied Social Psychology, 13*(2), 99–125.

Cohen, S., Underwood, L. G., & Gottlieb, B. H. (2000). Social Support Measurement and Intervention: A Guide for Health and Social Scientists. In *Social Support Measurement and Intervention*. Oxford University Press.
https://doi.org/10.1093/med:psych/9780195126709.003.0010

Cohen, S., & Wills, T. A. (1985). Stress, Social Support, and the Buffering Hypothesis. *Psychologkal Bulletin, 98*(2), 310–357.
https://doi.org/10.1016/0163-8343(94)90083-3

Craske, M. G., & Simos, G. (2013). Panic disorder and agoraphobia. In *CBT for Anxiety Disorders: A Practitioner Book* (pp. 3–24). John Wiley and Sons.
https://doi.org/10.1016/B978-0-12-813004-9.00009-8

Craske, M. G., & Waters, A. M. (2005). Panic Disorder, Phobias, and Generalized Anxiety Disorder. *Annual Review of Clinical Psychology, 1*, 197–225.
https://doi.org/10.1146/annurev.clinpsy.1.102803.143857

Cullen, F. T. (1994). Social support as an organizing concept for criminology: Presidential, address to the academy of criminal, justice sciences. *Justice Quarterly, 11*(4), 527–559.
https://doi.org/10.1080/07418829400092421

Dahlem, N. W., Zimet, G. D., & Walker, R. R. (1991). The Multidimensional Scale of Perceived Social Support: A Confirmation Study. *Journal of Clinical Psychology, 47*(6), 756–761.
https://doi.org/10.1207/s15327752jpa5201_2

Eilenberg, T., Fink, P., Jensen, J. S., Rief, W., & Frostholm, L. (2016). Acceptance and commitment group therapy (ACT-G) for health anxiety: A randomized controlled trial. *Psychological Medicine, 46*(1), 103–115.
https://doi.org/10.1017/S0033291715001579

El-Zoghby, S. M., Soltan, E. M., & Salama, H. M. (2020). Impact of the COVID-19 Pandemic

on Mental Health and Social Support among Adult Egyptians. *Journal of Community Health, 45*(4), 689–695.
https://doi.org/10.1007/s10900-020-00853-5

Fergus, T. A., & Valentiner, D. P. (2009). Reexamining the domain of hypochondriasis: Comparing the Illness Attitudes Scale to other approaches. *Journal of Anxiety Disorders, 23*(6), 760–766.
https://doi.org/10.1016/j.janxdis.2009.02.016

Fergus, T. A., & Valentiner, D. P. (2010). Disease phobia and disease conviction are separate dimensions underlying hypochondriasis. *Journal of Behavior Therapy and Experimental Psychiatry, 41*(4), 438–444.
https://doi.org/10.1016/j.jbtep.2010.05.002

Ferguson, E. (2008). Health anxiety moderates the daytime cortisol slope. *Journal of Psychosomatic Research, 64*(5), 487–494.
https://doi.org/10.1016/j.jpsychores.2008.01.011

Gao, J., Zheng, P., Jia, Y., Chen, H., Mao, Y., Chen, S., Wang, Y., Fu, H., & Dai, J. (2020). Mental health problems and social media exposure during COVID-19 outbreak. *Plos One, 15*(4), 1–10.
https://doi.org/10.1371/journal.pone.0231924

Gerolimatos, L. A., & Edelstein, B. A. (2012). Anxiety-related constructs mediate the relation between age and health anxiety. *Aging and Mental Health, 16*(8), 975–982.
https://doi.org/10.1080/13607863.2012.688192

Handelzalts, J. E., Levy, S., Peled, Y., Binyamin, L., Wiznitzer, A., Goldzweig, G., & Krissi, H. (2016). Information seeking and perceptions of anxiety and pain among women undergoing hysterosalpingography. *European Journal of Obstetrics and Gynecology and Reproductive Biology, 202*, 41–44.
https://doi.org/10.1016/j.ejogrb.2016.04.037

Hart, J., & Björgvinsson, T. (2010). Health anxiety and hypochondriasis: Description and treatment issues highlighted through a case illustration. *Bulletin of the Menninger Clinic, 74*(2), 122–140.
https://doi.org/10.1521/bumc.2010.74.2.122

Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable moderation, mediation, and conditional process modeling. *Manuscript Submitted for Publication, January*, 1–39.
http://www.afhayes.com/public/process2012.pdf

Hedman, E., Axelsson, E., Görling, A., Ritzman, C., Ronnheden, M., El Alaoui, S., Andersson, E., Lekander, M., & Ljótsson, B. (2014). Internet-delivered exposure-based cognitive-behavioural therapy and behavioural stress management for severe health anxiety: Randomised controlled trial. *British Journal of Psychiatry, 205*(4), 307–314.
https://doi.org/10.1192/bjp.bp.113.140913

Hedman, E., Lekander, M., Ljótsson, B., Lindefors, N., Rück, C., Andersson, G., & Andersson, E. (2015). Optimal cut-off points on the health anxiety inventory, illness attitude scales and whiteley index to identify severe health anxiety. *PLoS ONE, 10*(4), 1–12.
https://doi.org/10.1371/journal.pone.0123412

Hefner, J., & Eisenberg, D. (2009). Social Support and Mental Health Among College Students. *American Journal of Orthopsychiatry, 79*(4), 491–499.
https://doi.org/10.1037/a0016918

Hipkins, J., Whitworth, M., Tarrier, N., & Jayson, G. (2004). Social support, anxiety and depression after chemotherapy for ovarian cancer: A prospective study. *British Journal of Health Psychology, 9*(4), 569–581.
https://doi.org/10.1348/1359107042304542

Holt, M. K., & Espelage, D. L. (2005). Social support as a moderator between dating violence victimization and depression/anxiety among African American and Caucasian adolescents. *School Psychology Review, 34*(3), 309–328.

Horowitz, L. M., Krasnoperova, E. N., Tatar, D. G., Hansen, M. B., Person, E. A., Galvin, K. L., & Nelson, K. L. (2001). The Way to Console May Depend on the Goal: Experimental Studies of Social Support. *Journal of Experimental Social Psychology, 37*(1), 49–61.
https://doi.org/10.1006/jesp.2000.1435

Howell, A. J., Digdon, N. L., Buro, K., & Sheptycki, A. R. (2008). Relations among mindfulness, well-being, and sleep. *Personality and Individual Differences, 45*(8), 773–777.
https://doi.org/10.1016/j.paid.2008.08.005

Hu, T., Xiao, J., Peng, J., Kuang, X., & He, B. (2018). Relationship between resilience, social support as well as anxiety/depression of lung cancer patients: A cross-sectional observation study. *Journal of Cancer Research and Therapeutics, 14*(1), 72–77.
https://doi.org/10.4103/jcrt.JCRT_849_17

Huang, M. F., Yen, C. F., & Lung, F. W. (2010). Moderators and mediators among panic, agoraphobia symptoms, and suicidal ideation in patients with panic disorder. *Comprehensive Psychiatry, 51*(3), 243–249.
https://doi.org/10.1016/j.comppsych.2009.07.005

Huff, J. L. (2001). Parental Attachment, Reverse Culture Shock, Perceived Social Support, and College Adjustment of Missionary Children. *Journal of Psychology and Theology, 29*(3), 246–264.

Jones, S. L., Hadjistavropoulos, H. D., & Sherry, S. B. (2012). Health anxiety in women with early-stage breast cancer: What is the relationship to social support? *Canadian Journal of Behavioural Science, 44*(2), 108–116.
https://doi.org/10.1037/a0027526

Jungmann, S. M., & Witthöft, M. (2020). Health anxiety, cyberchondria, and coping in the current COVID-19 pandemic: Which factors are related to coronavirus anxiety? *Journal of Anxiety Disorders, 73*.
https://doi.org/10.1016/j.janxdis.2020.102239

Kellner, R., Abbott, P., Winslow, W. W., & Pathak, D. (1987). Fears, beliefs, and attitudes in DSM-III hypochondriasis. In *Journal of Nervous and Mental Disease* (Vol. 175, Issue 1, pp. 20–25).
https://doi.org/10.1097/00005053-198701000-00004

Klein, D. N., Taylor, E. B., Dickstein, S., & Harding, K. (1988). Primary Early-Onset Dysthymia: Comparison With Primary Nonbipolar Nonchronic Major Depression on Demographic, Clinical, Familial, Personality, and Socioenvironmental Characteristics and Short-Term Outcome. *Journal of Abnormal Psychology, 97*(4), 387–398.
https://doi.org/10.1037/0021-843X.97.4.387

Korabik, K., Lero, D. S., & Ayman, R. (2003). A multi-level approach to cross cultural work-family research: A micro and macro perspective. *International Journal of Cross Cultural Management, 3*(3), 289–303.
https://doi.org/10.1177/1470595803003003003

Leavy, R. L. (1983). Social support and psychological disorder: A review. *Journal of Community Psychology, 11*(1), 3–21.
https://doi.org/10.1002/1520-6629(198301)11:13.0.CO;2-E

Lee, S. A. (2020). Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. *Death Studies, 44*(7), 393–401.
https://doi.org/10.1080/07481187.2020.1748481

Lin, N., Ye, X., & Ensel, W. M. (1999). *Social Support and Depressed Mood: A Structural Analysis. 40*(4), 344–359.

Liu, C. H., Zhang, E., Wong, G. T. F., Hyun, S., & Hahm, H. "Chris." (2020). Factors associated with depression, anxiety, and PTSD symptomatology during the COVID-19 pandemic: Clinical implications for U.S. young adult mental health. *Psychiatry Research, 290*.
https://doi.org/10.1016/j.psychres.2020.113172

Mak, W. W. S., Law, R. W., Woo, J., Cheung, F. M., & Lee, D. (2009). Social support and psychological adjustment to SARS: The mediating role of self-care self-efficacy. *Psychology and Health, 24*(2), 161–174.
https://doi.org/10.1080/08870440701447649

Malecki, C. K., & Demaray, M. K. (2002). Measuring perceived social support: Development of the Child and Adolescent Social Support Scale (CASSS). *Psychology in the Schools, 39*(1), 1–18.
https://doi.org/10.1002/pits.10004

Matt, G. E., & Dean, A. (1993). Social support from friends and psychological distress among elderly persons: moderator effects of age. *Journal of Health and Social Behavior, 34*(3), 187–200.
https://doi.org/10.2307/2137201

McNally, R. J., Hornig, C. D., Hoffman, E. C., & Han, E. M. (1999). Anxiety sensitivity and cognitive biases for threat. *Behavior Therapy, 30*(1), 51–61.
https://doi.org/10.1016/S0005-7894(99)80045-8

Mehnert, A., Lehmann, C., Graefen, M., Huland, H., & Koch, U. (2010). Depression, anxiety, post-traumatic stress disorder and health-related

quality of life and its association with social support in ambulatory prostate cancer patients. *European Journal of Cancer Care, 19*(6), 736–745.
https://doi.org/10.1111/j.1365-2354.2009.01117.x

Mertens, G., Gerritsen, L., Duijndam, S., Salemink, E., & Engelhard, I. M. (2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. J*ournal of Anxiety Disorders, 74*, 102258.
https://doi.org/10.1016/j.janxdis.2020.102258

Monroe, S. M., & Steiner, S. C. (1986). Social Support and Psychopathology: Interrelations With Preexisting Disorder, Stress, and Personality. *Journal of Abnormal Psychology, 95*(1), 29–39.

Naliboff, B. D., Mayer, M., Fass, R., Fitzgerald, L. Z., Chang, L., Bolus, R., & Mayer, E. A. (2004). The effect of life stress on symptoms of heartburn. *Psychosomatic Medicine, 66*(3), 426–434.
https://doi.org/10.1097/01.psy.0000124756.37520.84

Nolen-Hoeksema, S. (2011). *Abnormal psychology* (5th ed). McGraw-Hill.

Norlander, T., Dahlin, A., & Archer, T. (2000). Health of women: Associations among life events, social support, and personality for selected patient groups. *Psychological Reports, 86*(1), 76–78.
https://doi.org/10.2466/pr0.2000.86.1.76

Olatunji, B. O. (2009). Incremental specificity of disgust propensity and sensitivity in the prediction of health anxiety dimensions. *Journal of Behavior Therapy and Experimental Psychiatry, 40*(2), 230–239.
https://doi.org/10.1016/j.jbtep.2008.10.003

Özdin, S., & Bayrak Özdin, Ş. (2020). Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. *International Journal of Social Psychiatry*.
https://doi.org/10.1177/0020764020927051

Paulsen, J. S., & Altmaier, E. M. (1995). The effects of perceived versus enacted social support on the discriminative cue function of spouses for pain behaviors. *Pain, 60*(1), 103–110.
https://doi.org/10.1016/0304-3959(94)00096-W

Philips, H. C. (2011). Imagery and pain: The prevalence, characteristics, and potency of imagery associated with pain. *Behavioural and Cognitive Psychotherapy, 39*(5), 523–540.
https://doi.org/10.1017/S1352465811000282

Pilowsky, I. (1967). Dimensions of hypochondriasis. *The British Journal of Psychiatry, 113*, 89–93.
https://doi.org/10.1192/bjp.113.494.89

Pilowsky, I., & Spence, N. D. (1975). Patterns of illness behaviour in patients with intractable pain. *Journal of Psychosomatic Research, 19*, 279–287.
https://doi.org/10.1016/0022-3999(75)90026-4

Rachman, S. (2012). Health anxiety disorders: A cognitive construal. *Behaviour Research and Therapy, 50*(7–8), 502–512.
https://doi.org/10.1016/j.brat.2012.05.001

Rachman, S., & Arntz, A. (1991). The overprediction and underprediction of pain. *Clinical Psychology Review, 11*(4), 339–355.
https://doi.org/10.1016/0272-7358(91)90112-8

Rachman, S., Radomsky, A. S., & Shafran, R. (2008). Safety behaviour: A reconsideration. *Behaviour Research and Therapy, 46*(2), 163–173.
https://doi.org/10.1016/j.brat.2007.11.008

Rajkumar, R. P. (2020). COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry, 52*.
https://doi.org/10.1016/j.ajp.2020.102066

Rask, C. U., Elberling, H., Skovgaard, A. M., Thomsen, P. H., & Fink, P. (2012). Parental-Reported Health Anxiety Symptoms in 5- to 7-Year-Old Children: The Copenhagen Child Cohort CCC 2000. *Psychosomatics, 53*(1), 58–67.
https://doi.org/10.1016/j.psym.2011.05.006

Reevy, G. M., & Maslach, C. (2001). Use of social support: Gender and personality differences. *Sex Roles, 44*(7–8), 437–459.
https://doi.org/10.1023/A:1011930128829

Roy, D., Tripathy, S., Kar, S. K., Sharma, N., Verma, S. K., & Kaushal, V. (2020). Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian Journal of Psychiatry, 51*.
https://doi.org/10.1016/j.ajp.2020.102083

Salkovskis, P. M., Rimes, K. A., Warwick, H. M. C., & Clark, D. M. (2002). The health anxiety

inventory: Development and validation of scales for the measurement of health anxiety and hypochondriasis. *Psychological Medicine, 32*(5), 843–853.
https://doi.org/10.1017/S0033291702005822

Sarason, B. R., Pierce, G. R., Shearin, E. N., Sarason, I. G., Waltz, J. A., & Poppe, L. (1991). Perceived Social Support and Working Models of Self and Actual Others. *Journal of Personality and Social Psychology, 60*(2), 273–287.
https://doi.org/10.1037/0022-3514.60.2.273

Schwarzer, R., & Knoll, N. (2007). Functional roles of social support within the stress and coping process: A theoretical and empirical overview. *International Journal of Psychology, 42*(4), 243–252.
https://doi.org/10.1080/00207590701396641

Seeman, T. E. (1996). Social ties and health: The benefits of social integration. *Annals of Epidemiology, 6*(5), 442–451.
https://doi.org/10.1016/S1047-2797(96)00095-6

Seivewright, H., Green, J., Salkovskis, P., Barrett, B., Nur, U., & Tyrer, P. (2008). Cognitive-behavioural therapy for health anxiety in a genitourinary medicine clinic: Randomised controlled trial. *British Journal of Psychiatry, 193*(4), 332–337.
https://doi.org/10.1192/bjp.bp.108.052936

Shafran, R., & Rachman, S. (2004). Thought-action fusion: A review. *Journal of Behavior Therapy and Experimental Psychiatry, 35*(2), 87–107.
https://doi.org/10.1016/j.jbtep.2004.04.002

Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A., Iosifidis, C., & Agha, R. (2020). World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery, 76*(February), 71–76.
https://doi.org/10.1016/j.ijsu.2020.02.034

Starcevic, V. (2013). Hypochondriasis and health anxiety: Conceptual challenges. *British Journal of Psychiatry, 202*(1), 7–8.
https://doi.org/10.1192/bjp.bp.112.115402

Stice, E., Barrera, M., & Chassin, L. (1998). Prospective differential prediction of adolescent alcohol use and problem use: Examining the mechanisms of effect. *Journal of Abnormal Psychology, 107*(4), 616–628.
https://doi.org/10.1037/0021-843X.107.4.616

Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology, 21*(2), 131–138.
https://doi.org/10.1037/0278-6133.21.2.131

Sun, L., Sun, Z., Wu, L., Zhu, Z., Zhang, F., Shang, Z., Jia, Y., Gu, J., Zhou, Y., Wang, Y., Liu, N., & Liu, W. (2020). Prevalence and Risk Factors of Acute Posttraumatic Stress Symptoms during the COVID-19 Outbreak in Wuhan, China. *MedRxiv*, 2020.03.06.20032425.
https://doi.org/10.1101/2020.03.06.20032425

Sunderland, M., Newby, J. M., & Andrews, G. (2013). Health anxiety in Australia: Prevalence, comorbidity, disability and service use. *British Journal of Psychiatry, 202*(1), 56–61.
https://doi.org/10.1192/bjp.bp.111.103960

Taylor, S. (2004). Understanding and Treating Health Anxiety: A Cognitive-Behavioral Approach. *Cognitive and Behavioral Practice, 11*(1), 112–123.
https://doi.org/10.1176/ajp.148.9.1255

Taylor, S., & Asmundson, G. J. G. (2004). *Treating health anxiety: A cognitive-behavioral approach*. The Guilford Press.
https://doi.org/10.1136/bmj.1.4910.415-c

Taylor, S. E. (2011). Social Support: A Review. In H. S. Friedman (Ed.), *The Oxford handbook of health psychology* (pp. 189–214). Oxford University Press.

Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A. R., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review, 107*(3), 411–429.
https://doi.org/10.1037/0033-295X.107.3.411

Taylor, S. E., Sherman, D. K., Kim, H. S., Jarcho, J., Takagi, K., & Dunagan, M. S. (2004). Culture and social support: Who seeks it and why? *Journal of Personality and Social Psychology, 87*(3), 354–362.
https://doi.org/10.1037/0022-3514.87.3.354

Torgrud, L. J., Walker, J. R., Murray, L., Cox, B. J., Chartier, M., & Kjernisted, K. D. (2004).

Deficits in perceived social support associated with generalized social phobia. *Cognitive Behaviour Therapy, 33*(2), 87–96.
https://doi.org/10.1080/16506070410029577

Tyrer, H., Tyrer, P., Lisseman-Stones, Y., McAllister, S., Cooper, S., Salkovskis, P., Crawford, M. J., Dupont, S., Green, J., Murphy, D., & Wang, D. (2015). Therapist differences in a randomised trial of the outcome of cognitive behaviour therapy for health anxiety in medical patients. *International Journal of Nursing Studies, 52*(3), 686–694.
https://doi.org/10.1016/j.ijnurstu.2014.11.013

Tyrer, P., & Tyrer, H. (2018). Health anxiety: detection and treatment. *BJPsych Advances, 24*(1), 66–72.
https://doi.org/10.1192/bja.2017.5

Uchino, B. N. (2004). *Social Support and Physical Understanding the Health:Understanding the Health Consequences of Relationships*. Yale University Press.

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health, 17*(5).
https://doi.org/10.3390/ijerph17051729

Warwick, H. M. C., & Salkovskis, P. M. (1989). Cognitive and behavioural characteristics of primary hypochondriasis. *Scandinavian Journal of Behaviour Therapy, 18*(2), 85–92.
https://doi.org/10.1080/16506078909455848

Westerlund, A., Lagerros, Y. T., Kecklund, G., Axelsson, J., & Åkerstedt, T. (2016). Relationships Between Questionnaire Ratings of Sleep Quality and Polysomnography in Healthy Adults. *Behavioral Sleep Medicine, 14*(2), 185–199.
https://doi.org/10.1080/15402002.2014.974181

Wiederhold, B. K. (2020). Using Social Media to Our Advantage: Alleviating Anxiety during a Pandemic. *Cyberpsychology, Behavior, and Social Networking, 23*(4), 197–198.
https://doi.org/10.1089/cyber.2020.29180.bkw

Williams, M. J., McManus, F., Muse, K., & Williams, J. M. G. (2011). Mindfulness-based cognitive therapy for severe health anxiety (hypochondriasis): An interpretative phenomenological analysis of patients' experiences. *British Journal of Clinical Psychology, 50*(4), 379–397.
https://doi.org/10.1111/j.2044-8260.2010.02000.x

Xiao, C. (2020). A novel approach of consultation on 2019 novel coronavirus (COVID-19)-related psychological and mental problems: Structured letter therapy. *Psychiatry Investigation, 17*(2), 175–176.
https://doi.org/10.30773/pi.2020.0047

Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N. (2020a). Social capital and sleep quality in individuals who self-isolated for 14 days during the coronavirus disease 2019 (COVID-19) outbreak in January 2020 in China. *Medical Science Monitor, 26*, 1–8.
https://doi.org/10.12659/MSM.923921

Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N. (2020b). The effects of social support on sleep quality of medical staff treating patients with coronavirus disease 2019(COVID-19) in January and February 2020 in China. *Medical Science Monitor, 26*, 1–8.
https://doi.org/10.12659/MSM.923549

Yi, H., Shin, K., & Shin, C. (2006). Development of the Sleep Quality Scale. *Journal of Sleep Research, 15*(3), 309–316.
https://doi.org/10.1111/j.1365-2869.2006.00544.x

Zhai, Y., & Du, X. (2020). Mental health care for international Chinese students affected by the COVID-19 outbreak. *The Lancet Psychiatry, 7*(4), e22.
https://doi.org/10.1016/S2215-0366(20)30089-4

Zhang, Y., & Ma, Z. F. (2020). Impact of the COVID-19 pandemic on mental health and quality of life among local residents in Liaoning Province, China: A cross-sectional study. *International Journal of Environmental Research and Public Health, 17*(7), 2381.
https://doi.org/10.3390/ijerph17072381

Zhou, X., Zhu, H., Zhang, B., & Cai, T. (2013). Perceived social support as moderator of perfectionism, depression, and anxiety in college students. *Social Behavior and*

Personality, 41(7), 1141–1152.
https://doi.org/10.2224/sbp.2013.41.7.1141

Zimet, G. D., Dahlem, N. W., Zimet, S. G., Gordon, K., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 52*(1), 30–41.
https://doi.org/10.1207/s15327752jpa5201

Zimet, G. D., Powell, S. S., Farley, G. K., Werkman, S., & Berkoff, K. A. (1990). Psychometric Characteristics of the Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment, 55*(3–4), 610–617.
https://doi.org/10.1080/00223891.1990.9674095

Conflict of Interest

There is no conflict of interest.