Research article

Assessment of mental health of medical personnel during COVID-19: insights from Pakistan

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GRAPHICAL ABSTRACT

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ABSTRACT

The purpose of this paper is to examine how fear of COVID-19 affects:

i) psychological distress; and

ii) anxiety among healthcare workers. Additionally, the possible mediating role of passion was conceptually hypothesized and empirically tested in these two relationships. Data were collected from 360 healthcare employees working at hospitals in Pakistan. AMOS (v. 26) was used to perform confirmatory factor analysis and structural equation modeling to test hypotheses and relationships. The results of the study revealed the fear of COVID-19, the psychological distress, and anxiety of medical personnel have positive connections. There is now strong evidence that fear of COVID-19 substantially influences anxiety and psychological distress. In particular, the results demonstrate that passion did not mediate the relationship between fear of COVID-19 and employees’ mental health. It concludes that the outcomes of this work support the presence of a significant association between COVID-19 fear and the mental health of medical staff in Pakistan. Implications are discussed in light of the findings.

1. Introduction

Healthcare professionals are placed under excess pressure during the COVID-19 outbreak, rendering working life much more difficult than usual (Sharma et al., 2020). COVID-19 is a novel strain of coronavirus that has not been identified in humans previously. COVID-19 is the cause of a respiratory disease outbreak that was first detected in Wuhan, Hubei Province, China. On one hand, the rising demand for treatment due to an increased number of patients is putting a major strain on both healthcare service providers and staff (Sharma et al., 2020). The proximity to most patients is causing extra stress to healthcare professionals because of a higher chance of risk to themselves. On the other side, the shortage of

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sufficient personal protection equipment for frontline health care staff, including gloves, face shields, respirators, gowns, and hand sanitizers aggravated the mental health and well-being (Cullen et al., 2020). According to a recent study conducted in 194 Chinese cities to survey the general public, 54 percent of respondents rated the psychological impact of the COVID-19 outbreak as moderate to severe; 29 percent reported moderate to severe anxiety symptoms; and 17 percent reported moderate to severe depressive symptoms (Wang et al., 2020). Moreover, a meta-analysis of the workplace risk from the 2009 pandemic of swine flu indicates that the risks of healthcare professionals catching the virus are double those of comparable groups (Lietz et al., 2016).

Previous studies have also documented that healthcare professionals experienced a higher level of psychological distress and anxiety (Alnazy et al., 2021; Xiao et al., 2020). Compared to other occupational groups, healthcare professionals often have a higher risk of work-related stress (Xiao et al., 2020). Furthermore, past studies indicate that medical practitioners find it difficult to describe their mental health difficulties to their colleagues and employers (Hassan et al., 2009). Healthcare professionals not only find it daunting to discuss mental health issues with friends, but they also hesitate to seek clinical assistance. Scholars in the past argued that many physicians tend to seek assistance from friends and family instead of psychological and psychiatric consultation (Hassan et al., 2009; Wallace, 2012). Despite the significance of the issue, limited studies have been conducted to explain the relationship between fear of COVID-19 and mental health problems (Alnazy et al., 2021; Taylor et al., 2020) (Manzoor et al., 2021c), but still, research on this topic is needed.

The goal of this article is to investigate whether, how, and when fear of COVID-19 causes psychological distress and anxiety. Prior research suggests that fear can stimulate psychological distress and anxiety (Greeson and Brantley, 2009; Spielberger, 2016; Um et al., 2017). What is missing from the existing literature is an understanding of why and how fear of COVID-19 influences psychological distress and anxiety. Prior research suggests that fear may influence psychological distress and anxiety through its effect on healthcare professionals’ desires and internalization activities, therefore passion is likely to be an essential intervening factor in explaining the association between fear of COVID-19 and psychological distress and anxiety. We propose that passion is likely to mediate the relationship by increasing healthcare professionals’ abilities and perceptions of the importance of a task, thereby increasing their psychological distress and level of anxiety.

The following is how this paper is organized. First, a theoretical context and research hypotheses related to COVID-19 fear, passion, anxiety level, and psychological distress are established. Second, the proposed research framework is tested using data obtained from Pakistani hospitals. Finally, managerial and theoretical implications, conclusions, and future research recommendations are provided.

2. Literature and hypotheses development

2.1. The effect of Covid-19 on psychological distress and level of anxiety

The COVID-19 pandemic has over overwhelmingly influenced the lives of health care specialists (Lee et al., 2020; Sharma et al., 2020). Intensive patients care has imposed a significant cognitive and psychological burden on the medical staff (Lee et al., 2020). Direct contact with patients can further increase the chance of getting an infection (Cullen et al., 2020; Wang et al., 2020). The risk of infection can further engender concerns from the medical professional who are living with their parents and children (Cullen et al., 2020; Lee et al., 2020). Scholars in the past have specified that healthcare professionals experienced a broad range of psychological distress and anxiety during and after the pandemics (Qia et al., 2020; Shechter et al., 2020). For instance, in 2003, during the outbreak of the acute respiratory syndrome epidemic (SARS) healthcare professionals suffered from depression, emotional fatigue, and anxiety (Chau et al., 2021; Lee et al., 2007). Similarly, recent studies, conducted to observe the influence of the COVID-19 pandemic in Italy and China have reported psychological distress and level of anxiety among health care professionals (Di Tella et al., 2020; Rossi et al., 2020; Xiao et al., 2020).

The association between pandemics and mental health is well documented in past literature (Galbraith et al., 2020; McFeeters et al., 2015). For instance, Galbraith et al. (2020) argued that fears of health risk and social isolation lead to psychological distress. The adverse impacts on mental health, however, can be observed in healthcare professionals regardless of whether or not they interacted with contaminated patients (Um et al., 2017).

Fear and anxiety are closely related constructs and the relationship between fear and anxiety has been established in previous studies. However, the researchers find it critical to advance research about the sources of healthcare professionals’ anxiety to invent approaches for supporting healthcare professionals (Shanafelt et al., 2020). Thus, this study has hypothesized a positive association between the fear of the Covid-19 pandemic among healthcare professionals and the level of their anxiety for a variety of reasons. Fear of COVID-19 is an understood and natural reality of today’s pandemic crisis (Ahrons et al., 2020; Harper et al., 2020) whether someone belongs to the general public or some healthcare profession for a variety of reasons including easy and speedy transmission of COVID-19.

Fear is a negative emotion that is linked with clinical phobias and anxiety (Krueger et al., 2018). Although the healthcare professionals may have better training and equipment to fight the COVID-19 Pandemic yet their direct and consistent exposure to COVID-19 patients may put them under continuous stress of being infected with the disease. This continuous stress may lead healthcare workers engaged in the cure of COVID-19 patients may result in a higher level of anxiety. The medical specialists who are concerned with the treatment of COVID-19 patients also experience poor health conditions due to lack of sleep quality and consistent exposure to Covid-19 patients (Stojanov et al., 2020). Stojanov et al. (2020) also found a higher level of anxiety and mental disorder among healthcare workers engaged in the cure of COVID-19 patients.

Therefore, we propose:

H1. Fear of COVID-19 has a significant and positive relationship with psychological distress.

H2. Anxiety and fear of COVID-19 have a significant and positive relationship.

2.2. The impact of passion on psychological distress and anxiety

The role of passion has been well documented in past literature (Houlfort et al., 2018; Peixoto et al., 2021). It is described as a solid trend toward an action that people consider important in their lives and in which they provide time and effort (Houlfort et al., 2015; Zainal Badri et al., 2020). From the perspective of self-determination theory, scholars classified passion into two distinctive dimensions i.e., obsessive and harmonious (Cardon et al., 2009; Vallerand, 2012; Wang et al., 2020). The obsessive passion originates from the controlled internalization of an activity. Because of certain contingency, it stems from interpersonal pressure fixed to action such as feelings of self-esteem and social approval (Cardon et al., 2009; Vallerand, 2012). Therefore, persons having obsessive passion may encounter an uncontrollable desire to engage in the task they feel is essential and enjoyable. Obsessive passion develops strong desires to engage in an activity that contributes to rigid persistence. Past studies documented some benefits as well as excessive costs such as limited efficiency due to the lack of flexibility (Fieser, 1992; Hirshleifer, 1993; Mageau et al., 2005). However, previous studies placed more emphasis on passion’s emotional facets than on the dimensions of the motivation (Lord et al., 2022; Smith et al., 2022; Vallerand, 2012). Some previous studies show that obsessive passion can also lead to self-closure from interpersonal and intrapersonal interactions, as well as a lack of integrative experience during task interaction, which can lead to negative emotional feelings and, as a result, a
reduction in the positive outcomes that are usually practiced (Hodgins and Knee, 2002; Vallerand, 2012). Besides, such a rigid persistence can lead to the experience of interfering with other facets of the normal life of the individual when engaged in the passionate task and also to anger and cogitation about the task when barred due to the missed opportunity from engaged in it (Wang et al., 2020).

Contrary to obsessive passion, harmonious passion refers to an independent internalization that causes people to choose and participate in the activity they want (Luu, 2021; Whelan et al., 2021). An independent internalization occurs because without any contingencies added to it when individuals realized the importance of activity essential to them. This type of internalization originates from self-intrinsic and integrative tendencies. Harmonious passion creates a driving force to participate enthusiastically in the task and generates an emotion of willingness and personal support to undertake the task. People do not have an uncontrollable desire to indulge in the passionate activity during the harmonious passion, but rather opt to do so freely. The practice occupies a significant but not overwhelming space in the person’s personality and is influenced by other aspects of the person’s life (Jan et al., 2021). This implies that harmonious enthusiasm enables the individual to completely engage in the passionate task with versatility and an open way that is favorable to positive experiences (Lord et al., 2022).

Psychological distress refers to the discomfort related to severe illness (Rathnayake et al., 2021). It is rarely described as a separate notion and is frequently integrated into the sense of tension, stress, and distress (Casali et al., 2021; Xu et al., 2021). Psychological distress is used in the sense of physical, mental, and moral circumstances by health care practitioners (Lorang et al., 2021). According to Fox and Picciotto (2019) distress is also employed to represent spiritual discomfort. He further argued that it is difficult to define the psychological distress concept.

Anxiety refers to the state of emotions followed by physiological arousal, including feelings of anxiety, stress, nervousness, and concern (Spielfieber, 2022). According to him, anxiety was resilient to motivational actions that helped people deal with dangerous conditions, and in most psychological disorders, severe anxiety was also prevalent, and that extreme anxiety was prevalent in most psychiatric disorders (Spielfieber, 2022). Similarly, Brandão et al. (2008) highlighted the significance of differentiating between anxiety as an emotional condition and individual variation in anxiety as a personality trait in measuring anxiety.

Past research studies showed passion affects psychological distress such as Houlfort et al. (2018) revealed in their study that harmonious and obsessive passion for work negatively and positively predicted psychological distress, respectively. Likewise, Peixoto et al. (2021) argued that passion leads to psychological distress. The study which was conducted by Kubo et al. (2022), concluded that there is a significant effect of passion on fear of COVID-19 and mental health (psychological distress/anxiety) in the Japanese population. There have been very few studies to determine the relationship between passion and mental health problems such as psychological distress and anxiety. Our study looked at the relationship from the perspective of medical professionals. Therefore, we propose the following hypotheses:

H3. Passion and psychological distress have a significant and positive relationship.

H4. Passion and anxiety have a significant and positive relationship.

2.3. The effect of COVID-19 on psychological distress and anxiety level via the intervening role of passion

The pressure on healthcare professionals during the pandemic may lead to higher turnover. Previous studies also suggest that healthcare professionals also feel a strong obligation and passion to continue to serve despite the health risks (Galbraith et al., 2020; Hassan et al., 2009). However, given the urgency during a pandemic to maintain high-quality healthcare coverage, combined with the inability of doctors to seek assistance or report their difficulties, it is conceivable that this form of professional involvement may be closely linked to their passion (Galbraith et al., 2020; Um et al., 2017). Previous studies that examined the impact of passion on psychological distress and anxiety have inconclusive findings (Lyubomirsky et al., 2005). For instance, some studies found that fear may reduce the level of anxiety (Verner-Filion et al., 2014). While others argued that obsessive passion may lead to psychological distress and anxiety held (Peixoto et al., 2021; Vallerand, 2012). Additionally, while literature shows that passion and mental health (psychological distress/anxiety) have positive and significant correlations and sometimes negative associations (Houlfort et al., 2018; Kubo et al., 2022; Peixoto et al., 2021). Similarly, previous research has shown that fear of COVID-19 hurts mental health (Erbicer et al., 2022; Manzoor et al., 2021c), however, the mediating mechanism of passion remains unknown. Consequently, the current study is based on an innovative idea that aims to observe the correlation between fear of COVID-19 and mental health (psychological distress, anxiety) with the mediating variable of passion (harmonious; obsessive). As we argue in this study that passion intervenes in the link between fear of COVID-19 and psychological distress and anxiety or not. Therefore, our study contributes to the body of literature and offers new insights concerning the effects of COVID-19 on the mental condition with the mediating role of passion.

Therefore, we propose:

H5. Passion will act as a positive mediator between fear of COVID-19 and psychological distress. (Or does not)

H6. Passion will positively mediate the relationship between COVID-19 fear and Anxiety among medical staff. (Or does not)

3. Methodology

The primary goal of this study is to investigate the impact of COVID-19 fear on mental health using Passion as a mediating mechanism. Reflecting on the literature and the assumed hypotheses, the proposed study model is developed in Figure 1. In this study, the data were evaluated by using the conceptual and statistical recommendations of Baron and Kenny (1986) for determining the presence of a mediator effect. To carry out data analyses the statistical package SPSS 26.0 and AMOS 26.0 were employed. We used structural equation modeling (SEM) techniques to test the hypotheses.

The population of the study consists of medical staff working in different health institutions and hospitals in Pakistan. We selected 20 medical institutes and large hospitals in two provinces Khyber Pakhtunkhwa (KPK) and Punjab province, Pakistan. We used the convenience sampling method and circulated 400 questionnaires to collect primary data. Out of a total of 400 distributed questionnaires, 360 responses were recorded/received, having a response rate of 90%, and 10 fragmented or invalid surveys were disposed. The time slot of the survey for this study was early July to October 2020. Respondents were included in the study based on the following inclusion criteria: (i) accepting the informed consent, (ii) being the medical personnel who were closely engaged in the care of COVID-19 patients, and (iii) living in Pakistan during the COVID-19 outbreak. Almost, 140 of the participants were physicians and epidemiologists (38.9%), 157 of them were nurses (43.5%), 32 of them were administrative staff (8.9%), and 31 of them were other healthcare workers. Participants of this work have not received any compensation for participating in the study. Male participants were 200 (55.6%) and 160 (44.4%) were female professionals. The majority part (N = 158) 44.1% of the participants were in the 30–39 age group, (N = 70) 19.7% of the respondents were >25, 28.9% (N = 104) were 40–49, 7.8% (N = 28) were in between 50-60 age range.

3.1. Measurements

The questionnaire consisted of participants’ socio-demographic characteristics (control variables such as gender, age, and occupation), and main four latent constructs are involved i.e., fear of COVID-19,
anxiety condition of medical workers, psychological distress due to the pandemic, and passions (harmony passion and obsessive passion). Passion acts as a mediating variable in said relationships. It has two subscale: harmonious passion and obsessive passion.

### 3.1.3. Anxiety

From the previous study of Batterham et al. (2016), and we have done some amendments according to our study setting. “I am very afraid of COVID-19” is an example item. Cronbach α value for this scale is .855 and McDonald’s Ω is 0.861.

### 3.1.4. Passion

To measure passion in the COVID-19 pandemic at the work, we applied the Passion scale which is adapted from the report of Gonçalves et al. (2014). The Passion Scale involves fourteen items, with no inverse items, divided into two sub-scales: harmonious passion (7 items) and obsessive passion (7 item scale). Participants of the study answered on a five-point Likert scale was used. The scale ranged from 1 (strongly disagree = 1) to 5 (strongly agree = 5). As an example, “I am very worried about getting sickening with COVID-19” is a sample item with Cronbach’s alpha of 0.853 and McDonald’s Ω of 0.860.

### 3.1.5. Control variable

The present study holds three control variables containing, age, gender, and occupation. Age is assessed by categorical variables as (1 = 25 years and 5 = “60 or above years), gender of medical staff as (1 = male and 2 = female), and occupation of health workers is measured through following categories (1 = “physicians/epidemiologist”, 2 = “Nurses”, 3 = “administrative staff”, and 4 = “others”).

### 4. Statistical analysis and results

Table 1 reported descriptive statistic mean, standard deviation, average variance extracted (AVE), and Pearson’s correlation of entire constructs. The results show a positive and significant correlation between all presumed variables. The AVE values lie in the range suggested which is from 0 to 1. To be sufficient for convergent validity, the AVE value should exceed 0.50 (Baggozzi and Yi, 1988; Henseler et al., 2009). Diagonal values (in bold) show the discriminant validity, the criterion is to evaluate discriminant validity using the Fornell-Lacker criterion (Fornell and Larcker, 1981). This technique compares the AVE’s square root to the correlation of latent constructs (Hair et al., 2016). A latent construct should better describe its indicator’s variance than the variance of other latent constructs (Ab Hamid et al., 2017; Manzoor et al., 2021b). As a result, the square root of each construct’s AVE should be greater than the correlations with other latent constructs (Hair et al., 2016). To evaluate measurement biases Harman’s one-factor test (Harman, 1976) has been used (Aguirre-Urreta and Hu, 2019; Manzoor et al., 2019b) which revealed that the study data does not experience the common method bias problem because the percentage of variance explained by a one-factor is 30.6%, that is lower than the 50%. Consequently, data can be recognized as a valid (Manzoor et al., 2019a; Podsakoff and Organ, 1986). To identify any irregular and abnormal items, an exploratory factor analysis (EFA) was executed. The outcomes displayed that the expected factors are loaded by all the variables, thereby showing that the data was not abnormal. We then proceeded with the research sample to test the CFA model and the findings were appropriate (χ² = 432.42, DF = 386, CFI = 0.994, SRMR = 0.044, RMSEA = 0.018 and P-Close = 1). Model fit measures are reported in Table 2, results are excellent with the cut-off standards (Hu and Bentler, 1999). The Comparative Fit Index (CFI) is between 0 and 1 with a greater value showing a better model fit. Acceptable model fit is specified by a CFI value of 0.90 or higher (Hu and Bentler, 1999). The standardized root means square residual (SRMR) and root mean square error of approximation (RMSEA) met the suggested standard (Maydeu-Olivares and Shi, 2017; Shi et al., 2018).

Cronbach alpha, McDonald’s Omega, and composite reliability, which measure reliability based on the interrelationship of the observed item variables, are the most commonly used measures for internal consistency. Table 3 reported standardized factor loading, composite reliability (CR),
Hypothesis 3 predicted that passion is positively linked to psychological distress. The finding of our study reveals that passion had a significant and negative relation with psychological distress among medical staff members (β = -0.134, P < 0.01). we did not find a positive correlation between passion and psychological distress, with these results as evidence, rejecting Hypothesis 3. Hypothesis 4 suggested that Passion is positively correlated to anxiety. There was a positive relation between passion and anxiety among medical staff (β = 0.291, P < 0.01). we found support for hypothesis 4.

Hypotheses 5 and 6, suggested that passion mediates the association between FOC-19 and psychological distress, and passion mediates the link between FOC-19 and anxiety. Therefore, these mediating relationships were verified according to the recommendations of (James et al., 2006), rather than (Baron and Kenny, 1986).

To assess mediation hypotheses, we would like to point out Baron and Kenny (1986) study focused on a set of steps involving regression weights and correlations. According to Baron and Kenny (1986), four conditions must be met to approve complete mediation. First, the explanatory variable (fear of COVID-19) must be closely and significantly connected to the mediator (passion). Secondly, FOC-19 (Independent variable) must be significantly linked to psychological distress and anxiety (dependent variables). Thirdly, passion (mediator variable) needs to be significantly correlated with psychological distress and anxiety (dependent variables). Finally, when passion (mediator variable) is inserted into the regression equation, the correlation between FOC-19 (IV) and psychological distress and anxiety (DV) must vanish.

Though, James et al. (2006) suggested that if theoretical mediation models are assumed to be causal models, techniques explicitly designed to assess the fit of causal models to data, such as structural equation modeling (SEM), should be used to test these mediation models. The critical distinction between the SEM techniques and the approach of Baron and Kenny is the choice of focal or base-line model for mediation. By using the full mediation model, the SEM method obeys the parsimony principle, but the partial mediation model is followed by Baron and Kenny's approach.

Moreover, James et al. (2006) having compared these two viewpoints (SEM approach and Baron & Kenny method) recommend a two-step approach to evaluate mediation. The first stage is to ascertain if every hypothesized mediation link is partial or complete. Previous research and theory are supposed to provide an adequate basis to define whether partial or full mediation is postulated. If prior research and theory are inadequate to assume partial or complete mediation, then a full mediation check is recommended. It is an utmost parsimonious model of mediation, and parsimonious models are called theoretical bases in science as these are the simplest to dismiss (Mulaik, 2001). Stage two is that, after a mediation procedure has been posited, the next suggestion is to
evaluate the hypothesis employing the SEM approach. For such a reason, following the proposals of Wang et al. (2005) a chain of nested model comparisons was prepared. The outcomes are presented in Table 6. Model 1 illustrates a completely mediated model, which did not include direct pathways from FOC-19 to anxiety and psychological distress. This model has been tested against three models that are nested. Model 2 integrated a direct route from FOC-19 to psychological distress, Model 3 integrated a direct path from FOC-19 to anxiety, and both of these direct

| Latent constructs | No. of Items | Items  | Cronbach Alpha/McDonald's Omega | EFA | CFA  | Composite Reliability |
|-------------------|--------------|--------|-------------------------------|-----|------|-----------------------|
| Fear of COVID-19  | 07           | FOC1-1 | 0.931/0.940                   | 0.835 | 0.875 | 0.927                 |
|                   |              | FOC1-2 | 0.829                        | 0.815 |       |                       |
|                   |              | FOC1-3 | 0.823                        | 0.803 |       |                       |
|                   |              | FOC1-4 | 0.799                        | 0.821 |       |                       |
|                   |              | FOC1-5 | 0.716                        | 0.709 |       |                       |
|                   |              | FOC1-6 | 0.781                        | 0.783 |       |                       |
|                   |              | FOC1-7 | 0.847                        | 0.813 |       |                       |
| Psychological distress | 05 | PD1  | 0.855/0.861                   | 0.734 | 0.705 | 0.858                 |
|                   |              | PD2  | 0.789                        | 0.772 |       |                       |
|                   |              | PD3  | 0.813                        | 0.786 |       |                       |
|                   |              | PD4  | 0.734                        | 0.677 |       |                       |
|                   |              | PD5  | 0.744                        | 0.758 |       |                       |
| Anxiety           | 05           | AN1  | 0.853/0.860                  | 0.724 | 0.784 | 0.858                 |
|                   |              | AN2  | 0.719                        | 0.693 |       |                       |
|                   |              | AN3  | 0.608                        | 0.757 |       |                       |
|                   |              | AN4  | 0.776                        | 0.693 |       |                       |
|                   |              | AN5  | 0.723                        | 0.711 |       |                       |
| Harmonious Passion | 07  | HP1  | 0.907/0.910                  | 0.771 | 0.829 | 0.907                 |
|                   |              | HP2  | 0.794                        | 0.809 |       |                       |
|                   |              | HP3  | 0.771                        | 0.824 |       |                       |
|                   |              | HP4  | 0.797                        | 0.83  |       |                       |
|                   |              | HP5  | 0.724                        | 0.716 |       |                       |
|                   |              | HP6  | 0.595                        | 0.56  |       |                       |
|                   |              | HP7  | 0.774                        | 0.755 |       |                       |
| Obsessive Passion  | 07           | OP1  | 0.936/0.941                  | 0.831 | 0.844 | 0.936                 |
|                   |              | OP2  | 0.856                        | 0.867 |       |                       |
|                   |              | OP3  | 0.814                        | 0.819 |       |                       |
|                   |              | OP4  | 0.807                        | 0.801 |       |                       |
|                   |              | OP5  | 0.758                        | 0.783 |       |                       |
|                   |              | OP6  | 0.829                        | 0.795 |       |                       |
|                   |              | OP7  | 0.827                        | 0.843 |       |                       |

Table 3. Factor loadings of indicators Cronbach alpha and composite reliability.

| Indicators                | Fear of COVID-19 | Psychological distress | Anxiety |
|---------------------------|------------------|------------------------|---------|
|                           | C.R              | R²                     | C.R     | R²   | C.R     | R²    |
|                           | Standardized regression weights | Standardized regression weights | Standardized regression weights |
| FOC1-1                    | 0.875            | *                      | 0.765   |      |         |       |
| FOC1-2                    | 0.815            | 17.944                 | 0.664   |      |         |       |
| FOC1-3                    | 0.803            | 17.440                 | 0.644   |      |         |       |
| FOC1-4                    | 0.821            | 18.228                 | 0.674   |      |         |       |
| FOC1-5                    | 0.799            | 15.041                 | 0.502   |      |         |       |
| FOC1-6                    | 0.783            | 17.023                 | 0.613   |      |         |       |
| FOC1-7                    | 0.813            | 19.915                 | 0.660   |      |         |       |
| PD1                       | 0.705            | *                      | 0.497   |      |         |       |
| PD2                       | 0.772            | 15.418                 | 0.557   |      |         |       |
| PD3                       | 0.786            | 13.744                 | 0.617   |      |         |       |
| PD4                       | 0.677            | 13.156                 | 0.458   |      |         |       |
| PD5                       | 0.758            | 14.964                 | 0.574   |      |         |       |
| AN1                       | 0.784            | *                      | 0.614   |      |         |       |
| AN2                       | 0.693            | 12.298                 | 0.480   |      |         |       |
| AN3                       | 0.757            | 12.740                 | 0.573   |      |         |       |
| AN4                       | 0.693            | 13.175                 | 0.480   |      |         |       |
| AN5                       | 0.771            | 13.488                 | 0.594   |      |         |       |

Table 4a. Measurement model.
paths were integrated into Model 4. As Table 6 illustrates, when comparing Model 1 with Models 2, 3, and 4, the differences between chi-squared ($\chi^2$) were not significant. These outcomes propose that Model 1 was the best fit for the data.

Furthermore, the coefficients of pathways and the direct and indirect effects tested for mediation are shown in Figure 2 and Table 7. Figure 2 displays the role of FOC-19 on psychological distress and anxiety through passion. The direct effect from FOC-19 to passion was non-significant ($\beta = -0.21, p < 0.05$), passion significantly and negatively predicted psychological distress ($\beta = -0.14, p < 0.05$) and the path from passion to anxiety condition of medical staff ($\beta = 0.30, p < 0.01$) was significant and reveals positive association. The direct relationship between FOC-19 and psychological distress ($\beta = 0.201$ and $p < 0.01$) is significant and the direct relationship between FOC-19 and Anxiety ($\beta = 0.401$ and $p < 0.01$) is significant.

Moreover, we conducted percentile bootstrapping and bias-corrected bootstrapping with 1000 bootstrap samples at a 95 percent confidence interval (Arnold et al., 2015) to assess full or partial mediation following the above facts. As suggested by Preacher and Hayes (2008), we evaluated the confidence of the interval of the lower and upper bounds to measure the significance of indirect effects. Furthermore, the bootstrap inquiry established the indirect effect of the FOC-19 and psychological distress and anxiety, with 95% CI and containing zero. Hence, Table 7 indicated that the indirect effect of passion on psychological distress (bootstrap value = 0.003, $p > 0.05$) and Anxiety (bootstrap value = -0.006, $p > 0.05$) not mediated the link of FOC-19 on psychological distress and anxiety. However, the outcomes of the study exposed that the positive relationship between FOC-19 and psychological distress and anxiety was not mediated by passion.

5. Discussion

Globally, COVID-19 has attracted intensive attention. The influences of this virus on psychological and mental health cannot be ignored. The present study is an effort to observe the effect of fear of COVID-19 on mental health with the mechanism of passion as a mediator among Pakistani medical staff. Furthermore, according to our knowledge, First, the present study introduces a mechanism that reduces (or does not) the effect of fear of COVID-19 among medical staff through passion as a mediator that can play a remedial role.

The findings of the present article indicate that FOC-19 is positively related to the psychological distress of medical staff during the pandemic situation. These results confirm that fear situations may lead to higher psychological distress. The positive association is in line with the findings of Satici et al. (2021), Mumtaz et al. (2021), and Shacham et al. (2020). They reported that the outbreak of COVID-19 has caused fear, depression, widespread concern, and damaged people’s mental health. Furthermore, the results prove that there is a significant and positive association between fear of COVID-19 and the anxiety of medical staff during the pandemic period. These results are consistent with the prior research findings of Ahorsu et al. (2020), Xiang et al. (2020), Tuman (2022), and Erbiçer et al. (2022). They indicated that the fear of...
COVID-19 has a positive correlation with depression and hospital anxiety. Additionally, in the case of our study, the outcome revealed that fear of COVID-19 is non-significant and negatively influenced by the passion of medical staff during a pandemic situation. These results approve that fear situation may reduce through passionate behavior. Passion is a feeling of intense enthusiasm towards or compelling desire for something. It is a strong and barely controllable emotion (Vallerand, 2010).

### Table 7. Results of Bootstrapping for standardized direct, indirect, and total model effects.

|                      | Coeff. | Std. E | Bootstrapping     |                      |                      | Sig. |
|----------------------|--------|--------|-------------------|----------------------|----------------------|------|
|                      |        |        | Percentile method 95% | Bias-corrected percentile 95% |                        |      |
|                      |        |        | LLCI | ULCI | LLCI | ULCI |      |
| **Standardized direct effects** |        |        |        |        |        |      |
| FOC19→PD             | 0.201  | 0.058  | 0.099 | 0.321 | 0.100 | 0.323 | 0.002 |
| FOC→AN               | 0.406  | 0.074  | 0.263 | 0.554 | 0.260 | 0.551 | 0.002 |
| FOC→PAN              | -0.021 | 0.084  | -0.195| 0.137 | -0.197| 0.132 | 0.811 |
| PAN→PD               | -0.138 | 0.043  | -0.216| -0.05 | -0.220| -0.052| 0.004 |
| PAN→AN               | 0.300  | 0.065  | 0.173 | 0.425 | 0.172 | 0.425 | 0.002 |
| **Standardized indirect effects** |        |        |        |        |        |      |
| FOC19→PAN→PD         | 0.003  | 0.012  | -0.065| 0.029 | -0.019| 0.033 | 0.753 |
| FOC19→PAN→AN         | -0.006 | 0.026  | -0.022| 0.039 | -0.070| 0.037 | 0.787 |
| **Standardized total effects** |        |        |        |        |        |      |
| FOC19→PD             | 0.204  | 0.058  | 0.101 | 0.325 | 0.102 | 0.327 | 0.002 |
| FOC→AN               | 0.400  | 0.078  | 0.241 | 0.558 | 0.228 | 0.542 | 0.003 |
| FOC→PAN              | -0.201 | 0.084  | -0.195| 0.137 | -0.197| 0.132 | 0.811 |
| PAN→PD               | -0.138 | 0.043  | -0.216| -0.05 | -0.220| -0.052| 0.004 |
| PAN→AN               | 0.300  | 0.065  | 0.173 | 0.425 | 0.172 | 0.425 | 0.002 |

Note: LLCI = lower level of confidence interval; ULCI upper level of a confidence interval.
Passion can be defined as “a strong inclination toward a particular thing, action, idea or individual that one loves (or at least strongly likes) and highly values, which is part of identity, and which leads one to regularly spend time and energy in the activity” (Vallerand, 2015). Passion in life can boost well-being, provide inspiration, and drive self-fulfillment. Passion, though, may also cause adverse feelings, contribute to inflexible persistence, and undermine well-being (Zhao et al., 2015). This study's results align with the findings of Stroe et al. (2020), Kubo et al. (2022), and Alessa (2019).

Additionally, this study exposes a negative and significant relationship between the passion and psychological distress of medical staff in pandemic crises. These results also suggest that, while being passionate about work can lead to a healthy mental condition which means that there is a very low risk of physical and psychological distress. Therefore, supporting findings from Houlfort et al. (2018), and Houlfort et al. (2015) suggest that a passionate attitude cannot lead to psychological distress. Moreover, harmonious passion develops a strong desire to engage in an activity. Previous research studies showed that when people are passionate about an activity, cause, or talent, they will do whatever it takes to devote themselves fully to it, which is exactly why the admirable work of pursuing their passions can slowly ramp up symptoms of psychological distress (Thaler and Koval, 2015).

In the case of passion and anxiety, this study found that passion is significantly and positively related to the anxiety condition of medical staff during a pandemic. We explain that obsessive passion generates uncontrollable desires and rigid persistence. Therefore, people with obsessive passion have limited leverage to be flexible that associate them with unfavorable consequences such as the conflict in other domains of life, negative effects during and after the activity, and anxiety. Previous research has also found that obsessive passion has some drawbacks, such as insufficient competence and nervousness due to a lack of versatility (Fu et al., 2022; Ho and Pollack, 2014). This study reveals that passion leads to increase anxiety, which may be because medical staff in Pakistan have become more passionate about their work during the pandemic. But at the same time, the widespread news of the media was demotivating them. The role of the media in COVID-19 is very disappointing. Pakistan's electronic media and popular talk shows cover the COVID-19 news. In that panic situation, the medical staff's family was worried about their health and also forced them to stay at home and be a part of lockdown. Pakistan as a developing country was suffering due to the limited testing kits for coronavirus and patients were in large numbers, which was a dread condition. On the other side, physicians, doctors, and epidemiologists were real heroes in fighting disease outbreaks and it is their responsibility to treat existing diseases and prevent future outbreaks. In all of the above situation results confirm that in the relation between passion and anxiety, a more passionate medical staff leads to the experience of higher levels of anxiety during this pandemic situation. Therefore, these results are coherent with the previous outcomes of Verner-Filion et al. (2014) and Moreno-Jiménez et al. (2020).

However, it is worth noting that the current study results reveal that passion has not played a mediating role between FOC-19 and psychological distress of medical staff and their condition of anxiety during a pandemic. It confirms that in that situation family pressure, limited resources of medical kit, and widespread news through media decreased the medical staff's passion to face this panic phase. Therefore, the association between fear of COVID-19 and psychological distress as well as anxiety was not mediated by passion.

Despite the worst situations during virus time, most importantly, Covid-19 vaccines are one of the most crucial innovations that help fight against the virus (Vuong et al., 2022). As a result, Covid-19 vaccines are the best hope for reducing fear, not only for medical personnel but also for the general population worldwide.

It is also important to note that the fight against misinformation has expanded more on the front of information about Covid-19 vaccines at this point. On social media, for instance, there were conspiracy theories about microchips in vaccines, genetic modifications, and pharmaceutical profits. Thereby, the future success of the vaccine development and production process relied on government and media efforts to prevent misinformation.

6. Conclusion

This study investigated the relationship between fear of COVID-19 and healthcare personnel's mental health (psychological distress/ anxiety) as well as their passion for work. Passion is tested as a mediator between the said relationships. It has two dimensions i.e. harmonious passion and obsessive passion. The findings support the existence of a significant relationship between COVID-19 fear and the mental health of healthcare employees in Pakistan. Furthermore, the results demonstrate that passion does not play an intervening role between fear of COVID-19 and employees' mental health.

6.1. Implications, limitations, and future direction

The outcomes of this study demonstrate that medical workers face extreme pressure in the current phase, which affects their psychological, emotional, and mental health. In this situation, a preservation plan is required for the mental health of medical staff. A secure and productive work setting is proposed as it can improve an individual sense of control and increase the strength of workers in the epidemic. Hospital administration and management must postulate psychological support, job training, supportive supervision, and financial support to nurses, doctors, epidemiologists, and other backup staff who are directly battling against COVID-19. Moreover, it is also applicable for health care organizations to spread reliable and relevant news/information on dealing with anxiety, minimizing burnout, and enhancing the resilience of workers during an emergency. Confirming that nurses and lower staff (helpers) are held up to date on a current and correct report about COVID-19 reduces their fears and adverse feelings connected with this virus. The news to be shared with them contains the appropriate use of the resources available, the existence of the virus, preventive measures to prevent transmission, the number of new cases identified on regular basis, the number of cases recovered, hospital procedures, and a new trend in the treatment of COVID-19 patients. Besides, resilience can be developed through mental health training and strengthened by a strong sense of self-confidence and self-efficacy. In the case of such a pandemic, encouraging healthcare staff may empower their cognitive and emotional abilities. Some vital aspects can help to decrease the fear of the workers. These aspects are backing from family and friends, supervisors, and colleagues, satisfactory break time, exchanging professional experience, and on-the-job mentoring. These factors can provide them with a sense of security, boost their morale, and motivate them to perform better in their assigned duties and responsibilities.

Despite the novel contributions of the current study, some essential limitations must be addressed. First, the data were collected using twenty medical institutes and big hospitals from two provinces of Pakistan. Therefore, results may not be generalizable to the remaining hospitals in the country. To prevent this limitation, future research must include medical personnel from across the country. Secondly, a recent study is being performed in Pakistani contexts. Upcoming research may conduct similar nature studies in other countries to boost the generalizability of the outcomes. Third, we used 360 observations as a sample size in our study; future studies must use a larger number that may be sufficient to make reliable generalization implications. Likewise, the results of this study were focused on self-reported data with the possibility of source bias. Therefore, longitudinal or time lag study design should be used by potential researchers for better outcomes and to prevent common method bias. Third, a recent study is being performed in Pakistani contexts. Upcoming research may conduct similar nature studies in other countries to boost the generalizability of the outcomes.

Finally, this research only focused on limited factors and their relationship with fear of COVID-19 and fail to recognize other organizational
and personal variables. Future research should encourage the review of other organizational variables such as the working environment, hospital resources, personal skills, adequacy of employees, the volume of patients, and insight that may also affect the belief of fear by staff members. The resources, personal skills, adequacy of employees, the volume of patients, and personal variables. Future research should encourage the review of the number of new cases identified on regular basis, the number of cases recovered, hospital procedures, and a new trend in the treatment of COVID-19 patients.

6.2. Relevance for clinical practice

Our study offers several implications for clinical practices. First, secure and productive work seating is important to boost a personal sense of control and increase the resilience of workers. Second, this study may help doctors, nurses, and lower staff by highlighting the importance of current and accurate information about COVID-19, which reduces their fears and negative emotions connected with this disease. Finally, our study also related to clinical practices and provides guidelines for the proper resources available, preventive measures to curtail transmission, the number of new cases identified on regular basis, the number of cases recovered, hospital procedures, and a new trend in the treatment of COVID-19 patients.

Ethics approval and consent to participate

Ethical clearance to conduct the research was obtained from the Ethical Review Committee of Zhejiang University, Hangzhou, China. Written informed consent was obtained from each study participant after a brief explanation. Confidentiality was ensured by removing identifiers and locking the questionnaires.

Declarations

Author contribution statement

Faiza Manzoor: Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools, or data; Wrote the paper.
Longhao Wei: Conceived and designed the experiments; Performed the experiments; Wrote the paper.
Muhammad Zia ul Haq: Conceived and designed the experiments; Performed the experiments.
Hafiz ur Rehman: Performed the experiments; Contributed reagents, materials, analysis tools, or data.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

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References

Ab Hamid, M., Sami, W., Sidek, M., 2017. Discriminant validity assessment: use of Fornell & Larcker vs HTMT criterion. J. Phys. Conf. Aguirre-Ureta, M.I., Hu, J., 2019. Detecting common method bias: performance of the Harman’s single-factor test. In: ACM SIGMIS - Data Base: the DATABASE for Advances in Information Systems, 50, pp. 45–70 (2).
Ahrens, H., Lin, C.Y., Imam, Y., Skidmore, M., Griffiths, M.D., Pakpour, A.H., 2020. The fear of COVID-19 scale: development and initial validation. Int. J. Ment. Health Addiction.
Alexa, A.A., 2019. The relationship between education level, gender, emotion and passion on the fear of failure among entrepreneurs. SMART J. Bus. Manag. Stud. 15 (2), 17–27.
Ahmady, E., Khrisat, O.M., Al-Bashaireh, A.M., Bryant, C.L., 2021. Anxiety, depression, stress, fear and social support during COVID-19 pandemic among Jordanian healthcare workers. PLoS One 16 (3), e0247679.
Arnold, K.A., Connelly, C.E., Walsh, M.M., Martin Ginis, K.A., 2015. Leadership styles, emotion regulation, and burnout. J. Occup. Health Psychol. 20 (4), 481.
Asif, M., Miao, Q., Jameel, A., Manzoor, F., Hussain, A., 2020. How ethical leadership influence employee creativity: a parallel multiple mediation model. Curr. Psychol. 1–17.
Bagoozi, R.P., Yi, Y., 1988. On the evaluation of structural equation models. J. Acad. Market. Sci. 16 (1), 74–94.
Baron, R.M., Kenny, D.A., 1986. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. J. Pers. Soc. Psychol. 51 (6), 1173.
Batterham, P.J., Sunderland, M., Carragher, N., Callear, A.L., Mackinnon, A.J., Slade, T., 2016. The Distress Questionnaire-5: population screener for psychological distress was more accurate than the K6/K10. J. Clin. Epidemiol. 71, 35–42.
Brandao, M.L., Zanoveli, J.M., Ruiz-Martinez, R.C., Oliveira, L.C., Landeiras-Fernandez, J., 2008. Different patterns of freezing behavior organized in the periaqueductal gray of rats: association with different types of anxiety. Behav. Brain Res. 188 (1), 1–13.
Cardon, M.S., Sudek, R., Mittenes, C., 2009. The impact of perceived entrepreneurial passion on angel investing. Front. Entrepreneur. Res. 29 (2), 1.
Caselli, N., Feron, T., Ghisi, M., Meneghetti, C., 2021. Andra tuto bene’: associations between character strengths, psychological distress and self-efficacy during Covid-19 lockdown. J. Happiness Stud. 22 (5), 2255–2274.
Chau, S.W., Wong, O.W., Ramakrishnan, R., Chan, S.S., Wong, E.K., Li, P.Y., Raymont, V., Elliott, K., Rathod, S., Delasserre, G., 2021. History for some or lesson for all? A systematic review and meta-analysis on the immediate and long-term mental health impact of the 2002–2003 Severe Acute Respiratory Syndrome (SARS) outbreak. BMC Publ. Health 21 (1), 1–23.
Cullen, W., Golati, G., Kelly, B., 2020. Mental health in the Covid-19 pandemic. QJM: Int. Med. 113 (5), 311–312.
Di Tella, M., Romeo, A., Benfante, A., Castelli, L., 2020. Mental health in the Covid-19 pandemic. QJM: Int. J. Med. 2020. 113 (5), 311–312.
Di Tella, M., Romeo, A., Benfante, A., Castelli, L., 2020. Mental health of healthcare workers during the COVID-19 pandemic in Italy. J. Eval. Clin. Pract. 26 (6), 1583–1587.
Erber, E.S., Metin, A., Çetinkaya, A., Çen, S., 2022. The Relationship between Fear of COVID-19 and Depression, Anxiety, and Stress. European Psychologist.
Fieser, J., 1992. Hume’s classification of the passions and its precursors. Hum. Stud. 15 (1), 1–17.
Fornell, C., Larcker, D.F., 1981. Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics. Sage Publications Sage CA, Los Angeles, CA.
Fox, J., Picciotto, G., 2019. The mediating effects of spiritual bypass on depression, anxiety, and stress. Counsel. Rev. 64 (2), 227–245.
Fu, Y., Tietz, M.A., Delmar, F., 2022. Obsessive passion and the venture team: when co-founders join, and when they don’t. J. Bus. Ventur. 37 (4), 106219.
Galbraith, N., Boyda, D., McFeeters, D., Hassan, T., 2020. The mental health of doctors during the Covid-19 pandemic. BJPsych Bull. 1–4.
Gonçalves, G., Orgambídez-Ramos, A., Serrano, M., 2021. Adaptation and initial validation of the Passion Scale in a Portuguese sample. In: Escritos de Psicología-Psychological Writings, 7, pp. 19–27 (2).
Greerson, J., Bramley, J., 2009. Mindfulness and anxiety disorders: developing a wise relationship with the inner experience of fear. In: Clinical Handbook of Mindfulness. Springer, pp. 171–188.
Hair, J.F., 2011. Multivariate Data Analysis: An Overview. International encyclopedia of statistical science, 904907.
Hair Jr., J.F., Hult, G.T.M., Ringle, C., Sarstedt, M., 2016. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). Sage publications, Harman, H.H., 1976. Modern Factor Analysis. University of Chicago press, Harper, C.A., Batchell, L.P., Fido, D., Latzman, R.D., 2020. Functional fear predicts public health compliance in the COVID-19 pandemic. Int. J. Ment. Health Addiction.
Hasson, T.M., Ahmed, S.O., White, A.C., Galbraith, N., 2009. A postal survey of doctors’ attitudes to becoming mentally ill. Clin. Med. 9 (4), 327.
Henzeler, J., Ringle, C.M., Sinkovics, R.R., 2009. The use of partial least squares path modeling in international marketing. In: New Challenges to International Marketing. Emerald Group Publishing Limited, Hirschleifer, J., 1993. The affections and the passions: their economic logic. Ration. Soc. 5 (2), 185–202.
Ho, V.T., Pollack, J.M., 2014. Passion isn’t always a good thing: examining entrepreneurs’ network centrality and financial performance with a dualistic model of passion. J. Manag. Stud. 51 (3), 433–459.
Hodgins, H.S., Knee, C.R., 2002. The integrating self and conscious experience. In: Handbook of self-determination research, 87, p. 100.
Houfourt, N., Fernet, C., Vallender, R.J., Lafamboire, A., Guay, F., Koesnetr, R., 2015. The role of passion for work and need satisfaction in psychological adjustment to work. J. Appl. Psychol. 98, 84–94.

Houfourt, N., Philippe, F.L., Bourdeau, S., Leduc, C., 2018. A comprehensive understanding of the relationships between passion for work and work–family conflict and the consequences for psychological distress. Int. J. Stress Manag. 25 (4), 313.

Hu, L., Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. Struct. Equ. Model. A Multidiscip. J. 6 (1), 1–55.

Ingusci, E., Signore, F., Giancapani, M.L., Manati, A., Molino, M., Russo, V., Zito, M., Cottone, C.G., 2021. Workload, techno overload, and behavioral stress during COVID-19 emergency: the role of job crafting in remote workers. Front. Psychol. 12, 655148.

James, L., Mulaik, S., JM, B., 2006. A tale of two methods. Organ. Res. Methods 9 (2), 253–244.

Jan, G., Zainal, S.R.M., Lee, M.C.C., 2021. HRM practices and innovative work behavior within the hotel industry in Pakistan: harmonious passion as a mediator. J. Hum. Resour. Hospit. Tourism 1–30.

Kramer, R.F., Kotov, R., Watson, S., Forbes, M.K., Eaton, N.R., Ruggero, C.J., Simms, L.L., Widiger, T.A., Achenbach, T.M., Bach, B., 2018. Progress in achieving quantitative classification of psychopathology. World Psychi. 17 (3), 282–293.

Kubo, T., Sugawara, D., Masuyama, A., 2022. The effect of passion for activities on fear of COVID-19 and mental health among the Japanese population. Pers. Indiv. Differ. 186, 111558.

Lee, A.M., Wong, J.G., McAlonan, G.M., Cheung, V., Cheung, C., Sham, P.C., Chu, C.-M., Wong, P.-C., Tsang, K.W., Chia, S.E., 2007. Stress and psychological distress among SARS survivors 1 year after the outbreak. Can. J. Psychiatr. 52 (4), 233–240.

Lee, M.C., Thomp, S., Chan, H.P., Khoo, D., Chin, B.Z., Foo, D.P., Lau, C.B., Lewin, B., Jacob, R., 2020. Psychological distress during the COVID-19 pandemic amongst healthcare providers and nurses. Br. J. Anaesth. 124 (5), e384–e386.

Lee, S.A., 2020. Coronavirus Pandemic Scale: a brief mental health screener for COVID-19 related anxiety. Death Stud. 44 (7), 393–401.

Lietz, J., Westermann, C., Nienhaus, A., Schablon, A., 2016. The occupational risk of influenza A (H1N1) infection among healthcare workers during the 2009 pandemic: a systematic review and meta-analysis of observational studies. PLoS One 11 (8), e0162061.

Lorant, V., Smith, P., Van den Broeck, K., Nicaise, P., 2021. Psychological distress associated with the COVID-19 pandemic and suppression measures during the first wave in Belgium. BMC Psychiatr. 21 (1), 1–10.

Lord, K.R., Lord, B.C., Lord, E.K., 2022. Cultivating & leveraging quitters’ harmonious passion. J. Market. Theor. Pract. 1–18.

Lun, T.T., 2021. Can human resource flexibility incentivize diverse behavior across hospitality employers? The roles of harmonious passion and regulatory fit. Int. J. Contemp. Hospit. Manag. 879–891.

Manzoor, F., Wei, L., Nurunnabi, M., Subhan, Q.A., 2019a. An examination of SMEs. Sustainability 11 (2), 436.

Manzoor, F., Wei, L., Sahin, N., 2020b. The role of SMEs in rural development: access of SMEs. Sustainability 11 (8), 2263.

Manzoor, F., Wei, L., Asif, M., 2021a. Intrinsic rewards and employee’s performance with psychological health outcomes. Int. J. Environ. Res. Publ. Health 9 (11), 1–12.

Manzoor, F., Wei, L., Anstey, D.E., Ye, A., Agarwal, S., Bird, J.L., Brodie, D., Cannone, D.E., Chang, B., 2020. Psychological distress, coping behaviors, and preferences for support among New York healthcare workers during the COVID-19 pandemic. Gen. Hosp. Psychiatr. 66, 1–9.

Maydeu-Olivares, A., Shi, D., 2017. Effect sizes of model misspecification in factor analysis models. Multivariate Behav. Res. 52 (5), 676–694.

Smith, R.W., Min, H., Ng, M.A., Haynes, J.C., Clark, M.A., 2022. A content validation of the passion: the work passion scale. J. Bus. Psychol. 1–23.

Spielberger, C.D., 2010. Test anxiety inventory. In: The Corsini encyclopedia of psychology, p. 1–1.

Spielberger, C.D., 2022. Anxiety. In: Social Problems and Mental Health. Routledge, 192–214.

Stoianov, J., Malobabic, M., Stanojevic, G., Stevic, M., Milosevic, V., Stojanova, A., 2020. Quality of sleep and health-related quality of life among health care professionals treating patients with coronavirus disease-19. Int. J. Psychiatr. 66, 1–9.

Taylor, S., Landy, C.A., Paluszek, M.M., Fergus, T.A., McKay, D., Asmundson, G.J., 2020. COVID stress syndrome: concept, structure, and correlates. Depress Anxiety 37 (8), 706–714.

Thaler, L.K., Koval, R., 2015. Grit to Great: How Perseverance, Passion, and Pluck Take You from Ordinary to Extraordinary. Currency.

Tuman, T.C., 2022. The effect of type D personality on anxiety, depression and fear of COVID-19 in healthcare workers. Arch. Environ. Occup. Health 77 (3), 177–184.

Um, K.S., Lim, J.S., Lee, H.W., Lee, S.H., 2017. Psychological effects on medical doctors from the Middle East Respiratory Syndrome (MERS) outbreak: a comparison of whether they worked at the MERS occurred hospital or not, and whether they participated in MERS diagnosis and treatment. J. Korean Neurosurg. Assoc. 56 (5), 323–334.

Vallender, R.J., 2010. On Passion for Life Activities: the Dualistic Model of Passion. In Advances in Experimental Social Psychology, 42. Elsevier, pp. 97–192.

Vallender, R.J., 2012. The role of passion in sustainable psychological well-being. Psychol. Well-Being· Theory Res. Pract. 1 (1), 1–21.

Vallender, R.J., 2015. The psychology of passion: a dualistic model. Ser. Posit. Psychol. Verner-Filjon, J., Vallender, R.J., Donahue, E.G., Moreau, E., Martin, A., Mageau, G.A., Martin, A., 2014. Passion, coping, and anxiety in sport: the interplay between key motivational and self-regulatory processes. Int. J. Sport Psychol. 45 (6), 516–537.

Vuong, Q.H., Le, T.T., La, V.-P., Nguyen, H.T.T., Ho, M.-T., Van Khoc, Q., Nguyen, M.-H., 2020. COVID-19 vaccines production and societal immunization under the serendipity-minidopango-3D knowledge management theory and conceptual framework. Human. Soc. Comput. 9 (1), 1–12.

Wallace, J.E., 2012. Mental health and stigma in the medical profession. Health 16 (1), 3–18.

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C.S., Ho, R.C., 2020. Immediate psychological and social impact of treating patients with coronavirus disease-19. Int. J. Soc. Psychiatr. 66 (7), 714–718.

Xiang, Y.-T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., Ng, C.H., 2020. Timely mental healthcare for COVID-19: a novel coronavirus outbreak is urgently needed. J. Bus. Psychol. 7 (3), 228–232.
Xiao, X., Zhu, X., Fu, S., Hu, Y., Li, X., Xiao, J., 2020. Psychological impact of healthcare workers in China during COVID-19 pneumonia epidemic: a multi-center cross-sectional survey investigation. J. Affect. Disord. 274, 405–410.

Xu, X., Manzoor, F., Jiang, S., Mumtaz, A., 2021. Unpacking the mental health of nurses during COVID-19: evidence from Pakistan. J. Clin. Med. 10 (16), 3546.

Zainal Badri, S.K., Mun, C.T.Y., Ramos, H.M., 2020. Work passion and psychological wellbeing among millennial employees in Malaysia: the moderating role of personality. Int. J. Employ. Stud. 28 (1), 28–47.

Zhao, Y., St-Louis, A., Vallerand, R.J., 2015. On the validation of the passion scale in Chinese. Psychol. Well-being 5 (1), 3.