RESEARCH ARTICLE

Ambivalent heroism? – Psychological burden and suicidal ideation among nurses during the Covid-19 pandemic

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Abstract

Aim: During the Covid-19 pandemic, the risk for nurses' mental health has rapidly increased. The two main goals of this study were the examination of (1) the psychological burden and (2) of suicidal ideation and its associated risk factors one year after the Covid-19 pandemic begun.

Design: This was a cross-sectional online survey.

Methods: $N = 1311$ nurses (96.9% female) aged 18–63 years ($M = 30.96$, $SD = 8.48$) were assessed for various symptoms of psychological burden, suicidal ideation and behaviour and its risk factors.

Results: Almost half of participants (41.5%) reported heightened levels of depressive symptoms, 691 (52.7%) reported a medium to high risk for burnout. One fifth of participants (21.7%) reported suicidal ideation in the past 4 weeks. The direct contact to people with Covid-19 was not related to the extent of the psychological burden. Depression, agitation, perceived burdensomeness and previous suicide attempt were associated with suicidal ideation.

KEYWORDS
anxiety, burn-out, Covid-19 pandemic, depression, nurses, suicidal ideation

1 | INTRODUCTION

The Covid-19 pandemic has kept the world breathless since March 2020. Since its onset there have been 159,319,384 confirmed cases of Covid-19 infections and 3,311,780 deaths associated with Covid-19 worldwide (status May 14th 2021; WHO, 2021). In Germany, there have been 3,548,285 confirmed cases and 85,380 deaths. Besides the direct physiological consequences of an infection with Covid-19, there is an ongoing discussion that the Covid-19 pandemic alarmingly influences individual and collective health about emotional and social functioning (Pfefferbaum & North, 2020). Numerous studies with large samples already found evidence for increased generalized anxiety, depression, psychological distress and insomnia in different populations (Bäuerle et al., 2020; Skoda et al., 2021; Torales, O'Higgins, Castaldelli-Maia & Ventriglio, 2020).

A particularly vulnerable group for psychological burden are health care workers (HCW). HCW are not only emotionally distressed due to their given risk of exposure to the virus but also due to tightened work conditions related to overtime hours and shortages of personal protective equipment (Pfefferbaum & North, 2020). Even before this pandemic, the ability of HCW to cope with stress has been reported to vary depending on the level of resilience and the ability to protect oneself from stress (O'Dowd et al., 2018). It has been concluded that about 25% of physicians and other HCW suffer from "burnout" (Mateen & Dorji, 2009). Even more alarmingly, HCW have an elevated risk to die by suicide compared with the general population (Dutheil et al., 2019; Hawton, Agerbo, Simkin, Platt & Mellanby, 2011; Hawton et al., 2002). Surgeons for example report up to three times more suicidal ideation than the general population (Sullivan & Germain, 2019). Although individuals who do not work

in the health care system are invoked to stay at home during this pandemic, HCW are directly confronted with the risk of infecting themselves during their working hours and with the risk of infecting others in their private life. They are forced to handle life and death situations while putting their own lives at risk (Clarke, Stephens, Liao, Byrne & Gregory, 2020; Huang et al., 2020; Jun et al., 2020; Shreffler, Petrey & Huecker, 2020).

2 | BACKGROUND

Given this background, it is not surprising that recent findings on mental health of HCW revealed that stress, anxiety, depressive symptoms and burnout were reported by HCW in relation to the Covid-19 pandemic depending on inter alia closeness to people with Covid-19 (Matsuo et al., 2020; Shreffler et al., 2020).

However, most of those studies have been conducted in the year 2020, thus relatively shortly after the onset of the pandemic. Depending on the extent of resilience, HCW can withstand stress, but information is missing on the influence of continuing high levels of stress on their mental health. There is only one review, which focuses on 1 year of evidence on mental health in the Covid-19 crisis (Chen et al., 2021). This review found a prevalence of anxiety, depression, distress, insomnia, general psychological symptoms and PTSD ranging from 11% to 20% in the Chinese population. Most studies also did not include the influence of resilience of HCW in their studies. Additionally, there have only been three studies examining suicidal ideation and behaviour in relation to the Covid-19 pandemic in HCW: Mamun et al. (2020), Murata et al. (2021) and Young et al. (2021). This is surprising given the multiple indications (such as increased stress, depression and anxiety) for HCW that they are at risk for suicide. Interestingly, the psychological strain on HCW during the pandemic is already empirically quite well documented, but studies on the incidence of suicidal ideation and behaviour in this group are scarce. This is alarming given the disheartening assumption that suicide rates will increase because of the pandemic (Cheung, Chau & Yip, 2008; Gunnell et al., 2020; Sher, 2020; Wasserman, 1992) and given that HCW in general have an increased suicide risk compared to the general population (Dutheil et al., 2019; Hawton et al., 2002, 2011). Even though newer findings suggest that especially in high-income and upper-middle-income countries the numbers of suicide have not significantly changed in the early months of the pandemic (Pirkis et al., 2021), there is no information on the influence of the duration of this pandemic and its long-term consequences.

In spite of this knowledge, there are only three studies examining suicidality in HCW during the Covid-19 pandemic so far. In the first study of Mamun et al. (2020) with data collected in April 2020, 6.1% of all participants reported suicidal behaviour with no differences between the general population and HCW. Unfortunately, suicidal ideation was not examined. Young et al. (2021) with data from April 2020 and Murata et al. (2021) with data from April to July 2020 investigated suicidal ideation in HCW. Murata et al. (2021) reported that 10% of $N = 1,672$ HCW had suicidal ideation and one person reported a suicide attempt. In the study of Young et al. (2021), only 5.4% of HCW reported suicidal ideation. Even though these studies contribute to a better understanding of the mental health of HCW, there is more information needed. Young et al. (2021) only assessed suicidal ideation with one item, which actually assessed thoughts about suicide but also thoughts of hurting oneself. Murata et al. (2021) assessed suicidal ideation with the SITBI, but information is missing on the time frame of reported suicidal ideation. This might have contributed to the surprisingly low prevalence of suicidal ideation in these studies, even though it is well known that suicidal ideation is usually much more common than suicidal behaviour (Borges et al., 2014). All three studies reported symptoms of psychological burden in HCW. However, two of the studies did not report the exact profession of HCW that were included. The one study that identified the professions of HCW did not categorize any as "nurses". HCW is a very wide term including, for example, nurses, physicians and psychologists. However, it has to be assumed that the burden on HCW differs depending on their job. Nurses are especially confronted with Covid-19 since they work in hospitals and are involved in the direct care of people with Covid-19. Due to their workplace, they are also more confronted with the worse consequences of a Covid-19 infection (such as artificial respiration and death) than other professions included in the term HCW such as psychologists. Additionally, Skoda et al. (2020) could already show that nurses showed the most psychological burden of HCW but they did not assess suicidality.

In light of the obvious increased risk for suicidality in HCW, it is important to identify approaches for possible interventions. Therefore, it is necessary to examine the associations between suicidal ideation and psychological risk factors. In particular, the presence of central variables from current ideation-to-action frameworks should be considered. Multiple helpful prevention ideas and interventions have been derived from those theories (Joiner, van Orden, Witte & Rudd, 2009; O'Connor et al., 2017). According to the Integrated Motivational-Volitional Model of Suicidal Behaviour (O'Connor & Kirtley, 2018) and the Interpersonal Theory of Suicide (Joiner, 2005), which have been empirically validated, it is assumed that constructs such as defeat, entrapment, perceived burdensomeness and thwarted belongingness are associated with suicidal ideation. Two other important risk factors are hopelessness (Ribeiro, Huang, Fox & Franklin, 2018) and agitation (Rogers, Ringer & Joiner, 2016). None of these important variables have been examined in HCW and particularly nurses yet. The presence of those risk factors in nurses could indicate a higher risk for suicidal ideation that might entail future suicidal behaviour.

There were two main goals of this study. The first goal was to give an overview of the psychological burden of nurses after 1 year of Covid-19 pandemic. The second goal was to examine the extent of suicidal ideation and behaviour and associations with respective risk factors.

We wanted to replicate previous findings by hypothesizing that (1a) nurses report anxiety, stress, depression and symptoms of burnout in line with Shreffler et al. (2020) and Matsuo et al. (2020). We hypothesized that (1b) those nurses with high resilience report less symptom burden than those with low resilience (O'Dowd et al., 2018). We further hypothesized that (1c) nurses who are directly in contact with people with Covid-19 report more symptom burden than those

who are not (Bohlken, Schömig, Lemke, Pumberger & Riedel-Heller, 2020). Additionally, we hypothesized that (1d) nurses report increased occupational and psychological burden over the past year.

In line with Sullivan and Germain (2019), we also hypothesized that (2a) approximately one third of the nurses report suicidal ideation. We hypothesized that (2b) the direct contact with Covid-19 people, anxiety, stress, depression, symptoms of burnout and defeat, entrapment, perceived burdensomeness and thwarted belongingness, hopelessness and agitation predict suicidal ideation in nurses. And lastly, we hypothesized that (2c) nurses with direct contact to people with Covid-19 differ in suicidal ideation from those without.

3 | METHODS

3.1 | Sample

Participants were eligible for the study if they were at least 18 years old, had sufficient knowledge of the German language and worked in the German health care system. An additional inclusion criterion for this study was that participants had to particularly work as nurses and not in another job of the German health care system. Participants' data were eliminated when participants' age was below 18 and when they did not work as nurses.

The online sample comprised $N = 1,311$ nurses, aged 18–63 years ($M = 30.96$, $SD = 8.48$). A total of 1,270 (96.9%) of the participants were female. A total of 849 (64.8%) participants reported to be single, 415 (31.7%) married, 45 (3.4) divorced and two (0.2%) widowed. A total of 772 (58.9%) reported to have a completed apprenticeship, whereas 46 (3.5%) participants reported a university degree; 332 (25.3%) participants reported a mental health problem in the past; 257 (19.6%) of the participants reported currently experiencing a mental health problem. According to the International Classification of Diseases (ICD-10; Dilling, Mombour, Schmidt & Schulte-Markwort, 2016), the most common self-reported diagnoses were affective disorders ($N = 142$, 56.3%) and anxiety, dissociative, stress-related, somatoform and other nonpsychotic mental disorders ($N = 83$; 32.9%). Out of those currently experiencing a mental health problem, 128 (49.6%) participants were receiving treatment. A total of 200 (15.2%) reported that they had an infection with Covid-19, and 724 (55.2%) worked in direct contact to people with Covid-19. A total of 483 (26.8%) reported that their work conditions had changed due to the Covid-19 pandemic. A total of 420 (32.0%) participants reported that since the Covid-19 pandemic they are working more overtime hours. For more information see Table 1.

3.2 | Procedure

The study followed *Equator Guidelines (STROBE*; see Appendix S2) Participants were recruited between February 2021 and April 2021. Data were collected through an anonymous online survey using the SoSci-server (www.soscisurvey.de). Participants were recruited through advertisement over social media (e.g. Instagram and Facebook).

Additionally, we contacted several hospitals in Germany. Before starting the survey, participants were informed about the purpose of the study, the voluntary nature of participation, data storage and security and gave informed consent prior to participating. Addresses for helplines and contact information for psychotherapy institutions were provided in case participants required psychological help.

3.3 | Ethics

The study was approved by the responsible Ethics Committee of the Institute of Psychology, University of Duisburg-Essen. The study was in accordance with the Declaration of Helsinki (World Medical Association, 2001).

3.4 | Measures

Participants filled out a comprehensive set of self-report questionnaires including the following:

3.4.1 | Burnout Assessment Tool (BAT; Schaufeli, De Witte & Desart, 2019; German version: Glaser & Seubert, 2020)

The work-related version of the BAT was used to assess burnout complaints and to estimate the level of burnout symptoms of the participants. The BAT includes five subscales with a total of 33 items (e.g. "At work I have trouble staying focused"), which have to be answered on a Likert scale ranging from "1 = never" to "5 = always". Items do not refer to a specific time frame. The BAM consists of four core symptoms subscales (exhaustion, mental distance, cognitive impairment and emotional impairment). It includes 23 items that can be interpreted separate or together in a mean sum score resulting in a score between one to five. The BAM has two scales for secondary symptoms (psychological distress and psychosomatic complaints) with 10 items that are always added together to one mean sum score building the secondary distress symptoms resulting in a score between one to five. The authors recommend different cut-offs. Scores greater than 2.58 indicate a risk of burnout and scores >3.01 indicate a very high risk of burnout (Schaufeli et al., 2020). De Beer et al. (2020) showed good internal consistency for the German version of the BAT with Cronbach's $\alpha = 0.94$ for the core symptoms. Internal consistency was good with Cronbach's $\alpha = 0.94$ for the core symptoms and Cronbach's $\alpha = 0.85$ for the secondary symptoms in the present sample.

3.4.2 | Depression, anxiety and stress scales (DASS-21; Lovibond & Lovibond, 1995; German version: Henry & Crawford, 2005)

The DASS assesses depression, anxiety and stress symptoms with 7 items each resulting in a total of 21 items. All items refer to the

TABLE 1 Sociodemographic information

Job	N	%	
Nurse	1246	95.0	
Nurse in training	36	2.7	
Assistant nurse	19	1.4	
Leading nurse	12	0.9	
Working hours			
Full-time	815	62.2	
Part-time	474	36.2	
Infection with Covid-19?			
Yes	200	15.2	
Yes multiple times	1	0.1	
No	1109	84.6	
Direct contact to people with Covid-19?			
Yes	724	55.2	
No	587	44.8	
How much work time do you spend with people with Covid-19?			
80%–100%	152	11.6	
60%–80%	121	9.2	
40%–60%	131	10.0	
20%–40%	136	10.4	
1%–20%	176	13.4	
Other	12	0.9	
Have your work conditions changed due to the Covid-19 pandemic?			
Yes	483	26.8	
No	828	63.2	
Do you have more overtime hours due to the Covid-19 pandemic?			
Yes	420	32.0	
No	891	68.0	
Do you have more on-call duty due to the Covid-19 pandemic?			
Yes	125	9.5	
No	1186	90.5	
Smoking			
Yes	446	34.0	
No	864	65.9	
Alcohol			
Yes	474	36.2	
No	837	63.8	
Mental disorder in the past?			
Yes	332	25.3	
No	979	74.7	
Treatment in the past?			
Yes	264	78.8	N = 335
No	71	21.2	
Current mental disorder?			
Yes	257	19.6	
No	1054	80.4	

(Continues)

TABLE 1 (Continued)

Job	N	%	
Current mental disorder			
F3	142	56.3	N = 252
F4	83	32.9	
F5	4	1.6	
F6	8	3.2	
F7	2	0.8	
"Post-Covid"	4	1.6	
"Burnout"	9	3.6	
Current therapeutic treatment?			
Yes	128	49.6	N = 258
No	130	50.4	
Depression			
Yes	544	41.5	
No	767	58.5	
Burnout			
No risk	620	47.3	
Medium risk	351	26.8	
High risk	340	25.9	
Recent suicidal ideation			
Yes	285	21.7	
No	1026	78.3	
Lifetime suicidal ideation			
Yes	584	44.5	
No	727	55.5	
Recent suicide attempt			
Yes	7	0.5	
No	1304	99.5	
Lifetime suicide attempt			
Yes	165	12.6	
No	1146	87.4	
Resilience			
Yes	421	32.1	
No	890	67.9	
Training "mental health at the workplace"			
Yes	165	12.6	
No	1146	87.4	
Was there an offer for a training?			
Yes	132	11.5	N = 1146
No	1014	88.5	
Who conducted the training?			
Psychologist	85	50.6	N = 168
Nurse	38	22.6	
Physician	15	8.9	
Other	30	17.9	
Number of hours of the training	M	SD	
	9.48	13.53	N = 165

TABLE 1 (Continued)

Subjective occupational burden during..			Subjective psychological burden during…		
	N	%		N	%
First lockdown					
Very strong	181	13.8		210	16.0
Strong	271	20.7		296	22.6
Rather strong	370	28.2		313	23.9
Rather weak	298	22.7		325	24.8
Weak	93	7.1		99	7.6
Very weak	54	4.1		53	4.0
Not burdened	44	3.4		15	1.1
Second lockdown					
Very strong	287	21.9		234	17.8
Strong	419	32.0		401	30.6
Rather strong	379	28.9		403	30.7
Rather weak	163	12.4		201	15.3
Weak	41	3.1		49	3.7
Very weak	8	0.6		16	1.2
Not burdened	14	1.1		7	0.5
Third lockdown					
Very strong	455	34.7		408	31.1
Strong	385	29.4		413	31.5
Rather strong	285	21.7		298	22.7
Rather weak	126	9.6		134	10.2
Weak	30	2.3		31	2.4
Very weak	12	0.9		11	0.8
Not burdened	18	1.4		16	1.2

Note: First lockdown = March 2020; second lockdown = November 2020, third lockdown = December 2020.

last week and are to be answered on a 4-point Likert scale ranging from "0 = did not apply to me at all" to "3 = applied to me very much or most of the time". A sum score indicates psychological distress with higher scores indicating higher levels of psychological distress. A sum score and a separate score for the stress subscale were calculated. High internal consistency was found in previous studies with Cronbach's α = 0.89 for the sum score and Cronbach's α = 0.86 for the stress subscale (Bibi, Lin, Zhang & Margraf, 2020). In the present sample, internal consistency was good with Cronbach's α = 0.94 for the sum score, 0.88 for the stress subscale, 0.82 for the anxiety subscale and 0.91 for the depression subscale.

3.4.3 | Rasch-based depression screening (DESC; Forkmann et al., 2009)

The DESC assesses depressive symptoms with 10 items (e.g. "How often during the last 2 weeks did you feel sad?"). All items refer to the last 2 weeks and are to be answered on a Likert scale ranging from "0 = never" to "4 = always". Total scores range from 0 to 40 with higher scores indicating greater depression. A sum score was calculated for all items. A sum score ≥12 indicates a potential depressive episode. Good validity and good internal consistency was reported for the German version of the DESC in previous studies (Cronbach's α = 0.92–0.93; Forkmann et al., 2010). Internal consistency was also good in the present sample (Cronbach's α = 0.94).

3.4.4 | *The Beck Hopelessness* Scale (BHS; Beck & Steer, 1989; German version: Kliem & Brähler, 2016)

The BHS comprises 20 true-false ("0 = false", "1 = true") items that assess pessimistic and hopeless cognitions (e.g. "I might as well give up because there is nothing I can do to improve the situation") referring to the last week. A sum score was calculated for all 20 items with higher scores indicating higher levels of hopelessness. Validity and reliability of the German version of the BHS have been shown by Sören Kliem, Lohmann, Mößle and Brähler (2018) with Cronbach's α = 0.87. Internal consistency was also good in the present sample (Cronbach's α = 0.89).

3.4.5 | Brief Agitation Measure (BAM; Ribeiro, Bender, Selby, Hames & Joiner, 2011; German version: Höller & Forkmann, 2021)

The BAM is a short self-report questionnaire that consists of three items ("I want to crawl out of my skin", "I feel so stirred up inside I want to scream" and "I feel a lot of emotional turmoil in my gut"). All items refer to the last week and are to be answered on a Likert scale ranging from "1 = I don't agree at all" to "7 = I totally agree". Total scores range from 3 to 21 with higher scores indicating higher feelings of agitation. A sum score for the three items was calculated. Höller and Forkmann (2021) found good validity, significant factor loadings and high internal consistency (Cronbach's α = 0.83) for the German Version. Internal consistency was good in the present sample (Cronbach's α = 0.86).

3.4.6 | Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte & Joiner, 2012; German version: Hallensleben, Spangenberg, Kapusta, Forkmann & Glaesmer, 2016)

The INQ assesses perceived burdensomeness with six items (e.g. "These days I feel like a burden on the people in my life") and thwarted belongingness with nine items (e.g. "These days other people care about me"). All items are answered on a Likert scale ranging from "1 = not at all true for me" to "7 = very true for me" and do not refer to a specific time frame. Sum scores for perceived burdensomeness range from 6 to 42, whereas sum scores for thwarted belongingness range from 9 to 63. Sum scores for both subscales were calculated. Hallensleben et al. (2016) reported good internal consistency for the German version of the INQ (Cronbach's $\alpha_{\text{Perceived burdensomeness}}$ = 0.94, Cronbach's $\alpha_{\text{Thwarted belongingness}}$ = 0.89) and good validity. Internal consistency was good in the present sample (Cronbach's $\alpha_{\text{Perceived burdensomeness}}$ = 0.91, Cronbach's $\alpha_{\text{Thwarted belongingness}}$ = 0.86).

3.4.7 | Short Defeat and Entrapment Scale (SDES; Griffiths et al., 2015; German version: Höller et al., 2020)

The SDES consists of four items assessing feelings of defeat (e.g. "I feel defeated by life") and four items assessing feelings of entrapment (e.g. "I would like to get away from who I am and start again") referring to the last week that have to be answered on a Likert scale ranging from "0 = not at all like me" to "4 = extremely like me". Higher scores indicate stronger perceptions of defeat and entrapment. Because recent research has demonstrated that the scale is best understood in terms of two factors (Forkmann, Teismann, Stenzel, Glaesmer & De Beurs, 2018; Höller et al., 2020), defeat and entrapment were analysed separately in the present study. Sum scores range from 0 to 16 for both scales with higher scores indicating higher feelings of defeat and entrapment. Höller et al. (2020) showed good internal

consistencies for the German version of the defeat scale (Cronbach's α_{Defeat} = 0.85-0.88) and good internal consistencies for the German version of the entrapment scale (Cronbach's $\alpha_{\text{Entrapment}}$ = 0.65-0.83) as well as good validity. Internal consistency was good in the present sample (Cronbach's α_{Defeat} = 0.91, Cronbach's $\alpha_{\text{Entrapment}}$ = 0.88).

3.4.8 | German version of the Suicide Ideation and Behaviour Scale (SSEV; Teismann, Forkmann, Glaesmer, Juckel and Cwik, 2021)

The SSEV consists of seven items with six items assessing the frequency of suicidal ideation and behaviour during the past four weeks (e.g. "During the past 4 weeks, I wished to be dead"), which have to be answered on a Likert scale ranging from "0 = never" to "5 = every day multiple times". Total scores range from 0 to 30. Higher scores indicate more severe suicidal ideation. A sum score for the six items was calculated. Participants were classified as suicidal ideators in the past 4 weeks when they scored greater or equal one in the sum score of the first six items of the SSEV. Additionally, lifetime suicide attempt was assessed with one item ("During the course of my life, I have tried to kill myself (and really wanted to die)") with a dichotomous answer format (yes/no). Participants were classified as lifetime attempters when they answered with "yes". Teismann, Forkmann, Glaesmer, Juckel and Cwik (2021) reported good validity and good internal consistency for the German version of the SSEV (Cronbach's α = 0.77-0.92). Internal consistency was good in the present sample (Cronbach's α = 0.89).

3.4.9 | Resilience Scale (RS-13; Wagnild & Young, 1993), German version: Leppert, Koch, Brähler & Strauß, 2008

The RS-13 assesses resilience with 13 items. The items do not refer to a specific time frame and are to be answered on a 7-point Likert scale ranging from "1 = no, I don't agree" to "7 = yes, I totally agree" (e.g. "When I'm in a difficult situation, I can usually find my way out of it"). A sum score was calculated with higher scores indicating higher resilience. Following, Leppert et al. (2008), participants with scores ≤73 were classified as having "high resilience". In previous research, internal consistency was high with Cronbach's α = 0.90 (Leppert et al., 2008). Internal consistency was good in the present sample (Cronbach's α = 0.92).

3.5 | Statistical analysis

Data analyses were conducted using IBM SPSS 26.0. For descriptive statistics, means, standard deviations and range for all measures were calculated (Hypotheses: 1 a), 2a)). Results of the Shapiro–Wilk tests and Spearman correlations can be found in the supplementary material (Appendix S1). For hypothesis (1b) that nurses with high resilience report less symptom burden than those with low to medium resilience and for hypothesis 1c) that nurses with direct contact to people with

TABLE 2 Descriptive information over all measurements

Measurement	N	M	SD	Min.	Max.
BAT core symptoms	1311	2.62	0.63	1.13	4.78
BAT secondary	1311	2.98	0.69	1.1	4.9
DASS total	1311	23.41	13.64	0	61
DASS stress	1311	9.64	5.04	0	21
DASS anxiety	1311	6.11	4.78	0	21
DASS depression	1311	7.66	5.42	0	21
DESC	1311	10.93	8.33	0	40
BHS	1311	6.95	5.00	0	20
BAM	1311	13.00	4.97	3	21
INQ-TB	1311	28.94	12.58	9	63
INQ-PB	1311	8.99	6.28	6	42
SDES-E	1311	4.80	4.39	0	16
SDES-D	1311	4.73	3.84	0	16
SSEV	1311	0.80	2.38	0	25
RS	1299	65.04	13.88	13	91
Psychological burden 1. Lockdown	1311	4.86	1.47	1	7
Psychological burden 2. Lockdown	1311	5.51	1.19	1	7
Psychological burden 3. Lockdown	1311	5.76	1.26	1	7
Occupational burden 1. Lockdown	1311	4.98	1.40	1	7
Occupational burden 2. Lockdown	1311	5.38	1.17	1	7
Occupational burden 3. Lockdown	1311	5.71	1.23	1	7

Note: BAM, Brief Agitation Measure; BAT, Burnout Assessment Tool; BHS , Beck Hopelessness Scale; DASS, Depression Anxiety Stress Scale; DESC, Rasch-based Depressions screening; First Lockdown, March 2020; INQ, Interpersonal Needs Questionnaire (TB, Thwarted Belongingness subscale; PB, Perceived Burdensomeness subscale); RS, Resilience Scale; SDES, Short Defeat and Entrapment Scale (E, entrapment; D, defeat); Second Lockdown, November 2020, Third Lockdown, December 2020; SSEV, Suicide Ideation and Behaviour Scale.

Covid-19 report more symptom burden than those without, *t*-test for independent samples were conducted. When homoscedasticity was not given, the Welch test was reported. For hypothesis 1d) that nurses report that their occupational and psychological burden has increased over the past year, ANOVAs with repeated measures were conducted.

About hypothesis (2b), a regression analysis was conducted to test whether direct contact with Covid-19 people, anxiety, stress, depression, symptoms of burnout, defeat, entrapment, perceived burdensomeness, thwarted belongingness, hopelessness and agitation predict suicidal ideation. For an unbiased estimation of explained variance of the regression, a second regression analysis was conducted that included only the significant predictors from the first model. For both regression analyses, independency of residuals (Durbon Watson statistic), multicollinearity (variance inflation factor [VIF]) and homoscedasticity was tested. Scatter plots can additionally be found in the supplementary material (Appendix S1). Because homoscedasticity was not given, bootstrapping with 1,000 resamples and bias-corrected 95% confidence intervals was conducted. For examining differences in suicidal ideation between nurses with versus without direct contact to people with Covid-19 as stated in (hypothesis 2c), another *t*-test for independent samples was conducted.

4 | RESULTS

4.1 | Descriptive results

Shapiro–Wilk tests revealed that normality was not given for all measures ($p \leq .05$; see supplementary material for more details; Appendix S1). Information about sociodemographic variables, the subjective occupational and psychological burden during the Covid-19 pandemic can be found in Table 1. Descriptive information of all scales used in this study are depicted in Table 2. For hypothesis 1a), 544 (41.5%) of the participants reached a score higher than the cut-off for a clinical depression in the DESC. A total of 340 (25.9) participants had a medium and 351 (26.8%) a high risk for burnout. For hypothesis 2a), 285 (21.7%) participants reported recent (in the last 4 weeks) suicidal ideation and 7 (0.5%) reported a recent suicide attempt. A total of 584 (44.5%) participants reported lifetime suicidal ideation and 165 (12.6%) reported at least one lifetime suicide attempt. A total of 165 (12.6) participants reported to have taken part in a training for mental health at the workplace (see Table 1).

TABLE 3 Results of group comparisons

Resilience	N	M	SD	t (df)	p	d
BAT core						
Resilient	421	2.32	0.63	−12.26 (760.30)[a]	.000***	−0.89
Not resilient	890	2.76	0.58			
Direct contact to people with Covid-19						
Direct contact	724	2.62	0.62	0.26 (1309)	.799	0.01
No direct contact	587	2.61	0.64			
BAT secondary						
Resilient	421	2.66	0.67	−12.50 (1309)	.000***	−0.69
Not resilient	890	3.14	0.64			
Direct contact to people with Covid-19						
Direct contact	724	2.99	0.67	0.40 (1309)	.689	0.02
No direct contact	587	2.98	0.71			
BHS						
Resilient	421	4.10	3.67	−17.12 (1083.70)[a]	.000***	−1.04
Not resilient	890	8.29	4.98			
Direct contact to people with Covid-19						
Direct contact	724	6.81	4.91	−1.10 (1309)	.273	−0.06
No direct contact	587	7.11	5.11			
DASS depression						
Resilient	421	4.54	4.38	−16.58 (968.98)[a]	.000***	−1.07
Not resilient	890	9.12	5.23			
Direct contact to people with Covid-19						
Direct contact	724	7.55	5.37	−0.79 (1309)	.432	−0.04
No direct contact	587	7.78	5.46			
DASS stress						
Resilient	421	7.15	4.87	−13.10 (1309)	.000***	−0.72
Not resilient	890	10.82	4.68			
Direct contact to people with Covid-19						
Direct contact	724	9.66	4.96	0.13 (1309)	.895	0.01
No direct contact	587	9.62	5.15			
DASS anxiety						
Resilient	421	4.13	3.90	−11.63 (1011.31)[a]	.000***	−0.73
Not resilient	890	7.04	4.88			
Direct contact to people with Covid-19						
Direct contact	724	6.19	4.66	0.68 (1309)	.496	0.04
No direct contact	587	6.01	4.93			
DESC						
Resilient	421	6.08	6.24	−17.42 (1055.07)[a]	.000***	−1.07
Not resilient	890	13.22	8.20			
Direct contact to people with Covid-19						
Direct contact	724	10.79	8.18	−0.69 (1309)	.491	−0.04
No direct contact	587	11.11	8.50			
INQ-PB						
Resilient	421	6.83	3.10	−11.27 (1302.18)[a]	.000***	−0.62
Not resilient	890	10.01	7.10			

TABLE 3 (Continued)

Resilience	N	M	SD	t (df)	p	d
Direct contact to people with Covid-19						
Direct contact	724	8.81	5.96	−1.12 (1187.39)[a]	.262	−0.07
No direct contact	587	9.21	6.67			
INQ-TB						
Resilient	421	22.09	10.21	−15.62 (974.80)[a]	.000***	−1.00
Not resilient	890	32.18	12.27			
Direct contact to people with Covid-19						
Direct contact	724	28.61	12.53	−1.03 (1309)	.303	−0.06
No direct contact	587	29.33	12.61			
BAM						
Resilient	421	10.51	5.18	−12.62 (715.63)[a]	.000***	−0.94
Not resilient	890	14.19	4.40			
Direct contact to people with Covid-19						
Direct contact	724	12.91	4.99	−0.82 (1309)	.413	−0.05
No direct contact	587	13.13	4.94			
SDES-D						
Resilient	421	2.52	2.98	−16.87 (1018.39)[a]	.000***	−1.06
Not resilient	890	5.77	3.76			
Direct contact to people with Covid-19						
Direct contact	724	4.61	3.85	−1.26 (1309)	.207	−0.07
No direct contact	587	4.88	3.82			
SDES-E						
Resilient	421	2.43	3.42	−15.69 (1023.66)[a]	.000***	−0.98
Not resilient	890	5.91	4.35			
Direct contact to people with Covid-19						
Direct contact	724	4.69	4.37	−0.99 (1309)	.324	−0.05
No direct contact	587	4.93	4.40			
SSEV						
Resilient	421	0.17	0.75	−6.63 (1309)	.000***	−0.39
Not resilient	890	1.09	2.79			
Direct contact to people with Covid-19						
Direct contact	724	0.74	2.28	−1.01 (1203.73)[a]	.314	−0.06
No direct contact	587	0.87	2.50			

Note: ***$p \geq .001$; BAM, Brief Agitation Measure; BAT, Burnout Assessment Tool; BHS, Beck Hopelessness Scale; DASS, Depression Anxiety Stress Scale; DESC, Rasch-based Depressions screening; INQ, Interpersonal Needs Questionnaire (TB, Thwarted Belongingness subscale; PB, Perceived Burdensomeness subscale); SDES, Short Defeat and Entrapment Scale (E, entrapment; D, defeat); SSEV, Suicide Ideation and Behaviour Scale.
[a]Welch test.

4.2 | Psychological burden, resilience and the contact to people with Covid-19

Results of all group comparisons can be found in Table 3.

About hypothesis 1b), *t*-tests for independent samples revealed that nurses with high resilience showed significantly less hopelessness, stress, anxiety, depression, perceived burdensomeness, thwarted belongingness, agitation, burnout symptoms, defeat and entrapment than those with low to medium resilience.

For hypothesis 1c) that nurses with direct contact to people with Covid-19 report more symptom burden than those without, a *t*-test for independent samples showed no significant differences.

For hypothesis 1d), ANOVAs with repeated measures showed that the subjective occupational burden significantly differed between the three lockdowns ($F(1.48, 1943.80) = 248.95, p < .001, \eta = 0.160$). Post hoc analyses revealed that the subjective occupational burden was lowest during the first lockdown in March 2020 and highest during the third lockdown in December 2020 (see Table 4). The subjective psychological burden also significantly differed between the three

TABLE 4 Results of differences between the occupational and psychological burden during the past year

	Occupational burden			Psychological burden		
	Mean difference	SE	p	Mean difference	SE	p
First lockdown						
Second lockdown	−0.65	0.05	<.001***	−0.40	0.03	<.001***
Third lockdown	−0.91	0.05	<.001***	−0.73	0.04	<.001***
Second lockdown						
Third lockdown	−0.25	0.03	<.001***	−0.34	0.03	<.001***

Note: First lockdown, March 2020; Second lockdown, November 2020, Third lockdown, December 2020; *** $p \geq .001$.s

TABLE 5 Multiple linear regression for the prediction of suicidal ideation

Predictor	B[a]	SE[a]	beta	t	p	VIF
Model 1						
Contact to people with Covid-19	0.056 [−0.14–0.23]	0.096	0.012	0.577	.564	1.014
BAT core	−0.160 [−0.38–0.08]	0.114	−0.043	−1.401	.161	2.292
BAT secondary	−0.127 [−0.33–0.08]	0.110	−0.037	−1.160	.246	2.523
BHS	−0.011 [−0.04–0.02]	0.015	−0.024	−0.778	.437	2.322
DASS depression	0.005 [−0.04–0.04]	0.019	0.010	0.232	.817	4.890
DASS anxiety	0.025 [−0.01–0.06]	0.016	0.049	1.574	.116	2.457
DASS stress	−0.028 [−0.07–0.01]	0.018	−0.059	−1.541	.124	3.641
DESC	0.096 [0.06–0.13]	0.014	0.336	29.007	.000***	6.092
INQ-PB	0.163 [0.12–0.21]	0.011	0.431	15.428	.000***	1.945
INQ-TB	−0.008 [−0.02–0.00]	0.005	−0.045	−1.586	.113	1.967
BAM	−0.042 [−0.07–(−0.01)]	0.015	−0.089	−2.741	.006**	2.605
SDES-D	0.032 [−0.02–0.08]	0.025	0.051	1.268	.205	4.098
SDES-E	0.002 [−0.05–0.05]	0.021	0.003	0.089	.929	3.709
Lifetime suicide attempt	1.137 [0.67–1.67]	0.154	0.159	7.398	.000***	1.145
Working hours	−0.010 [−0.21–0.21]	0.102	−0.002	−0.097	.923	1.057
Model 2						
DESC	0.090 [.07–0.12]	0.013	0.315	9.385	.000***	2.788
INQ-PB	0.164 [.12–0.21]	0.023	0.433	15.994	.000***	1.817
BAM	−0.061 [−0.084–(−0.039)]	0.011	−0.128	−4.659	.000***	1.874
Lifetime suicide attempt	1.167 [0.68–1.68]	0.255	0.163	7.675	.000***	1.118

Note: BAT, Burnout Assessment Tool; DASS, Depression Anxiety Stress Scale; DESC, Rasch-based Depressions screening; BHS, Beck Hopelessness Scale; BAM, Brief Agitation Measure; INQ, Interpersonal Needs Questionnaire (TB, Thwarted Belongingness subscale; PB, Perceived Burdensomeness subscale); SDES, Short Defeat and Entrapment Scale (E, entrapment; D, defeat); *** $p \geq .001$.
[a]B and SE per bootstrapping with 1,000 samples and bias-corrected 95% confidence intervals [CI].

lockdowns ($F(1.50, 1961.03) = 223.54$, $p < .001$, $\eta = 0.146$). Post hoc analyses revealed that the subjective psychological burden was lowest during the first lockdown in March 2020 and highest during the third lockdown in December 2020 (see Table 4).

4.3 | Suicidal ideation

About hypothesis 2b), the regression model showed no auto-correlations as the value of the Durbin-Watson statistic was 2.023.

There was no multicollinearity (see Table 5). The regression analysis with bootstrapping showed a good model fit with all predictors explaining 48% of variance in suicidal ideation ($R^2 = 0.48$, $R^2_{corr.} = 0.47$). The predictors significantly predicted suicidal ideation ($F(15,1295) = 79.54$, $p < .001$). Depression measured with the DESC, perceived burdensomeness, agitation and lifetime suicide attempt explained variance in recent suicidal ideation (Table 5). For the second regression analysis including only the four predictors depression, perceived burdensomeness, agitation and lifetime suicide attempt, the model showed no auto-correlations as the value of the

Durbin-Watson statistic was 2.023. There was no multicollinearity (see Table 5). The regression analysis with bootstrapping showed a good model fit with all predictors explaining 47% of variance in suicidal ideation ($R^2 = 0.47$, $R^2_{corr} = 0.47$). The four predictors still significantly predicted suicidal ideation ($F(4,1306) = 293.52$, $p < .001$), see Table 5.

For hypothesis 2c), no differences in suicidal ideation were found between nurses with versus without direct contact with people with Covid-19. (see Table 3).

5 | DISCUSSION

Because nurses seem to be a particularly burdened group due to the COVID-19 pandemic (Skoda et al., 2020), this study aimed at examining their psychological burden and possible suicidal ideation. We hypothesized that (1a) nurses report anxiety, stress, depression and symptoms of burnout. We also hypothesized that (1b) nurses with high resilience report less symptom burden than those with low resilience. And we hypothesized that (1c) nurses who are directly in contact with people with COVID-19 report more symptom burden than those who are not. Additionally, we hypothesized that (1d) nurses report that their occupational and psychological burden has increased over the past year.

We also hypothesized that (2a) approximately one third of the nurses report suicidal ideation. About suicidal ideation, we further hypothesized that (2b) the direct contact with people with Covid-19, anxiety, stress, depression, symptoms of burnout and defeat, entrapment, perceived burdensomeness and thwarted belongingness, hopelessness and agitation predict suicidal ideation in nurses. Last but not least, we hypothesized that (2c) nurses in direct contact to people with Covid-19 differ in suicidal ideation from those without.

5.1 | Psychological burden and suicidal ideation

Almost half of the participants reached scores higher than the recommended cut-off score for a clinical depression in the DESC, and more than half had a medium to high risk for burnout. This confirmed hypothesis (1a) and is in line with previous findings (Matsuo et al., 2020; Shreffler et al., 2020). In line with hypothesis (1b) and thereby complementing findings of O'Dowd et al. (2018), nurses with high resilience reported less psychological burden than those with low to medium resilience. Contrary to our hypothesis (1c) and in discordance to findings of Bohlken et al. (2020), nurses with direct contact to people with Covid-19 did not differ in their symptom burden from those without direct contact. Appallingly enough, one fifth of participants reported recent suicidal ideation and almost half reported lifetime suicidal ideation. This is in line with hypothesis (2a) and complements findings of Sullivan and Germain (2019). These prevalence rates are much higher than those reported for the German general population (Forkmann, Brähler, Gauggel &

Glaesmer, 2012). Contrary to our hypothesis (2b), only depression, perceived burdensomeness, agitation and previous lifetime suicide attempt were associated with suicidal ideation. Also contrary to our hypothesis (2c), participants with and without direct contact to people with Covid-19 did not differ in their suicidal ideation.

Given these results, it seems that not the direct contact to people with Covid-19 is decisive for the subjective amount of psychological burden but rather the overall situation, which leads to psychological distress. Moreover, nurses' resilience appears to be negatively related to the extent of the reported distress. This is in line with Yu, Raphael, Mackay, Smith and King (2019) who summarized in their systematic review that nurses' resilience influences the effects of job demands. There are several strategies that influence the building of resilience of nurses besides the common strategies such as work-life balance (Hart, McGowan, Minati & Critchley, 2013). Those strategies such as (emotional) toughness and emotional detachment (Kornhaber & Wilson, 2011) and reconciliation (Hodges, Keeley & Troyan, 2008) make nurses particularly resilient. The overall high extent of nurses' resilience reported in the present data could have been the reason why there were no effects of direct contact with people with Covid-19 on psychological symptom burden.

The high percentage of nurses recently experiencing suicidal ideation is especially alarming when keeping in mind that every 40 seconds a person dies by suicide (WHO, 2014). Surprisingly, not all of the established risk factors for suicidal ideation and behaviour such as symptoms of anxiety (Nock, Hwang, Sampson & Kessler, 2010) were related to suicidal ideation in this sample. But as expected, depression and agitation and previous suicide attempts were related to recent suicidal ideation. This is in line with previous findings (Nock et al., 2010; Rogers et al., 2016; Tidemalm, Elofsson, Stefansson, Waern & Runeson, 2005). Interestingly, the risk factors from the more recently introduced ideation-to-action theories such as the Interpersonal Theory of Suicide (Joiner, 2005) and Integrated Motivational-Volitional Model of Suicidal Behaviour (O'Connor & Kirtley, 2018) were not all significant predictors of suicidal ideation. Only perceived burdensomeness was significantly related to suicidal ideation. Even though we presume that nurses perceive themselves as a supportive group, which could probably reduce feelings of perceived burdensomeness at the work place, one might speculate that family and friends could treat them as "leprous" due to their heightened risk of infecting others. This could lead to isolation in their social surrounding, which in turn could increase the possibility to feel as a burden (i.e. a risk) to their family and friends. Perceived burdensomeness has been found to be a robust predictor of suicidal ideation in previous research (Chu et al., 2017; Ma, Batterham, Calear & Han, 2016).

6 | PRACTICAL IMPLICATIONS

Even though the direct contact to people with Covid-19 was not decisive for the experience of psychological symptom burden, the numbers for depression, burnout and suicidal ideation are

alarmingly high. Additionally, the subjective estimation of occupational and psychological burden has significantly increased over the course of the pandemic in the past nine months. Therefore, one should not rest on the subjective fact that nurses seem to be particularly resilient. High numbers of participants reported substantial psychological symptom burden so interventions about the staffs' mental health at the workplace should be considered. In this study, only 165 (12.6%) participants took part in a training for mental health at the work place, and 1014 (88.5%) even reported that there had never been an offer for such a training at their workplace at all (see Table 1). When calculating the odds ratio post hoc, mental health trainings do not seem to influence whether participants have suicidal ideation, feel depressed or have a medium to high risk for burnout ($OR_{suicidal\ ideation}$ = 1.08 [0.72–1.62]; $OR_{depression}$ = 0.98 [0.71–1.37]; $OR_{burnout}$ = 1.40 [0.94–2.09]). However, it could be possible that those reported mental health trainings have taken place years ago so the effect has long vanished. From this perspective, it appears to be necessary to further examine the influence of mental health trainings at the workplace on nurses' mental health. The mental health of nurses (and probably of all HCW) should not be ignored at their work place because most of their psychological burden is due to working conditions. Targeted preventions and interventions for preserving mental health should be included in the training program of every hospital. Future studies should examine the impact of such interventions on nurses' mental health.

Furthermore, the significance of perceived burdensomeness as a predictor of suicidal ideation in samples of nurses (and HCW) should be taken into account in future studies. It could be important to understand why exactly nurses feel like a burden to others and whether this is due to their workplace conditions, their social surrounding or other factors. Reger, Piccirillo and Buchman-Schmitt (2020) express their concern that the isolation of HCW from their family due to their heightened Covid-19 infection risk could serve as another risk factor for suicidality in the sense of Joiner's postulated thwarted belongingness (Joiner et al., 2005). Moreover, Reger et al. (2020) suggest that nurses and most HCW are repeatedly exposed to death and pain. The exposure to death and pain has been highlighted as potentially increasing the so-called capability for suicide, which has been discussed as a risk factor for suicidal behaviour (Smith & Cukrowicz, 2010). This construct should be examined in future studies.

7 | STRENGTH AND LIMITATIONS

The results of the present study should be appreciated in the light of some strengths and limitations. A major strength of the study was the relatively large sample consisting of only nurses. Even though there have been some studies about the psychological burden of HCW due to Covid-19 (Matsuo et al., 2020; Shreffler et al., 2020), this paper is the first to specifically concentrate on one subgroup that has been shown to be particularly burdened (Bäuerle et al., 2020). Another strength of

this study was the assessment of recent suicidal ideation (in the past 4 weeks) with multiple items specifically assessing suicidal ideation and lifetime suicidal ideation. This could be a reason why our numbers were higher than those reported by Young et al. (2021) and Murata et al. (2021), which are the only two other studies reporting suicidal ideation. Last but not least, this study was the first to assess risk factors for suicidal ideation in a large sample of nurses that have been introduced by more recent theories on the development of suicidal ideation and behaviour.

A major limitation of the study is that the sample was mostly female. However, this is not surprising considering that 80% of nurses in Germany are female (Bundesagentur für Arbeit, 2021). Still, it would be interesting to see whether there are gender differences in the experience of psychological burden and suicidal ideation during the Covid-19 pandemic. Another limitation is that all information was only self-reported. Especially the report about the subjective occupation and psychological burden is assessed retrospectively and might therefore be subject to biases.

8 | CONCLUSIONS

The present study aimed at giving an overview of psychological burden and suicidal ideation in German nurses. It can be summed up that nurses indeed show symptoms of depression, burnout and anxiety. They also report suicidal ideation. Especially in a crisis such as the Covid-19 pandemic, the care for those who care for us should be of top priority. Acknowledgement of their work through clapping hands and depicting them as heroes leaves therefore only a rather stale aftertaste. In the light of the present findings, the supply of training and prevention programs for nurses to maintain or restore mental health should be expanded and evaluated in future studies.

CONFLICT OF INTEREST
None.

AUTHOR CONTRIBUTION
IH and TH concepted and designed the study. IH was responsible for data acquisition and analyses. IH and TH were responsible for the interpretation of data. IH wrote the manuscript. TH supervised drafting the manuscript and revised it.

DATA AVAILABILITY STATEMENT
All relevant data are reported within the paper and are available from the corresponding author upon reasonable request.

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