Psychological Distress, Fear and Coping Strategies During the Second and Third Waves of the COVID-19 Pandemic in Southern Germany

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Background: The COVID-19 pandemic has imposed enormous psychological discomfort and fear across the globe, including Germany.

Objectives: To assess the levels of COVID-19 associated psychological distress and fear amongst Southern German population, and to identify their coping strategies.

Methods: A cross-sectional survey using an online questionnaire was conducted in healthcare and community settings in the region of Ulm, Southern Germany. Assessment inventories were the Kessler Psychological Distress Scale (K-10), the Brief Resilient Coping Scale (BRCS), and the Fear of COVID-19 Scale (FCV-19S), which were valid and reliable tools.

Results: A total of 474 individuals participated in the study. The mean age was 33.6 years, and 327 (69%) were females. Most participants (n = 381, 80.4%) had high levels of psychological distress, whereas only 5.1% had high levels of fear, and two-thirds of participants showed higher levels of coping. Moderate to very high levels of psychological distress were associated with being female, living alone, distress due to employment changes, experiencing financial impact, having multiple co-morbidities, being a smoker, increased alcohol use over the previous 6 months, contact with COVID-19 cases and healthcare providers for COVID-19-related stress. Individuals who were ≥60 years, lived with non-family members, had co-morbidities and visited a healthcare provider had higher levels of fear. Higher levels of education and income showed better coping amongst participants.

Conclusion: Psychological distress was very high during the COVID-19 pandemic in Germany and associated with low levels of coping. This study identified vulnerable groups of people, who should be given priorities for addressing their health and wellbeing in future crisis periods.

Keywords: COVID-19, psychological distress, fear, cross-sectional survey, coping, mental health, Germany
INTRODUCTION

The coronavirus disease (COVID-19) has spread into 222 countries and territories worldwide and the World Health Organization (WHO) declared a global public health emergency on 30 January 2020 (1). As of 23 November 2021, Germany reported more than five million confirmed cases and almost 100,000 deaths from COVID-19 (2). This led to enact public health measures by the Government such as physical distancing, canceling large gatherings, imposing travel restrictions and lockdown in large cities, ensuring obligatory quarantine for positive cases, primary close contacts, along with closing of educational institutions. The lockdown also resulted in the closure of many small businesses, and the unemployment rate increased to 4.1% in summer 2020 compared to 3.1% just before the pandemic (3). Ongoing restrictions also impacted on the physical and mental health of the population, especially older adults with multiple comorbidities (4). Ongoing social isolation and uncertainty of further COVID-19 pandemic waves could potentially trigger long-term mental disorders (5).

Furthermore, Unemployment and social isolation were associated with risky behaviors such as increased tobacco and alcohol consumption (6). Lockdown measures and social distancing restrictions caused a shift to telehealth facilities (7). Previous studies showed that healthcare workers engaged in the diagnosis and management of COVID-19 patients were more prone to psychological distress and various mental disorders, such as depression, anxiety, anger, fear of spreading the infection to their relatives, friends, or colleagues (8, 9).

Studies from several countries around the world including Germany found that the pandemic caused higher psychological distress, anxiety, and depression amongst a large proportion of community members (10–16). Studies also showed that depression, stress, and anxiety during the pandemic triggered sleep disorders and increased consumption of tobacco and alcohol (17). However, with increased vaccination rates and easing of restrictions, impacts may change during the current pandemic waves. Although there are previously published studies that assessed anxiety, fear and distress amongst community members and healthcare workers in Germany during the COVID-19 pandemic, the existing evidence lacks a full understanding of the impacts of the pandemic on mental health and coping strategies amongst the public in Germany and identification of the relevant predictors. Therefore, this study aimed to assess the levels of psychological distress, fear of the COVID-19 disease, and coping strategies among a wide range of population in Germany; it also aimed to identify critical factors associated with those outcomes. The population subgroups who were at higher risk of developing poor mental health outcomes would be identified in this study, which would enable the policymakers to optimize psychosocial interventions targeted to those vulnerable groups of population and guide resource planning to avoid long-term mental health impacts.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional study was conducted according to The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement Checklist (18). This study was a part of a large study involving 17 countries and was led by the last author (10). Participants were informed about the study using social media and received the link of the questionnaire through social media or by emails. In addition, Quick Response (QR) codes were used on professional posters in outpatient clinics to inform patients about the study and invite participation. Data were collected from healthcare settings, including General Practices, hospitals, allied health professionals, and community settings, using a structured self-administered online questionnaire (10, 13, 14, 19).

Study Population

Adult participants who were ≥ 18 years old with the capacity to respond to an online questionnaire in German language were included in three main groups: (a) patients who attended a healthcare setting, either for face-to-face or telehealth consultation in the last 4 weeks irrespective of respiratory/COVID-19 symptoms, (b) healthcare workers (full time, part-time or casual) who have been in contact with patients in the last 4 weeks in a healthcare setting (doctor, nurses, allied health professionals, technicians, patient service attendants, receptionists, etc.) irrespective of caring for respiratory/COVID-19 patients, and (c) community members who did not consult any healthcare provider in the last 4 weeks.

Data Collection

An online link to the web-based questionnaire was developed using Google forms to collect data from February to April 2021 during the second and third waves of the COVID-19 pandemic. According to Robert Koch Institute, the second German wave began in October 2020 (https://www.shorturl.at/shortener.php), while the third wave started in March 2021 (https://www.shorturl.at/loqHP). Initially, there was a screening question related to age to confirm eligibility; subsequently data were collected on: (a) socio-demographics as age, gender, location of residence, marital status, living conditions (alone or with families), the highest level of education, country of birth; (b) profession as a primary occupation, the impact of COVID-19 on occupation, identification as a frontline healthcare worker; (c) self-reported comorbidities as hypertension, cardiovascular diseases, chronic respiratory diseases, diabetes, cancer; (d) behavioral risk factors as current smoking, alcohol intake; (e) health service utilization (in the last 4 weeks) as consultation with a healthcare provider for any symptom, admission to the hospital including reasons for admission; (f) exposure and contact history of COVID-19, test and diagnosis of COVID-19, close contact, isolation and quarantine status; (g) psychological impact measured by the Kessler Depression Scale (K-10) (20), and fear measured by the Fear of COVID-19 Scale (FCV) (21); (h) coping strategies measured by the Brief Resilient Coping Scale.
(BRCS) (22); and (j) access to mental health resources (in the last four weeks) (see Appendix 1).

Study Tools
Kessler Psychological Distress Scale (K10)
The K10 scale is a 10-item self-rated questionnaire that measures distress based on depressive and anxiety symptoms. Each item has five possible answers (none of the time = 1, a little of the time = 2, some of the time = 3, most of the time = 4, all of the time = 5) allowing for a total score of 50. A score of 10–15 is likely to be well, 16–29 is medium risk for anxiety or depression and 30–50 is high risk for anxiety or depressive symptoms (20). Cronbach’s alpha for this tool was 0.902, which was satisfactory.

Fear of COVID-19 Scale (FCV-19S)
The FCV-19S is a seven-item scale that assesses fear of COVID-19 among the general population. Each item has five possible answers (strongly disagree = 1 disagree = 2 neutral = 3 agree = 4 strongly agree = 5) allowing for a maximum score of 35, a score of 7–22 is considered low fear and 23–35 is considered high fear of COVID-19 (21). Cronbach’s alpha for this tool was 0.82, which was satisfactory.

Brief Resilient Coping Scale (BRCS)
The BRCS is a 4-item scale that measures a psychological well-being construct: resilience. Each item is a 5-point response (does not describe me at all = 1, does not describe me = 2, neutral = 3, describes me = 4, describes me very well = 5). The maximum possible score is 20, and it is categorized into low resilience (score 4–13), medium resilience (score 14–16) and high resilience (Score 17–20) (22). Cronbach’s alpha for this tool was 0.758, which was satisfactory.

Sample Size Calculation
All participants fulfilling the inclusion criteria were invited to participate. Considering Germany’s population of 84 million according to World Population Prospects (23), the prevalence of lifetime mental health issues amongst Germans was 31.1% (24), at 95% confidence intervals, margin of error (5%), and 80% power, the required sample size was 329. The sample size was calculated using Open Epi Info software version 7.2. Convenient sampling was used to recruit the study participants by following snowball sampling.

Ethics
Ethical approval was obtained from the Research Ethical Committee (REC) of the Ulm University (Ethical Approval Number 448/20 – FSt/Sta).

Statistical Analysis
International Business Machines Corporation (IBM) Statistical Package for the Social Sciences (SPSS) statistics software version 25 was used for data analysis. Descriptive analyses were conducted and followed by inferential analyses. Continuous variables were presented as mean ± standard deviation (SD), while categorical variables were presented as numbers and percentages. Internal consistency of the instruments was calculated using Cronbach’s alpha. The study outcomes were categorized into binary variables as follows: K-10 score was categorized into low (score 10–15) and moderate to very high (score 16–50), FCV-19S score was categorized into low (score 7–21) and high (score 22–35) and BRCS score was defined into low (score 4–13) and medium to high (score 14–20) resilient copers. Univariate and multivariate logistic regression (adjusted for age, gender, born in Germany, living status, employment status, level of education) were performed to explore the association between population characteristics and the study’s outcomes. Odds ratios (ORs), adjusted odds ratios (AORs) and 95% confidence intervals (95% CIs) were obtained. Firth logistic regression with penalized maximum likelihood was used for fear of COVID-19 outcome as the number of events was relatively low for the number of adjusted variables. To measure the association between distress, fear and coping, partial rank correlation was conducted on the overall score as a continuous variable for each scale. This was done after controlling for potential confounding factors (age, gender, born in Germany, living status, employment status and level of education). P values less than 0.05 were considered statistically significant.

RESULTS

Population Characteristics
A total of 474 people participated in the study. The mean age of the participants was 33.6 (13.3) years, and 327 (69%) were females. Most of them were born in Germany (89.9%, n=426), and around half lived with family members (48.5%, n = 230). Two-thirds (62.4%, n = 296) of the participants had a source of income during the pandemic, and only 2.1% (n = 10) had their jobs affected by the pandemic. Half of the participants (57%, n = 270) reported change in the employment situation, and half of them (49.4%, n = 196) had higher perceived distress due to that change. About half participants (47.3%, n = 224) self-identified as essential service workers and 54.6% (n = 259) reported being healthcare workers. Only 7.4% (n = 35) participants reported having psychiatric or mental health issues, although a quarter of the participants (24.1%, n = 114) perceived their mental health status as poor to fair. Table 1 shows the characteristics of included participants, and Tables 2–4 shows multivariate analyses of psychological distress, fear, and coping.

Psychological Distress
After adjusting for potential confounders, multivariate analyses showed that being a female, living alone, those with distress due to employment change, worsened financial situation, having multiple co-morbidities, smoking, increased alcohol consumption over the last 6 months, contact with COVID-19 case whether direct or indirect, direct experience of COVID-19 and healthcare use to overcome pandemic stress in the last 6 months were associated with moderate to very high levels of psychological distress (Table 2).

Fear of COVID-19
Multivariate logistic regression showed that being over 60, living with non-family members, those having a diploma or a trade qualification, those with single or multiple comorbidities,
**TABLE 1 |** Baseline demographic characteristics of the participants (*N* = 474).

| Characteristic | No. | % |
|----------------|-----|---|
| **Age** | | |
| Mean (± SD) | 474 | 33.6 ± 13.32 |
| Age groups | 474 | |
| 18–29 | 232 | 48.9 |
| 30–59 | 220 | 46.4 |
| >60 | 22 | 4.6 |
| Gender | 474 | |
| Female | 327 | 69.0 |
| Born in Germany | 474 | |
| Yes | 426 | 89.9 |
| Living status | 474 | |
| Live with family members | 230 | 48.5 |
| Live with non-family members | 145 | 30.6 |
| Live alone | 99 | 20.9 |
| Highest educational/vocational qualification | 474 | |
| Secondary/Higher Secondary/Grade 7 to 12 | 188 | 39.7 |
| Certificate/Diploma/Trade qualifications | 83 | 17.5 |
| Bachelor/Masters/PhD | 203 | 42.8 |
| Current employment condition | 474 | |
| Unemployed/Housewife/Homemaker/Home duties (No source of income) | 168 | 35.4 |
| Jobs affected by COVID-19 (lost job/working hours reduced/afraid of job loss) | 10 | 2.1 |
| Have an income source (employed/Government benefits) | 296 | 62.4 |
| Perceived distress due to change of employment status | 397 | |
| A little to none | 201 | 50.6 |
| Moderate to a great deal | 196 | 49.4 |
| Improved working situation due to change of employment status | 406 | |
| A little to none | 352 | 86.7 |
| Moderate to a great deal | 54 | 13.3 |
| Self-identification as frontline or essential service worker | 474 | |
| Yes | 224 | 47.3 |
| Self-identification as a healthcare worker | 474 | |
| Yes, doctor | 64 | 13.5 |
| Yes, nurse | 18 | 3.8 |
| Yes, another healthcare worker | 177 | 37.3 |
| COVID-19 impacted the financial situation | 474 | |
| Yes, impacted positively | 43 | 9.1 |
| Yes, impacted negatively | 67 | 14.1 |
| Affected by the change in a financial situation | 474 | |
| Not at all | 198 | 41.8 |
| Unsure | 53 | 11.2 |
| Somewhat | 130 | 27.4 |
| A great extent | 39 | 8.2 |
| Co-morbidities | 474 | |
| Psychiatric/Mental health problem | 35 | 7.4 |
| Other co-morbidities* | 102 | 21.5 |
| Co-morbidities | 474 | |
| Single co-morbidity | 98 | 20.7 |
| Multiple co-morbidities | 43 | 9.1 |
| Perceived status of own mental health | 474 | |
| Good to Excellent | 360 | 75.9 |
| Poor to Fair | 114 | 24.1 |

(Continued)
TABLE 1 | Continued

| Characteristic                                                                 | No.  | %     |
|--------------------------------------------------------------------------------|------|-------|
| Smoking                                                                       | 474  |       |
| Ever smoker (Daily/Nondaily/Ex)                                                | 59   | 12.4  |
| Increased smoking over the last 6 months                                       | 59   |       |
| Yes                                                                            | 24   | 41.7  |
| Current alcohol drinking (last 4 weeks)                                       | 474  |       |
| Yes                                                                            | 200  | 42.2  |
| Increased alcohol drinking over the last 6 months                             | 200  |       |
| Yes                                                                            | 46   | 23    |
| Contact with known/suspected case of COVID-19                                  | 474  |       |
| Unsure                                                                         | 51   | 10.8  |
| Yes, I had indirect contact                                                    | 78   | 16.5  |
| Yes, provided direct care                                                      | 105  | 22.2  |
| Experience related to COVID-19 pandemic                                        | 474  |       |
| No known exposure to COVID-19                                                  | 334  | 70.5  |
| Treated in hospital / Ordered to quarantine / Tested positive / Lived with someone who had COVID-19 | 123  | 25.9  |
| Traveled overseas and had to quarantine                                        | 17   | 3.6   |
| Self-identification as a patient (visited a healthcare provider in the last 6 months) | 474  |       |
| Yes                                                                            | 224  | 47.3  |
| If yes, which type of healthcare did you use? (Multiple responses)             | 268  |       |
| Visit a primary care physician or health care professional                     | 184  | 68.7  |
| Telehealth consultation (online or by phone) with a general practitioner, specialist, or health professional | 10   | 3.7   |
| I was tested for COVID-19 at a special test site                               | 42   | 15.7  |
| Hospital emergency room                                                        | 8    | 3.0   |
| I was in a hospital for other reasons                                          | 24   | 9.0   |
| Healthcare service used to overcome COVID-19 related stress in the last 6 months | 474  |       |
| Yes                                                                            | 25   | 5.3   |
| If yes, which type of healthcare did you receive? (Multiple responses)         | 61   |       |
| Consulted a primary care physician                                             | 26   | 42.6  |
| Consulted a psychologist                                                       | 17   | 27.9  |
| Consulted a psychiatrist                                                       | 4    | 6.6   |
| Used specialty mental health services (hospital, community mental health services, inpatient mental health services) | 2    | 3.3   |
| Used mental health resources (pamphlets, brochures, leaflets, and books provided by mental health staff and distributed at hospital) | 3    | 4.9   |
| Mental health resources used and available through media (methods and techniques of psychological support provided by psychologists through online media, television news, or various online and social networking platforms) | 5    | 8.2   |
| Mental health support services used (including mental health program)          | 4    | 6.6   |

Data are presented as the mean and standard deviation (SD) or number (n) and percentage (%).

COVID-19, Coronavirus Disease 19; K-10, Kessler Depression Scale; FCV, Fear of Coronavirus-19 Scale; BRCS, Brief Resilient Coping Scale.

Cardiac diseases/Stroke/Hypertension/Hyperlipidaemia/Diabetes/Cancer/Chronic respiratory illness.

perceived mental health status as poor to fair, direct experience of COVID-19, visiting a health care provider in the past 6 months and using healthcare service to overcome pandemic related stress in the last 6 months were associated with higher levels of fear of COVID-19 (Table 3).

Coping Strategies

Multivariate analyses revealed that having an income source and being a healthcare worker were associated with higher levels of coping. Conversely, higher levels of education, distress due to change in employment, worsened financial situation due to the pandemic, and perceived status of mental health as poor to fair were the factors that predicted lower levels of coping amongst the study participants (Table 4).

Association Between Psychological Distress, Coping and Fear of COVID-19

The K-10 distress score correlated significantly with the FCV-19S score (Spearman’s r = 0.331, p < 0.001), the BRCS score showed an inverse relationship with the distress and fear scores
TABLE 2 | Factors associated with high psychological distress among the study population (based on K10 scoring).

| Characteristics                              | Low distress | High distress | Unadjusted analysis | Adjusted analysis* |
|----------------------------------------------|--------------|---------------|---------------------|--------------------|
|                                              | n     | %     | n     | %     | p   | ORs  | 95% CIs  | p   | ORs  | 95% CIs  |
| Age groups                                   |        |       |        |       |     |      |          |     |      |          |
| 18–29                                        | 23    | 9.9   | 209   | 90.1  | <0.001 | 0.31 | 0.18  | 0.52 | 0.029 | 0.41 | 0.18  | 0.91 |
| 30–59                                        | 58    | 26.4  | 162   | 73.6  | <0.001 | 0.09 | 0.04  | 0.24 | 0.000 | 0.10 | 0.03  | 0.33 |
| >60                                          | 12    | 54.5  | 10    | 45.5  | <0.001 | 3.61 | 2.26  | 5.76 | 0.000 | 4.04 | 2.41  | 6.77 |
| Gender                                       |        |       |        |       |     |      |          |     |      |          |
| Male                                         | 51    | 34.7  | 96    | 65.3  | Ref   |      |        |     | Ref   |          |
| Female                                       | 42    | 12.8  | 285   | 87.2  | <0.001 |      |        |     | Ref   |          |
| Born in the same country of residence        |        |       |        |       |     |      |          |     |      |          |
| No                                           | 7     | 14.6  | 41    | 85.4  | Ref   |      |        |     | Ref   |          |
| Yes                                          | 86    | 20.2  | 340   | 79.8  | 0.0357 | 1.48 | 0.64  | 3.42 | 0.055 | 0.41 | 0.16  | 1.02 |
| Living status                                |        |       |        |       |     |      |          |     |      |          |
| Live with family members                     | 63    | 27.4  | 167   | 72.6  | Ref   |      |        |     | Ref   |          |
| Live with non-family members                 | 16    | 11.0  | 129   | 89.0  | <0.001 | 3.04 | 1.68  | 5.51 | 0.530 | 1.32 | 0.55  | 3.17 |
| Live alone                                   | 14    | 14.1  | 85    | 85.9  | 0.011  | 2.29 | 1.21  | 4.32 | 0.041 | 2.05 | 1.03  | 4.01 |
| Highest educational/vocational qualification |        |       |        |       |     |      |          |     |      |          |
| Secondary/Higher                              | 21    | 11.2  | 167   | 88.8  | Ref   |      |        |     | Ref   |          |
| Secondary/Grade 7 to 12                      | 23    | 27.7  | 60    | 72.3  | 0.001  | 0.33 | 0.17  | 0.64 | 0.094 | 0.49 | 0.21  | 1.13 |
| Certificate/Diploma/Trade qualification       | 49    | 24.1  | 154   | 75.9  | 0.001  | 0.40 | 0.23  | 0.69 | 0.317 | 0.68 | 0.32  | 1.44 |
| Bachelor/Masters/PhD                         | 70    | 23.6  | 226   | 76.4  | 0.007  | 0.49 | 0.29  | 0.82 | 0.522 | 1.27 | 0.61  | 2.63 |
| Current employment condition                 |        |       |        |       |     |      |          |     |      |          |
| Unemployed/Housewife/Home maker/Home duties  | 1     | 10.0  | 9     | 90.0  | 0.778  | 1.36 | 0.16  | 11.23 | 0.272 | 3.56 | 0.37  | 34.23 |
| (No source of income)                        | 70    | 23.6  | 226   | 76.4  | 0.007  | 0.49 | 0.29  | 0.82 | 0.522 | 1.27 | 0.61  | 2.63 |
| Have an income source (employed/Government   | 68    | 23.4  | 154   | 76.6  | Ref   |      |        |     | Ref   |          |
| benefits)                                    | 47    | 23.4  | 154   | 76.6  | Ref   |      |        |     | Ref   |          |
| Perceived distress due to change of          | 21    | 10.7  | 175   | 89.3  | 0.001  | 2.54 | 1.45  | 4.44 | 0.001 | 2.85 | 1.54  | 5.27 |
| employment status                            | 72    | 33.4  | 334   | Ref   |      |        |        |     |        |          |
| A little to none                              | 65    | 18.5  | 287   | 81.5  | Ref   |      |        |     | Ref   |          |
| Moderate to a great deal                      | 7     | 13.0  | 47    | 87.0  | 0.327  | 1.52 | 0.66  | 3.52 | 0.735 | 1.17 | 0.48  | 2.85 |
| Improved working situation due to change of  |        |       |        |       |     |      |          |     |      |          |
| employment status                            | 93    | 381   |        |       |        |      |        |     |        |          |
| A little to none                              | 44    | 17.6  | 206   | 82.4  | Ref   |      |        |     | Ref   |          |
| Moderate to a great deal                      | 49    | 21.9  | 175   | 78.1  | 0.243  | 0.76 | 0.48  | 1.20 | 0.656 | 1.15 | 0.63  | 2.08 |

(Continued)
| Characteristics                                      | Low distress | High distress | Unadjusted analysis | Adjusted analysis* |
|-----------------------------------------------------|--------------|---------------|--------------------|-------------------|
|                                                     | n            | %             | n                  | %                |
|                                                     | p            | ORs 95% CIs   | p                  | AORs 95% CIs      |
| Self-identification as a healthcare worker          | 93           | 381           |                    |                  |
| No                                                  | 37           | 17.2          | 178                | 82.8              |
| Yes, doctor                                         | 16           | 25.0          | 48                 | 75.0              |
| Yes, nurse                                          | 2            | 11.1          | 16                 | 88.9              |
| Yes, other healthcare worker                        | 38           | 21.5          | 139                | 78.5              |
| COVID-19 impacted financial situation               | 93           | 381           |                    |                  |
| No impact                                           | 80           | 22.0          | 284                | 78.0              |
| Yes, impacted positively                            | 6            | 14.0          | 37                 | 86.0              |
| Yes, impacted negatively                            | 7            | 10.4          | 40                 | 89.6              |
| Affected by the change in financial situation       | 79           | 341           |                    |                  |
| Not at all                                          | 55           | 27.8          | 143                | 72.2              |
| Unsure                                              | 6            | 11.3          | 47                 | 88.7              |
| Somewhat                                            | 16           | 12.3          | 114                | 87.7              |
| A great extent                                      | 2            | 5.1           | 37                 | 94.9              |
| Co-morbidities                                      | 93           | 381           |                    |                  |
| No                                                  | 66           | 19.6          | 271                | 80.4              |
| Psychiatric/Mental health problem                   | 3            | 8.6           | 32                 | 91.4              |
| Other co-morbidities*                               | 24           | 23.5          | 78                 | 76.5              |
| Co-morbidities                                      | 93           | 381           |                    |                  |
| No                                                  | 64           | 19.2          | 269                | 80.8              |
| Single co-morbidity                                 | 24           | 24.5          | 74                 | 75.5              |
| Multiple co-morbidities                             | 5            | 11.6          | 38                 | 88.4              |
| Perceived status of own mental health               | 93           | 381           |                    |                  |
| Good to Excellent                                   | 93           | 25.8          | 267                | 74.2              |
| Poor to Fair                                        | 0            | 0.0           | 14                 | 100.0             |
| Smoking                                             | 93           | 381           |                    |                  |
| Never smoker                                        | 88           | 21.2          | 327                | 78.8              |
| Ever smoker (Daily/Nondaily/ Ex)                    | 5            | 8.5           | 54                 | 91.5              |
| Increased smoking over the last 6 months            | 5            |               | 5                  | 54                |
| No                                                  | 5            | 14.3          | 30                 | 85.7              |
| Yes                                                 | 0            | 0.0           | 24                 | 100.0             |
| Current alcohol drinking (last 4 weeks)             | 93           | 381           |                    |                  |
| No                                                  | 51           | 18.6          | 223                | 81.4              |
| Yes                                                 | 42           | 21.0          | 158                | 79.0              |
| Increased alcohol drinking over the last 6 months   | 42           |               | 158                |                  |
| No                                                  | 39           | 25.3          | 115                | 74.7              |
| Yes                                                 | 3            | 6.5           | 43                 | 93.5              |

(Continued)
TABLE 2 | Continued

| Characteristics                                      | Low distress | High distress | Unadjusted analysis | Adjusted analysis* |
|------------------------------------------------------|--------------|---------------|---------------------|--------------------|
|                                                      | n             | %             | n                  | %                  | p      | ORs   | 95% CIs | p      | AORs  | 95% CIs |
| Contact with known/suspected case of COVID-19        | 93            | 381           |                     |                    |        |       |         |        |       |         |
| No                                                   | 58            | 24.2          | 182                | 75.8               | Ref    |       |         |        |       |         |
| Unsure                                                | 10            | 19.6          | 41                 | 80.4               | 0.486  | 1.31  | 0.62    | 2.77   | 0.542 | 1.30    | 0.56    | 3.02   |
| Yes, had indirect contact                            | 10            | 12.8          | 68                 | 87.2               | 0.037  | 2.17  | 1.05    | 4.48   | 0.043 | 2.26    | 1.03    | 4.98   |
| Yes, provided direct care                             | 15            | 14.3          | 90                 | 85.7               | 0.041  | 1.91  | 1.03    | 3.56   | 0.017 | 2.33    | 1.17    | 4.68   |
| Experience related to COVID-19 pandemic               | 93            | 381           |                     |                    |        |       |         |        |       |         |
| No known exposure to COVID-19                        | 80            | 24.0          | 254                | 76.0               | Ref    |       |         |        | Ref    |         |
| Treated in hospital / Ordered to quarantine/ Tested positive / Lived with someone who had Covid-19 | 11            | 8.9           | 112                | 91.1               | 0.001  | 3.21  | 1.64    | 6.26   | 0.009 | 2.59    | 1.26    | 5.30   |
| Traveled overseas and had to quarantine               | 2             | 11.8          | 15                 | 88.2               | 0.260  | 2.36  | 0.53    | 10.55  | 0.428 | 1.89    | 0.39    | 9.06   |
| Self-identification as a patient (visited a healthcare provider in the last 6 months) | 93            | 381           |                     |                    |        |       |         |        |       |         |
| No                                                   | 54            | 21.6          | 196                | 78.4               | Ref    |       |         |        | Ref    |         |
| Yes                                                  | 39            | 17.4          | 185                | 82.6               | 0.252  | 1.31  | 0.83    | 2.07   | 0.271 | 1.34    | 0.80    | 2.26   |
| Level of fear of COVID-19 (FCV-19S categories)       | 93            | 381           |                     |                    |        |       |         |        |       |         |
| Low (score 7–21)                                     | 91            | 20.2          | 359                | 79.8               | Ref    |       |         |        | Ref    |         |
| High (score 22–35)                                   | 2             | 8.3           | 22                 | 91.7               | 0.170  | 2.79  | 0.64    | 12.08  | 0.142 | 3.26    | 0.67    | 15.74  |
| Level of coping (BRCS categories)                     | 93            | 381           |                     |                    |        |       |         |        |       |         |
| Low resilient coping (score 4–13)                    | 24            | 15.2          | 134                | 84.8               | Ref    |       |         |        | Ref    |         |
| Medium to high resilient coping (score 14–20)        | 69            | 21.8          | 247                | 78.2               | 0.087  | 0.64  | 0.39    | 1.07   | 0.087 | 0.61    | 0.34    | 1.09   |
| Healthcare services used to overcome COVID-19 related stress in the last 6 months | 93            | 381           |                     |                    |        |       |         |        |       |         |
| No                                                   | 93            | 20.7          | 356                | 79.3               | Ref    |       |         |        | Ref    |         |
| Yes                                                  | 0             | 0.0           | 25                 | 100.0              |        |       |         |        |        |         |

Data are presented as number (n) and percentage (%). P ≤ 0.05 were considered statistically significant. ORs, Odds Ratio; AOR, Adjusted Odds Ratio; CI, Confidence Interval; Ref, Reference category; COVID-19, Coronavirus Disease 19; K-10, Kessler Depression Scale; FCV, Fear of Coronavirus-19 Scale; BRCS, Brief Resilient Coping Scale.

*Adjusted for Age, Gender, born in Germany, living status, employment status and level of education. Bold indicated statistical significance.

(spearman’s r = −0.276 and −0.173, p < 0.001). People with higher distress had higher levels of fear of COVID-19 and lower coping. On the other hand, people with better coping had lower distress and fear of COVID-19 (Table 5).

DISCUSSION

Moderate to very high levels of psychological distress were associated with being a female, living alone, suffering employment change or worsening the financial situation, and poor mental health, smoking and alcohol consumption. Higher levels of fear of COVID-19 were markable in people of ≥60 years, or those with comorbidities or poor mental health. Having an income source and being a healthcare worker was associated with higher levels of coping.

During the COVID-19 pandemic, the course of psychological disturbances which were associated with psychological distress, fear, and coping strategies among the community members including healthcare workers across the world were well-studied (25). Our study can be seen as a supplement to a global cross-sectional study involving 17 countries (10). The same online instruments were used like the prior global study led by the last author (MAR), but the current study adapted German language. In this study, more females participated than males,
### TABLE 3 | Factors associated with high levels of fear of COVID-19 among the study population (based on FCV-19S scoring).

| Characteristics                                      | Low levels of fear | High levels of fear | Unadjusted analyses | Adjusted analysis |
|------------------------------------------------------|--------------------|---------------------|---------------------|------------------|
|                                                      | n  | %    | n    | %   | p    | ORs | 95% CIs | p    | AORs | 95% CIs |
| Age groups                                           |    |      |      |     |      |     |         |      |      |         |
| 18–29                                                | 223| 96.1 | 9    | 3.9 | Ref  |     |         |      |      |         |
| 30–59                                                | 209| 95.0 | 11   | 5.0 | 0.564| 1.30| 0.53    | 3.21 | 0.091| 3.40    | 0.84 | 17.49 |
| > ≥60                                                | 18 | 81.8 | 4    | 18.2| 0.009| 5.51| 1.54    | 19.65| 0.002| 13.93   | 2.66 | 84.21 |
| Gender                                               |    |      |      |     |      |     |         |      |      |         |
| Male                                                 | 144| 98.0 | 3    | 2.0 | Ref  |     |         |      |      |         |
| Female                                               | 306| 93.6 | 21   | 6.4 | 0.057| 3.29| 0.97    | 11.22| 0.057| 2.74    | 0.97 | 10.44 |
| Born in the same country of residence                |    |      |      |     |      |     |         |      |      |         |
| No                                                   | 47 | 97.9 | 1    | 2.1 | Ref  |     |         |      |      |         |
| Yes                                                  | 403 | 94.6 | 23   | 5.4 | 0.340| 2.68| 0.35    | 20.32| 0.651| 1.46    | 0.34 | 13.62 |
| Living status                                        |    |      |      |     |      |     |         |      |      |         |
| Live with family members                             | 221| 96.1 | 9    | 3.9 | Ref  |     |         |      |      |         |
| Live with non-family members                         | 136| 93.8 | 9    | 6.2 | 0.316| 1.63| 0.63    | 4.20 | 0.041| 4.12    | 1.06 | 17.39 |
| Live alone                                           | 93 | 93.9 | 6.1  | 3.9 | 0.395| 1.58| 0.55    | 4.58 | 0.164| 2.19    | 0.71 | 6.35  |
| Highest educational/vocational qualification         |    |      |      |     |      |     |         |      |      |         |
| Secondary/Higher                                     | 178| 94.7 | 10   | 5.3 | Ref  |     |         |      |      |         |
| Secondary/Grade 7 to 12                               | 77 | 92.8 | 6    | 7.2 | 0.540| 1.39| 0.49    | 3.95 | 0.034| 7.75    | 1.19 | 40.49 |
| Certificate/Diploma/Trade qualifications             | 195| 96.1 | 8    | 3.9 | 0.517| 0.73| 0.28    | 1.89 | 0.756| 1.21    | 0.37 | 4.08  |
| Bachelor/Masters/PhD                                  |    |      |      |     |      |     |         |      |      |         |
| Current employment condition                         |    |      |      |     |      |     |         |      |      |         |
| Unemployed/Housewife/Home maker/Home duties (No source of income) |    |      |      |     |      |     |         |      |      |         |
| Jobs affected by COVID-19 (lost job/working hours reduced/afraid of job loss) | 8  | 80.0 | 2    | 20.0| 0.047| 5.75| 1.03    | 32.25| 0.978| 0.98    | 0.29 | 3.23  |
| Have an income source (employed/Government benefits) | 281| 94.9 | 15   | 5.1 | 0.661| 1.23| 0.49    | 3.07 | 0.451| 0.65    | 0.21 | 2.01  |
| Perceived distress due to change of employment status | 375| 94.0 | 12   | 6.0 | Ref  |     |         |      |      |         |
| A little to none                                     | 189| 94.0 | 12   | 6.0 | Ref  |     |         |      |      |         |
| Moderate to a great deal                              | 186| 94.9 | 10   | 5.1 | 0.706| 0.85| 0.36    | 2.01 | 0.616| 0.79    | 0.31 | 1.96  |
| Improved working situation due to change of employment status | 384| 94.9 | 10   | 5.1 | 0.563| 0.65| 0.21    | 3.64 | 0.932| 1.06    | 0.21 | 3.64  |
| A little to none                                     | 332| 94.3 | 20   | 5.7 | Ref  |     |         |      |      |         |
| Moderate to a great deal                              | 52 | 96.3 | 2    | 3.7 | 0.553| 0.64| 0.15    | 2.81 | 0.932| 1.06    | 0.21 | 3.64  |
| Self-identification as a frontline or essential service worker | 450| 22   | 22   |     |      |     |         |      |      |         |
| No                                                   | 237| 94.8 | 13   | 5.2 | Ref  |     |         |      |      |         |
| Yes                                                  | 213| 95.1 | 11   | 4.9 | 0.886| 0.94| 0.41    | 2.15 | 0.982| 1.01    | 0.37 | 2.93  |
### TABLE 3 | Continued

| Characteristics | Low levels of fear | High levels of fear | Unadjusted analyses | Adjusted analysis |
|-----------------|-------------------|---------------------|---------------------|------------------|
|                 | n     | %     | n     | %     | p       | ORs   | 95% CIs | p   | AORs   | 95% CIs |
| Self-identification as a healthcare worker |        |        |        |        |        |        |        |        |        |        |
| No              | 201   | 94.5  | 14    | 6.5   | Ref    | Ref   | 0.035  | 0.04  | 2.41  |        |        |
| Yes, doctor     | 63    | 98.4  | 1     | 1.6   | 0.157  | 0.23  | 0.03   | 1.77  | 0.435  | 0.04  | 2.41  |        |        |
| Yes, nurse      | 15    | 83.3  | 3     | 16.7  | 0.126  | 2.87  | 0.74   | 11.11 | 0.453  | 0.34  | 9.02  |        |        |
| Yes, other healthcare worker | 171   | 96.6  | 6     | 3.4   | 0.169  | 0.50  | 0.19   | 1.34  | 0.121  | 0.13  | 1.27  |        |        |
| COVID-19 impacted financial situation |        |        |        |        |        |        |        |        |        |        |        |
| No impact       | 349   | 95.9  | 15    | 4.1   | Ref    | Ref   | 0.184  | 0.61  | 7.85  |        |        |
| Yes, impacted positively | 40    | 93.0  | 3     | 7.0   | 0.395  | 1.75  | 0.48   | 6.29  | 0.185  | 0.61  | 7.85  |        |        |
| Yes, impacted negatively | 61    | 91.0  | 6     | 9.0   | 0.099  | 2.29  | 0.86   | 6.13  | 0.163  | 0.70  | 6.66  |        |        |
| Affected by the change in financial situation |        |        |        |        |        |        |        |        |        |        |        |
| Not at all      | 188   | 94.9  | 10    | 5.1   | Ref    | Ref   |        |        |        |        |        |
| Unsure          | 51    | 96.2  | 2     | 3.8   | 0.700  | 0.74  | 0.16   | 3.47  | 0.940  | 0.16  | 3.76  |        |        |
| Somewhat        | 124   | 95.4  | 6     | 4.6   | 0.858  | 0.91  | 0.32   | 2.57  | 0.896  | 0.31  | 2.63  |        |        |
| A great extent  | 36    | 92.3  | 3     | 7.7   | 0.511  | 1.57  | 0.41   | 5.98  | 0.340  | 0.46  | 6.64  |        |        |
| Co-morbidities  | 450   | 24    |       |       |        |        |        |        |        |        |        |
| No              | 320   | 95.0  | 17    | 5.0   | Ref    | Ref   | 0.429  | 0.34  | 6.72  |        |        |
| Psychiatric/Mental health problem |        |        |        |        |        |        |        |        |        |        |        |
| Other co-morbidities* | 97    | 95.1  | 5     | 4.9   | 0.954  | 0.97  | 0.35   | 2.70  | 0.590  | 0.44  | 3.55  |        |        |
| Co-morbidities  | 450   | 24    |       |       |        |        |        |        |        |        |        |
| No              | 326   | 97.9  | 7     | 2.1   | Ref    | Ref   |        |        |        |        |        |
| Single co-morbidity | 89    | 90.8  | 9     | 9.2   | 0.003  | 4.71  | 1.71   | 13.00 | 0.001  | 5.76  | 2.01  | 17.44  |        |
| Multiple co-morbidities | 35    | 81.4  | 8     | 18.6  | <0.001 | 10.65 | 3.64   | 31.12 | <0.001 | 9.48  | 2.89  | 32.19  |        |
| Perceived status of own mental health |        |        |        |        |        |        |        |        |        |        |        |
| Good to Excellent | 350   | 97.2  | 10    | 2.8   | Ref    | Ref   |        |        |        |        |        |
| Poor to Fair    | 100   | 87.7  | 14    | 12.3  | <0.001 | 4.90  | 2.11   | 11.37 | <0.001 | 5.83  | 2.41  | 15.02  |        |
| Smoking         |        |        |        |        |        |        |        |        |        |        |        |
| Never smoker    | 392   | 94.5  | 23    | 5.5   | Ref    | Ref   |        |        |        |        |        |
| Ever smoker (Daily/Nondaily/ Ex) | 58    | 98.3  | 1     | 1.7   | 0.235  | 0.29  | 0.04   | 2.22  | 0.167  | 0.35  | 0.04  | 1.46  |        |
| Increased smoking over the last 6 months | 58    | 1     |       |       |        |        |        |        |        |        |        |
| No              | 35    | 100.0 | 0     | 0.0   | Ref    | Ref   |        |        |        |        |        |
| Yes             | 23    | 95.8  | 1     | 4.2   | 0.361  | 4.53  | 0.18   | 116.04| 0.334  | 3.48  | 0.27  | 276.80 |        |
| Current alcohol drinking (last 4 weeks) |        |        |        |        |        |        |        |        |        |        |        |
| No              | 258   | 94.2  | 16    | 5.8   | Ref    | Ref   |        |        |        |        |        |
| Yes             | 192   | 96.0  | 8     | 4.0   | 0.370  | 0.67  | 0.28   | 1.60  | 0.377  | 0.68  | 0.27  | 1.59  |        |
| Increased alcohol drinking over the last 6 months |        |        |        |        |        |        |        |        |        |        |        |
| No              | 147   | 95.5  | 7     | 4.5   | Ref    | Ref   |        |        |        |        |        |
| Yes             | 45    | 97.8  | 1     | 2.2   | 0.481  | 0.47  | 0.06   | 3.90  | 0.928  | 0.10  | 4.72  |        |        |
| Contact with known/suspected case of COVID-19 |        |        |        |        |        |        |        |        |        |        |        |
| No              | 230   | 95.8  | 10    | 4.2   | Ref    | Ref   |        |        |        |        |        |
| Unsure          | 50    | 98.0  | 1     | 2.0   | 0.464  | 0.46  | 0.06   | 3.68  | 0.942  | 0.10  | 4.36  |        |        |

(Continued)
| Characteristics                        | Low levels of fear | High levels of fear | Unadjusted analyses | Adjusted analysis |
|---------------------------------------|--------------------|---------------------|---------------------|-------------------|
|                                       | n  | %   | n  | %   | p    | ORs  | 95% CIs | p    | AORs  | 95% CIs |
| Yes, had indirect contact             | 70 | 89.7| 8  | 10.3| 0.050| 2.63 | 1.00    | 6.92 | 0.057| 2.64    | 0.97   | 7.07   |
| Yes, provided direct care             | 100| 95.2| 5  | 4.8 | 0.803| 1.15 | 0.38    | 3.45 | 0.513| 1.47    | 0.44   | 4.46   |
| Experience related to COVID-19 pandemic | 450| 24  |    |     |      |      |         |      |      |         |        |        |
| No known exposure to COVID-19         | 322| 96.4| 12 | 3.6 | Ref  |      |         |      |      |         |        |        |
| Treated in hospital / Ordered to quarantine/ Tested positive / Lived with someone who had Covid | 112| 91.1| 11 | 8.9 | 0.025| 2.64 | 1.13    | 6.14 | 0.021| 3.09    | 1.19   | 8.12   |
| Traveled overseas and had to quarantine | 16 | 94.1| 1  | 5.9 | 0.630| 1.68 | 0.21    | 13.71| 0.149| 4.95    | 0.49   | 26.65  |
| Self-identification as a patient (visited a healthcare provider in the last 6 months) | 450| 24  |    |     |      |      |         |      |      |         |        |        |
| No                                    | 244| 97.6| 6  | 2.4 | Ref  |      |         |      |      |         |        |        |
| Yes                                   | 206| 92.0| 18 | 8.0 | 0.008| 3.55 | 1.39    | 9.12 | 0.024| 2.81    | 1.14   | 7.77   |
| Level of psychological distress (K10 categories) | 450| 24  |    |     |      |      |         |      |      |         |        |        |
| Low (score 10–15)                     | 91 | 97.8| 2  | 2.2 | Ref  |      |         |      |      |         |        |        |
| Moderate to Very High (score 16–50)   | 359| 94.2| 22 | 5.8 | 0.170| 2.79 | 0.64    | 12.08| 0.162| 2.61    | 0.71   | 14.59  |
| Level of coping (BRCS categories)     | 450| 24  |    |     |      |      |         |      |      |         |        |        |
| Low resilient coping (score 4–13)     | 147| 93.0| 11 | 7.0 | Ref  |      |         |      |      |         |        |        |
| Medium to high resilient coping (score 14–20) | 303| 95.9| 13 | 4.1 | 0.187| 0.57 | 0.25    | 1.31 | 0.190| 0.56    | 0.23   | 1.35   |
| Healthcare services used to overcome COVID-19 related stress in the last 6 months | 450| 24  |    |     |      |      |         |      |      |         |        |        |
| No                                    | 433| 96.4| 16 | 3.6 | Ref  |      |         |      |      |         |        |        |
| Yes                                   | 17 | 68.0| 8  | 32.0| <0.001| 12.74 | 4.79    | 33.84| <0.001| 15.26   | 4.88   | 48.84  |

Data are presented as number (n) and percentage (%). P-values ≤ of 0.05 were considered statistically significant. ORs, Odds Ratio; AOR, Adjusted Odds Ratio; CI, Confidence Interval; Ref, Reference category; COVID-19, Coronavirus Disease 19; K-10, Kessler Depression Scale; FCV, Fear of Coronavirus-19 Scale; BRCS, Brief Resilient Coping Scale.

*Adjusted for Age, Gender, born in Germany, living status, employment status and level of education. Bold indicated statistical significance.

which was in line with other similar German studies (16, 26–28) in the first wave of the pandemic, and also supports an Australian (10), Egyptian (15), Bangladeshi (14), Malaysian (13), and global study (10). A possible explanation might be that women were more inclined to share their experiences by participating in the study or women were more impacted due to the pandemic, lockdown or financially that prompted them to participate in the study. The mean age (33.6 years) showed that the study participants of this study were younger than those who were included in similar German studies (16, 26, 27).

For the issue of psychological distress in this study, there were more participants with moderate to very high distress, which was in line with the results of previous studies conducted in Germany (27), Australia (10), Malaysia (13), Bangladesh (14), Hong Kong (19) and globally (10), as well as other studies (28–31). Furthermore, similar to this study, previous studies (10, 13, 14, 27) also reported that females and younger respondents had higher psychological distress compared to the reference group. A previous study showed that women seemed to be more impacted by the pandemic in terms of wellbeing than men (32). According to the findings of this study, the common factors associated with moderate to very high levels of psychological distress were being females, those with change in the employment status, and worsening the financial situation, which was supported by earlier evidence (10, 13, 14). Similarly, Hetkamp and Schweda (33) found that respondents reported reduced sleep quality and moderate generalized anxiety and psychological burdens.
### TABLE 4 | Factors associated with coping among the study population (based on BRCS scoring).

| Characteristics                                           | Low levels of coping | High levels of coping | Unadjusted analysis | Adjusted analysis |
|------------------------------------------------------------|----------------------|-----------------------|---------------------|-------------------|
|                                                            | n   | %    | n   | %    | p    | ORs | 95% CIs   | p    | AORs | 95% CIs |
| **Age groups**                                            |     |      |     |      |      |     |          |      |      |         |
| 18–29                                                      | 81  | 34.9 | 151 | 65.1 | Ref  |      |          |      |      |         |
| 30–59                                                      | 71  | 32.3 | 149 | 67.7 | 0.553| 1.13 | 0.76    | 1.66 | 0.830| 0.94    | 0.52 | 1.69    |
| >60                                                        | 6   | 27.3 | 16  | 72.7 | 0.472| 1.43 | 0.54    | 3.80 | 0.687| 1.25    | 0.43 | 3.66    |
| **Gender**                                                |     |      |     |      |      |     |          |      |      |         |
| Male                                                       | 45  | 30.6 | 102 | 69.4 | Ref  |      |          |      |      |         |
| Female                                                     | 113 | 34.6 | 214 | 65.4 | 0.400| 0.84 | 0.55    | 1.27 | 0.547| 0.87    | 0.56 | 1.36    |
| **Born in the same country of residence**                 |     |      |     |      |      |     |          |      |      |         |
| No                                                         | 18  | 37.5 | 30  | 62.5 | Ref  |      |          |      |      |         |
| Yes                                                        | 140 | 32.9 | 286 | 67.1 | 0.519| 1.23 | 0.66    | 2.28 | 0.788| 1.09    | 0.57 | 2.11    |
| **Living status**                                         |     |      |     |      |      |     |          |      |      |         |
| Live with family members                                   | 69  | 30.0 | 161 | 70.0 | Ref  |      |          |      |      |         |
| Live with non-family members                               | 48  | 33.1 | 97  | 66.9 | 0.528| 0.87 | 0.55    | 1.35 | 0.753| 1.11    | 0.59 | 2.06    |
| Live alone                                                 | 41  | 41.4 | 58  | 58.6 | 0.045| 0.61 | 0.37    | 0.99 | 0.063| 0.61    | 0.36 | 1.03    |
| **Highest educational/vocational qualification**          |     |      |     |      |      |     |          |      |      |         |
| Secondary/Higher                                           | 61  | 32.4 | 127 | 67.6 | Ref  |      |          |      |      |         |
| Secondary/Grade 7 to 12                                     | 33  | 39.8 | 50  | 60.2 | 0.245| 0.73 | 0.43    | 1.24 | 0.013| 0.43    | 0.22 | 0.83    |
| Certificate/Diploma/Trade qualifications                   | 64  | 31.5 | 139 | 68.5 | 0.846| 1.04 | 0.68    | 1.60 | 0.034| 0.53    | 0.29 | 0.95    |
| **Current employment condition**                           |     |      |     |      |      |     |          |      |      |         |
| Unemployed/Housewife/Home maker/Home duties (No source of income) | 73  | 43.5 | 95  | 56.5 | Ref  |      |          |      |      |         |
| Jobs affected by COVID-19 (lost job/working hours reduced/afraid of job loss) | 4   | 40.0 | 6   | 60.0 | 0.831| 1.15 | 0.31    | 4.24 | 0.525| 1.56    | 0.40 | 6.08    |
| Have an income source (employed/Government benefits)      | 81  | 27.4 | 215 | 72.6 | <0.001| 2.04 | 1.37    | 3.04 | <0.001| 3.33    | 1.90 | 5.87    |
| **Perceived distress due to change of employment status** |     |      |     |      |      |     |          |      |      |         |
| A little to none                                           | 53  | 26.4 | 148 | 73.6 | Ref  |      |          |      |      |         |
| Moderate to a great deal                                    | 81  | 41.3 | 115 | 58.7 | 0.002| 0.51 | 0.33    | 0.78 | 0.003| 0.51    | 0.33 | 0.80    |
| **Improved working situation due to change of employment status** | 140 | 44.4 | 30  | 55.6 | 0.1   | 0.61 | 0.34    | 1.10 | 0.189| 0.67    | 0.36 | 1.22    |
| **Self-identification as a frontline or essential service worker** | 158 | 38.8 | 153 | 61.2 | Ref  |      |          |      |      |         |
| Yes                                                        | 61  | 27.2 | 163 | 72.8 | 0.008| 1.69 | 1.15    | 2.50 | 0.070| 1.26    | 0.76 | 2.08    |
| **Self-identification as a healthcare worker**             |     |      |     |      |      |     |          |      |      |         |
| No                                                         | 90  | 41.9 | 125 | 58.1 | Ref  |      |          |      |      |         |
| Yes, doctor                                                | 24  | 37.5 | 40  | 62.5 | 0.534| 1.20 | 0.68    | 2.13 | 0.482| 0.76    | 0.36 | 1.63    |

(Continued)
### TABLE 4 | Continued

| Characteristics                                      | Low levels of coping | High levels of coping | Unadjusted analysis | Adjusted analysis |
|------------------------------------------------------|----------------------|-----------------------|---------------------|-------------------|
|                                                      | n  | %      | n   | %      | p | ORs | 95% CIs | p | AORs | 95% CIs |
| Yes, nurse                                           | 5  | 27.8   | 13  | 72.2   | 0.249 | 1.87 | 0.64 | 5.44 | 0.534 | 1.45 | 0.45 | 4.64 |
| Yes, other healthcare worker                         | 39 | 22.0   | 138 | 78.0   | <0.001 | 2.55 | 1.63 | 3.98 | 0.016 | 1.91 | 1.13 | 3.24 |
| **COVID-19 impacted financial situation**            | 158 | 316   |      |        |      |      |      |      |      |      |      |      |
| No impact                                            | 114 | 31.3  | 250 | 68.7   | Ref   | Ref   |      |      |      |      |      |      |
| Yes, impacted positively                             | 14  | 32.6   | 29  | 67.4   | 0.869 | 0.95 | 0.48 | 1.86 | 0.669 | 0.86 | 0.43 | 1.73 |
| Yes, impacted negatively                            | 30  | 44.8   | 37  | 55.2   | 0.033 | 0.56 | 0.33 | 0.96 | 0.023 | 0.51 | 0.29 | 0.91 |
| **Affected by the change in financial situation**    | 145 | 275   |      |        |      |      |      |      |      |      |      |      |
| Not at all                                           | 61  | 30.8   | 137 | 69.2   | Ref   | Ref   |      |      |      |      |      |      |
| Unsure                                               | 23  | 43.4   | 30  | 56.6   | 0.087 | 0.58 | 0.31 | 1.08 | 0.091 | 0.57 | 0.29 | 1.10 |
| Somewhat                                             | 37  | 28.5   | 93  | 71.5   | 0.650 | 1.12 | 0.69 | 1.82 | 0.843 | 1.05 | 0.63 | 1.75 |
| A great extent                                       | 24  | 61.5   | 15  | 38.5   | <0.001 | 0.28 | 0.14 | 0.57 | <0.001 | 0.23 | 0.11 | 0.47 |
| **Co-morbidities**                                   | 158 | 316   |      |        |      |      |      |      |      |      |      |      |
| No                                                   | 111 | 32.9   | 226 | 67.1   | Ref   | Ref   |      |      |      |      |      |      |
| Psychiatric/Mental health problem                    | 17  | 48.6   | 18  | 51.4   | 0.067 | 0.52 | 0.26 | 1.05 | 0.061 | 0.49 | 0.24 | 1.03 |
| Other co-morbidities*                                | 30  | 29.4   | 72  | 70.6   | 0.504 | 1.18 | 0.73 | 1.91 | 0.954 | 0.99 | 0.60 | 1.63 |
| **Co-morbidities**                                   | 158 | 316   |      |        |      |      |      |      |      |      |      |      |
| No                                                   | 102 | 30.6   | 231 | 69.4   | Ref   | Ref   |      |      |      |      |      |      |
| Single co-morbidity                                  | 38  | 38.8   | 60  | 61.2   | 0.131 | 0.70 | 0.44 | 1.11 | 0.110 | 0.66 | 0.40 | 1.10 |
| Multiple co-morbidities                              | 18  | 41.9   | 25  | 58.1   | 0.140 | 0.61 | 0.32 | 1.17 | 0.144 | 0.59 | 0.29 | 1.20 |
| **Perceived status of own mental health**            | 158 | 316   |      |        |      |      |      |      |      |      |      |      |
| Good to Excellent                                    | 87  | 24.2   | 273 | 75.8   | Ref   | Ref   |      |      |      |      |      |      |
| Poor to Fair                                         | 71  | 62.3   | 43  | 37.7   | <0.001 | 0.19 | 0.12 | 0.30 | <0.001 | 0.20 | 0.13 | 0.33 |
| **Smoking**                                          | 158 | 316   |      |        |      |      |      |      |      |      |      |      |
| Never smoker                                         | 133 | 32.0   | 282 | 68.0   | Ref   | Ref   |      |      |      |      |      |      |
| Ever smoker (Daily/Nondaily/ Ex)                     | 25  | 42.4   | 34  | 57.6   | 0.117 | 0.64 | 0.37 | 1.12 | 0.110 | 0.62 | 0.34 | 1.12 |
| Increased smoking over the last 6 months             | 25  | 34     |      |        |      |      |      |      |      |      |      |      |
| No                                                   | 16  | 45.7   | 19  | 54.3   | Ref   | Ref   |      |      |      |      |      |      |
| Yes                                                  | 9   | 37.5   | 15  | 62.5   | 0.531 | 1.40 | 0.49 | 4.05 | 0.349 | 1.99 | 0.47 | 8.38 |
| **Current alcohol drinking (last 4 weeks)**          | 158 | 316   |      |        |      |      |      |      |      |      |      |      |
| No                                                   | 89  | 32.5   | 185 | 67.5   | Ref   | Ref   |      |      |      |      |      |      |
| Yes                                                  | 69  | 34.5   | 131 | 65.5   | 0.645 | 0.91 | 0.62 | 1.34 | 0.375 | 0.83 | 0.55 | 1.25 |
| **Increased alcohol drinking over the last 6 months** | 69  | 131    |      |        |      |      |      |      |      |      |      |      |
| No                                                   | 52  | 33.8   | 102 | 66.2   | Ref   | Ref   |      |      |      |      |      |      |
| Yes                                                  | 17  | 37.0   | 29  | 63.0   | 0.690 | 0.87 | 0.44 | 1.73 | 0.423 | 0.74 | 0.35 | 1.55 |
| **Contact with known/suspected case of COVID-19**     | 158 | 316   |      |        |      |      |      |      |      |      |      |      |
| No                                                   | 85  | 35.4   | 155 | 64.6   | Ref   | Ref   |      |      |      |      |      |      |
| Unsure                                               | 24  | 47.1   | 27  | 52.9   | 0.121 | 0.62 | 0.34 | 1.14 | 0.153 | 0.64 | 0.34 | 1.18 |
| Yes, had indirect contact                            | 19  | 24.4   | 59  | 75.6   | 0.072 | 1.70 | 0.95 | 3.04 | 0.077 | 1.70 | 0.95 | 3.06 |
| Yes, provided direct care                             | 30  | 28.6   | 75  | 71.4   | 0.215 | 1.37 | 0.83 | 2.26 | 0.290 | 1.32 | 0.79 | 2.20 |
TABLE 4 | Continued

| Characteristics | Low levels of coping | High levels of coping | Unadjusted analysis | Adjusted analysis |
|-----------------|----------------------|----------------------|---------------------|------------------|
|                 | n %                  | n %                  | p ORs 95% CIs       | p AORs 95% CIs   |
| Experience related to COVID-19 pandemic |                      |                      |                    |                  |
| No known exposure to COVID-19 | 116 34.7 | 218 65.3 | Ref Ref |                      |
| Treated in hospital / Ordered to quarantine / Tested positive / Lived with someone who had Covid-19 | 38 30.9 | 85 69.1 | 0.442 1.19 0.76 1.86 | 0.378 1.23 0.78 1.93 |
| Traveled overseas and had to quarantine | 4 23.5 | 13 76.5 | 0.348 1.73 0.55 5.42 | 0.278 1.92 0.59 6.20 |
| Self-identification as a patient (visited a healthcare provider in the last 6 months) | 158 316 | 158 316 |                      |                  |
| No | 79 31.6 | 171 68.4 | Ref Ref |                      |
| Yes | 79 35.3 | 145 64.7 | 0.398 0.85 0.58 1.24 | 0.446 0.86 0.58 1.27 |
| Level of fear of COVID-19 (FCV-195 categories) | 158 316 | 158 316 |                      |                  |
| Low (score 7–21) | 147 32.7 | 303 67.3 | Ref Ref |                      |
| High (score 22–35) | 11 45.8 | 13 54.2 | 0.187 0.57 0.25 1.31 | 0.201 0.55 0.22 1.38 |
| Level of distress K-10 Score categories | 158 316 | 158 316 |                      |                  |
| Low (score 10–15) | 24 25.8 | 69 74.2 | Ref Ref |                      |
| Moderate to Very High (score 16–50) | 134 35.2 | 247 64.8 | 0.087 0.64 0.39 1.07 | 0.130 0.64 0.36 1.14 |
| Healthcare services used to overcome COVID-19 related stress in the last 6 months | 158 316 | 158 316 |                      |                  |
| No | 146 32.5 | 303 67.5 | Ref Ref |                      |
| Yes | 12 48.0 | 13 52.0 | 0.115 0.52 0.23 1.17 | 0.184 0.55 0.23 1.33 |

Data are presented as number (n) and percentage (%). *P* ≤ 0.05 were considered statistically significant. ORs, Odds Ratio; AOR, Adjusted Odds Ratio; CI, Confidence Interval; Ref, Reference category; COVID-19, Coronavirus Disease 19; K-10, Kessler Depression Scale; FCV, Fear of Coronavirus-19 Scale; BRCS, Brief Resilient Coping Scale.

*Adjusted for Age, Gender, Born in Germany, living status, employment status and level of education. Bold indicated statistical significance.

Possible explanation could be that participants might experience crucial interference with their everyday lives, which was likely to increase psychological distress while the accessibility of conventional mental health care was limited (25). It could also be assumed that uncertainties about the novel coronavirus, its progression, and variable nature of pandemic, and availability and access to the varied range of evidence also could contribute to the report of various country-wise reports of moderate to a high level of psychological stress. There was also a higher correlation between potential contact with COVID-19 cases, whether direct or indirect, experience with the pandemic, and healthcare use to overcome pandemic stress.

Regarding the issue of fear in this study, there were more participants with low fear, which supports studies conducted in Bangladesh (14), Australia (10), Malaysia (13), and globally (10). That indicated habituation to the threatening situation of the pandemic. However, generalized anxiety could remain elevated over time due to the ongoing nature of pandemic (33). Similarly, a largescale German study among 3,500 randomly selected participants reported mental health (anxiety, depression) impact shortly after the lockdown came into effect (34). This study identified the factors associated with higher fear of COVID-19, which were similar as reported in the earlier studies: being female, and middle-aged, or over 60 (10, 13, 14). Being born in the same country of residence, and having at least a trade/certificate/diploma or bachelor degree were associated with higher levels of fear in this study, which were similar to the study conducted in Bangladesh (14).

Regarding the issue of coping in this study, there were more participants with high levels of coping, which is supported by the previous Malaysian (13) and the global study (10). High resilience coping could be explained by the long period of pandemic in Germany. Having an income source and being a healthcare worker were associated with higher levels of coping, findings of which were different compared to the previous studies (10, 13, 14). Finally, results showed that the COVID-19 pandemic...
and subsequent lockdown measures in early 2020 might slow the spread of the virus. However, those restrictions forced a sudden and dramatic change to the daily routines of community people, although not all individuals were impacted in the similar way. Some situational factors such as occupation, family status, financial and health impact, personality traits could influence individuals’ experience during the ongoing COVID crisis in Germany (35).

This study had few limitations. The participants were included from the Ulm region in Southern Germany, which limits the generalizability across the whole German territory. Furthermore, it wasn’t possible to exclude more responses from distressed individuals than non-distressed individuals, potentially resulting in selection bias. Finally, the study findings were limited to individuals who could access to online platforms in order to participate; therefore, there was limited generalizability due to the focus to internet-literate people. However, due to the lockdown measures applied during data collection, an online survey was the only available option to perform this study. One of the most crucial points in our study was collecting the targeted sample size during the pandemic lockdown period. Lastly, this study was the only German study that assessed the factors associated with psychological distress, fear, and coping strategies during the second and third waves of the COVID-19 pandemic. The data collection period coincided with the transition between the second and third waves in Germany, therefore, it was also not unlikely to have increased prevalence of psychological distress amongst the participants who participated in this study.

**CONCLUSIONS**

This study identified levels of psychological distress, fear and coping amongst the community members during the COVID-19 pandemic in the Ulm region in Southern Germany. In addition, several factors and risk groups that were associated with those outcomes, were identified. The identified higher risk groups should be prioritized for receiving mental health support from the relevant healthcare providers such as family physicians and psychiatrists, and automated follow-up reminders could be sent through text messages which would prevent further deterioration of mental health conditions.

**DATA AVAILABILITY STATEMENT**

The original contributions generated for this study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author/s.

**ETHICS STATEMENT**

The studies involving human participants were reviewed and approved by the Research Ethical Committee (REC) of the Ulm University (Ethical Approval Number 448/20 – FSt/Sta). The patients/participants provided their written informed consent to participate in this study.

**AUTHOR CONTRIBUTIONS**

ME had substantial contribution to the conception or design of the study, data collection, and scientific writing of the manuscript. CS-L contributed to the conception and revised the manuscript critically. XW coordinated data collection. KD performed the statistical analysis. MK revised the manuscript critically for important intellectual content. SA, BB, and WC provided critical feedback on the narrative structure and methods and results. MAR conceptualized the study, coordinated data collection, provided critical feedback, and revised the manuscript. All authors contributed to the article and approved the submitted version.

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**SUPPLEMENTARY MATERIAL**

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2022.860683/full#supplementary-material

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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