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Mental Health and Health-Related Quality of Life Among Healthcare Workers in Indonesia During COVID-19 Pandemic

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Complete List of Authors:	<p>Syamlan, Adila T.; Faculty of Medicine Universitas Airlangga Salamah, Sovia; Faculty of Medicine Universitas Airlangga, Department of Public Health and Preventive Medicine; University Medical Centre Groningen, Division of Nephrology, Department of Internal Medicine, University Medical Center Groningen, Groningen, The Netherland.</p> <p>Alkaff, Firas; Faculty of Medicine Universitas Airlangga, Department of Anatomy, Histology, and Pharmacology; University Medical Centre Groningen, Division of Nephrology, Department of Internal Medicine, University Medical Center Groningen, Groningen, The Netherland.</p> <p>Prayudi, Yogi E.; Faculty of Medicine Universitas Airlangga Kamil, Muhammad; Faculty of Medicine Universitas Airlangga, Department of Neurosurgery</p> <p>Irzaldy, Abyan; Karolinska Institute</p> <p>Karimah, Azimatul; Universitas Airlangga Fakultas Kedokteran, Psychiatry; Faculty of Medicine, Universitas Airlangga- dr. Soetomo Academic Medical Center</p> <p>Postma, Maarten; University of Groningen, Pharmacoepidemiology and Pharmacoeconomics</p> <p>Purba, Fredrick; Padjadjaran University, Department of Developmental Psychology</p> <p>Arifin, Bustanul; University of Groningen, Pharmacoepidemiology and Pharmacoeconomics</p>
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3 **1 Mental Health and Health-Related Quality of Life Among Healthcare Workers**
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6 **2 in Indonesia During COVID-19 Pandemic**

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8 **3 Running title:** HCW mental health and HRQoL during pandemic
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13 5 Adila T. Syamlan^{1#}, Sovia Salamah^{2,3##}, Firas F. Alkaff^{3,4*}, Yogi E. Prayudi¹,
14
15 6 Muhammad Kamil⁵, Abyan Irzaldy⁶, Azimatul Karimah⁷, Maarten J. Postma^{4,8,9,10,11},
16
17 7 Fredrick D. Purba¹², Bustanul Arifin^{8,13}
18

19
20
21
22 9 ¹ Faculty of Medicine Universitas Airlangga, Surabaya, Indonesia

23
24 10 ² Department of Public Health and Preventive Medicine, Faculty of Medicine
25
26 11 Universitas Airlangga, Surabaya, Indonesia

27
28
29 12 ³Department of Internal Medicine, University Medical Center Groningen, Groningen,
30
31 13 The Netherlands

32
33 14 ⁴ Division of Pharmacology and Therapy, Department of Anatomy, Histology, and
34
35 15 Pharmacology, Faculty of Medicine Universitas Airlangga, Surabaya, Indonesia

36
37 16 ⁵ Department of Neurosurgery, Faculty of Medicine Universitas Airlangga, Surabaya,
38
39 17 Indonesia

40
41
42 18 ⁶ Karolinska Institute, Solna, Sweden

43
44
45 19 ⁷ Department of Psychiatry, Faculty of Medicine Universitas Airlangga – Dr. Soetomo
46
47 20 General Academic Hospital, Surabaya, Indonesia

48
49 21 ⁸ Department of Health Sciences, University of Groningen, University Medical Center
50
51 22 Groningen, Groningen, The Netherlands

52
53
54 23 ⁹ Institute of Science in Healthy Ageing & healthcaRE (SHARE), University Medical
55
56 24 Center Groningen, University of Groningen, Groningen, The Netherlands
57
58
59
60

1
2
3 10 Unit of Pharmacotherapy, Epidemiology and Economics (PTE2), Department of
4
5 2 Pharmacy, University of Groningen, Groningen, The Netherlands
6

7
8 3 11 Department of Economics, Econometrics and Finance, Faculty of Economics &
9
10 4 Business, University of Groningen, Groningen, The Netherlands
11

12 5 12 Department of Developmental Psychology, Faculty of Psychology, Universitas
13
14 6 Padjadjaran, Bandung, Indonesia
15

16
17 7 13 Pharmacy Faculty, Universitas Hasanuddin, Makassar, Sulawesi Selatan, Indonesia
18

19
20 8

21
22 9 #These authors contribute equally and are shared first author in this work.
23

24 10 *Corresponding authors:

25
26 11 Sovia Salamah
27

28
29 12 Hanzeplein 1, 9713GZ, Groningen, The Netherlands / Jl. Mayjen Prof. Dr. Moestopo
30

31
32 13 No 47, Surabaya, East Java 60132, Indonesia.

33
34 14 Email: s.salamah@umcg.nl / sovia.salamah@fk.unair.ac.id
35

36
37 15 Telephone: +31651114511 / +6282244485448
38

39
40 16

41
42 17 Firas Farisi Alkaff
43

44
45 18 Hanzeplein 1, 9713GZ, Groningen, The Netherlands / Jl. Mayjen Prof. Dr. Moestopo
46

47
48 19 No 47, Surabaya, East Java 60132, Indonesia.

49
50 20 Email: f.f.alkaff@umcg.nl / firmasfarisialkaff@fk.unair.ac.id
51

52
53 21 Telephone: +31616383945 / +6281330101993
54

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56 22

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58 23 **Keywords:** anxiety; COVID-19; depression; Indonesia; Quality of life; stress
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60
24 **Word counts:** 2930 words

1 **Abstract**

2 **Objectives:** Healthcare workers (HCWs) reflect the frontier during COVID-19
3 pandemics. They are more exposed to COVID-19 than other professions. Studies
4 from other countries have shown that HCWs mental health and health-related quality
5 of life (HRQoL) were affected during this pandemic. However, studies about mental
6 health in Indonesia are still scarce, and no study has been done to evaluate the
7 HRQoL among HCWs. Thus, this study aims to explore the mental health status and
8 HRQoL among HCWs in Indonesia.

9 **Design:** Cross sectional study.

10 **Setting:** Open online survey in Indonesia from December 2020 – February 2021.

11 **Participants:** HCWs who worked during COVID-19 pandemic. There were 502
12 respondents that filled the online questionnaire, and 392 respondents were included
13 for the analysis.

14 **Outcomes:** Mental health status that was measured using DASS-21 questionnaire and
15 HRQoL that was measured using SF12v2 questionnaire.

16 **Results:** Prevalence of depression, anxiety, and stress among HCWs that was
17 measured using the DASS-21 questionnaire were 29.4%, 44.9%, and 31.8%,
18 respectively. Using the SF12v2 questionnaire, it was found that 354 (90.3%) HCWs
19 were impaired in the physical component and 156 (39.8%) HCWs with impaired
20 mental component.

21 **Conclusion:** The prevalence of mental health problems among HCWs was high in
22 Indonesia. HRQoL, especially regarding physical component, was affected in most
23 HCWs. Thus, policymakers should pay attention to HCWs' mental health and
24 HRQoL during this COVID-19 pandemic.

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3 **1 Strength and limitations of this study**
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6 2 • This is the first study to evaluate the prevalence of both mental health status
7
8 3 and HRQoL during the COVID-19 pandemic in Indonesia.
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10 4 • The cross-sectional design is considered the most feasible approach both
11
12 5 logically and logistically to obtain representative samples in Indonesia during
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14 6 COVID-19 pandemic.
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16 7 • Temporal relationships between the course of the COVID-19 pandemic and
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18 8 mental health issues could not be identified.
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1 **Background**

2 Coronavirus disease 2019 (COVID-19), caused by new strain of the coronavirus
3 (Systemic Acute Respiratory Syndrome Coronavirus 2; SARS-CoV-2) emerged in
4 December 2019 in Wuhan, Hubei Province of China ¹. This virus is related to
5 SARS-CoV-1 which is known as the cause of SARS back in 2002 and also of 2012's
6 Middle East Respiratory Syndrome (Mers-CoV) ². As of 11 March 2020, WHO
7 characterized COVID-19 as a pandemic ³. To this date, there were over 223 million
8 confirmed cases with over 4 million of deaths, worldwide ⁴. In Indonesia, the first
9 official confirmed case of COVID-19 was on 2 March 2020 ⁵. Afterwards, the number
10 of reported cases in Indonesia has been exponentially increasing. There are currently
11 over 3.9 million confirmed cases with more than 121 thousand deaths ⁶.

12
13 Healthcare workers (HCWs) reflect the frontier during COVID-19 pandemic. They
14 are more exposed to COVID-19 than other professions. Worldwide, the total number
15 of deaths among HCWs are over 155 thousand deaths ⁷. In Indonesia, the total number
16 of deaths among HCWs are 2030 deaths to this date ⁸. Although the reported mortality
17 rate among HCWs is lower than in the general population ^{9,10}, higher levels of mental
18 health problems were found among HCWs ¹¹. Heavy workload and lack of personal
19 protective equipment (PPE) are highlighted as profession-related contributing risk
20 factors ¹².

21
22 A recently published systematic review revealed that the prevalence of depression and
23 anxiety was 24.3% and 25.8% among HCWs ¹³. This prevalence is significantly
24 higher compared to data from WHO on common mental disorders among the global
25 general population where the prevalence was only 4.4% for depression and 3.6% for

1 anxiety. However, studies included in this meta-analysis are predominantly from
2 China, and no study from Indonesia is included ¹³. To this date, studies regarding
3 mental health among HCWs in Indonesia are still scarce and are either focusing on a
4 certain HCW profession or only conducted in one part of the country ¹⁴⁻¹⁸.

5
6 Other than mental health problems, health-related quality of life (HRQoL) in general
7 is also affected during the COVID-19 pandemic ¹⁹. Currently, there are a few
8 published studies that evaluate the HRQoL among HCWs during COVID-19 ²⁰⁻²⁸, but
9 no such study has been done in Indonesia. Thus, this study aims to explore the mental
10 health status and HRQoL among HCWs in Indonesia and to identify the determinant
11 factors.

1 **Methods**

2 Study design

3 This study was a cross-sectional study using an open online questionnaire.
4 SurveyMonkey® was used as the survey platform. Using this survey platform, each
5 respondent can only participate in the questionnaire once because the IP address was
6 used to identify potential duplicate entries from the same respondent. The
7 questionnaire link was distributed through social media, i.e., WhatsApp and Instagram,
8 the most popular and accessible social media platforms in Indonesia.

10 Participants

11 Study participants were HCWs in Indonesia. Inclusion criteria were HCWs who were
12 actively working during the COVID-19 pandemic and agreed to become a respondent
13 in this study. Informed consent was obtained from each respondent. Data collection
14 were conducted from December 2020 until February 2021. The minimum required
15 sample size was calculated using EpiInfo™²⁹. A minimum of 383 samples were
16 needed to get sufficient statistical power, assuming 95% confidence intervals.

18 Ethics

19 This study was performed in line with the principles of the Declaration of Helsinki
20 and approved by relevant Institutional Reviewer Board. The data were kept
21 confidential and no personally identifiable information was reported.

23 Instruments

24 There were a total of 60 questions in the questionnaire, separated into 4 pages. The
25 time needed to complete the questionnaire was 15-20 minutes. All questions were

1 mandatory to answer, and respondents could not moved to the next page if all
2 questions in the previous page had been answered. Before submitting the
3 questionnaire, respondents were able to review and change their answer.

4
5 Background and demographic characteristics of each respondent were obtained
6 utilizing a questionnaire including questions about the respondent's gender, age,
7 marital status, specific job, workplace setting during pandemic, workplace island,
8 working experience as HCWs before COVID-19 pandemic, working hour per week,
9 monthly income, history of COVID-19 infection, comorbidities, availability of
10 personal protective equipment in the workplace, verbal or physical intimidation in the
11 workplace, intimidation from the society outside the workplace, support from the
12 workplace if there is any intimidation, willingness to work during COVID-19
13 pandemic, and reason of working during the COVID-19 pandemic.

14
15 Mental health was measured using Indonesian version of Depression, Anxiety, and
16 Stress scale (DASS-21)³⁰. This questionnaire has been adapted to Bahasa Indonesia
17 previously and showed good validity and reliability.³¹ DASS-21 was a
18 self-administered questionnaire consisting of depression, anxiety, and stress subscales,
19 each composed of 7 items, (21 items in total). Every item could have a score ranging
20 from 0, indicating lack of symptoms in the past week, to 3, indicating presence of
21 symptoms for almost every day in the past week. To calculate the final score of each
22 subscale, the score was multiplied by 2. The minimum final score was 0 and the
23 maximum score was 42 for each subscale. Based on the total score, mental health can
24 be categorized into normal or mild, moderate, severe, or extremely impaired (**table 1**)

25 ³⁰.

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5 2 HRQoL was evaluated using the SF12v2 health survey (12 items, license number:
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7 3 QM054173)³². The use of SF12v2 to evaluate HRQoL was based on the
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9 4 consideration that it can be used in non-patient populations and has fewer question
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11 5 than other HRQoL questionnaires. SF12v2 has been adapted to Bahasa Indonesia
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13 6 previously and showed good validity and reliability.³³ This questionnaire measures
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15 7 both physical and mental health components that are divided into 8 health domain
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17 8 scales, i.e.: physical functioning (PF), role physical (RP), bodily pain (BP), general
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19 9 health (GH), vitality (VT), social functioning (SF), role emotional (RE), and mental
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21 10 health (MH). PF, RP, BP, and GH have the greatest physical component amongst the
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23 11 health domains, whilst VT, SF, RE, and MH have the greatest mental component³².
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25 12 The explanations of each domain scales have been described elsewhere³³. Scoring of
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27 13 SF12v2 was performed using Optum® PRO CoRE software (Optum PROCoRE 1.3
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29 14 Smart Measurement System. Optum Inc., USA). The software will generate the score
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31 15 for each health domain, and also the physical and mental components summary scores.
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33 16 Score of less than 47 indicates significant impairment in the associated health domain
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35 17³².
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19 Data analysis

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47 20 Only completed questionnaire were included in the data analysis. Acquired data were
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49 21 analyzed using IBM SPSS Statistics for Windows version 25.0. (IBM Corp., Armonk,
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51 22 NY, USA). *p* value < .05 was considered statistically significant. One-sample
52
53 23 Kolmogorov-Smirnov test was used to evaluate the data distribution. To discover the
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55 24 determinants of mental health and HRQoL, multiple logistic regression analysis using
56
57 25 backward selection was used. Data analysis was conducted in two phases. In the first
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1 phase, univariate logistic regression was used to identify independent variables that
2 were associated with mental health status and quality of life. Variables with p value
3 $< .1$ were included in the next phase. In the second phase, multivariate logistic
4 regression using backward selection was used. Variables with p value $< .05$ from
5 multivariate regression analysis were considered as the determinants³⁴. During the
6 analysis to find the determinants, mental health variables were re-categorized into
7 dichotomous (normal or not) variables with the cut-off as follow: 9 for depression, 6
8 for anxiety, and 10 for stress³⁰.

10 Patient and public involvement

11 No patient involved.

1 **Results**

2 There were 502 HCWs that accessed the online questionnaire, and 392 of them were
3 included for the analysis. The total response rate for this study was 78% (**Figure 1**).

4 The detailed sociodemographic characteristic of the respondents is summarized in
5 **Table 2**.

6 Mental Health

7 The depression, anxiety, and stress subscales median scores were 6 [IQR: 2 – 10], 6 [2
8 – 12], and 10 [4 – 10], respectively. There were 119 (29.4%) respondents that had
9 depression, 176 (44.9%) that had anxiety, and 164 (31.8%) that had stress (**Figure 2**).
10 Stratified by gender, the prevalence among male HCWs were 27 (21.3%), 42 (33.1%),
11 and 45 (35.4%), and 92 (34.7%), 134 (50.6%), and 119 (44.9%) for females, for
12 depression, anxiety, and stress, respectively (**Supplementary Figure 1 and 2**).

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15 To find the determinants of depression among HCWs, multivariate logistic regression
16 analysis was performed by including all variables that had a *p* value of < .1 in the
17 univariate analysis (**Supplementary table 1**). Female HCWs, HCWs that did not
18 receive support from the workplace when intimidated by the patients' or patient
19 family members due to COVID-19-related issue, and HCWs that worked during the
20 pandemic because they were bound to working contracts were more likely to be
21 depressed. Meanwhile, HCWs with working experience of more than 3 years in the
22 healthcare facilities were less likely to be depressed (**Table 3**).

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24 To find the determinants of anxiety among HCWs, multivariate logistic regression
25 analysis was performed by including all variables that had a *p* value of < .1 in the
26 univariate analysis (**Supplementary table 2**). Female HCWs and HCWs that did not

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3 1 receive support from the workplace when intimidated by the patients' or patient
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5 2 family members were more likely to be anxious, and HCWs who were not actually
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7 3 willing to work during COVID-19 pandemic were more likely to be anxious.
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9 4 Meanwhile, older HCWs and HCWs who worked at other than COVID-19 hospital or
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11 5 referral hospital for COVID-19 were less likely to be anxious (**Table 4**).
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17 7 To find the determinants of stress among HCWs, multivariate logistic regression
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19 8 analysis was performed by including all variables that had a *p* value of < .1 in the
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21 9 univariate analysis (**Supplementary Table 3**). HCWs that did not receive support
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23 10 from the workplace when intimidated by the patients' or patient family members,
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25 11 HCWs who are not actually willing to work during COVID-19 pandemic, and HCWs
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27 12 that worked during pandemic because of financial matters or because they were bound
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29 13 to working contract were more likely to be stressed. Meanwhile, older HCWs were
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31 14 less likely to be stressed (**Table 5**).
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38 HRQoL

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40 17 The median [IQR] score of physical component summary was 41.80 [39.15 – 44.14],
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42 18 and the median [IQR] score of mental component summary was 49.81 [43.25 – 55.95].
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44 19 The detailed score of physical and mental components and each health domain scale
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46 20 are summarized in **Figure 3**. There were 354 (90.3%) HCWs that had an impairment
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48 21 in the physical component and 156 (39.8%) HCWs that had an impairment in the
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50 22 mental component (**Figure 4**).
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56 24 To find the determinants of impaired physical and mental health components among
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58 25 HCWs, multivariate logistic regression analysis was performed by including all
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- 1 variables that had a p value of $< .1$ in the univariate analysis (**Supplementary table 4**
- 2 **and 5**). However, no determinant was found in the multivariate analysis.

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1 **Discussion**

2 The results of this study provides additional information on the mental health
3 conditions and HRQoL among Indonesian HCWs. This study also identified several
4 significant determinants of stress, anxiety, and depression among HCWs. This may
5 also act as a guide for relevant actions that can be taken by relevant authorities to
6 provide preventive efforts on mental health matters.

7 8 Mental Health

9 The prevalence of depression, anxiety, and stress observed in this study was 29.4%,
10 44.9%, and 31.8%, respectively. The prevalence of depression and anxiety in our
11 study was higher than the estimate from recent meta-analysis study among HCWs
12 which yielded pooled prevalence estimate of 24.3% (95% CI, 18.2 – 31.6%) for
13 depression and 25.8% (95% CI, 20.5 – 31.9%) for anxiety ¹³, whilst the prevalence for
14 stress in our study was lower than the result yielded from recent meta-analysis study
15 with the pooled estimated stress prevalence of 45% (95% CI, 24.3 – 67.5%) ¹³. The
16 discrepancy might be due to the time difference in the study period, where the
17 meta-analysis study included studies that were published until June 2020, whilst our
18 study was conducted in a later period. The discrepancy might also be explained by the
19 disparity of COVID-19 pandemic impact on mental health status between countries,
20 since the number of cases and deaths, the impact on healthcare systems, and
21 government policies differ. Also, the questionnaire used in this study was DASS-21,
22 while in other studies other questionnaires were applied. Notably, in the recent
23 meta-analysis study ¹³, the DASS-21 questionnaire was only used in 7 out of 29
24 studies.

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3 1 There have been a few published studies that also evaluates the mental health status
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5 2 among HCWs in Indonesia ¹⁴⁻¹⁸, and some use the same questionnaire as our study.
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8 3 The prevalence in our study was higher than in previous studies with the same
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10 4 questionnaire, where the prevalence was ranging from 2.4 – 13.2% for depression,
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12 5 6.8% - 20.6% for anxiety, and 5.7 – 11% ^{14, 15, 17}. The discrepancy between our study
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14 6 and the previous studies might lies in the time period difference for the data collection,
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16 7 where in our study it was conducted in the later time of the pandemic while in the
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18 8 previous studies it was conducted in the beginning of the pandemic. We argue that in
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20 9 the beginning of the pandemic, the mental health status is not as affected as in the
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22 10 later periods. Also, previous studies only focus on a specific types of HCWs ^{15, 17},
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24 11 specific provinces in Indonesia ¹⁷, or the majority of the respondents were clerical
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26 12 staff/executive instead of physician or nurses as the frontline HCWs ¹⁴. Despite the
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28 13 prevalence discrepancy between our study and previous studies in Indonesia, the
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30 14 prevalence difference between depression, anxiety, and stress showed the same
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32 15 pattern where the prevalence of anxiety was the highest.
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40 17 We found that the prevalence of depression, anxiety, and stress were higher in female
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42 18 HCWs compared to male HCWs (**Supplementary figure 1 and 2**). Moreover, we
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44 19 also found that female sex is an independent risk factor for depression and anxiety
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46 20 (**table 3 and 4**). Similarly, other studies also showed that there are gender differences
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48 21 in mental health problem among HCWs during COVID-19 pandemic, where it is
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50 22 more prevalent in female HCWs ^{35, 36}. This can be explained by the fact that females
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52 23 in general have higher rates of mood and anxiety disorders due to higher mean level
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54 24 of internalizing ³⁷, and also potentially by the influence of sex hormones ³⁸.
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3 1 A recent study in Indonesia among nurses who worked during the COVID-19
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5 2 pandemic showed that rejection by the family and/or neighbors is a determinant factor
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7 3 for depression, anxiety, and stress ¹⁵. We also found similar finding, where
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9 4 intimidation from the society is a risk factor for depression, anxiety, and stress in the
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11 5 univariate analysis (**supplementary table 1, 2, 3**). However, this variable lost its
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13 6 significance in the multivariate analysis. Meanwhile, workplace support related to
14
15 7 potential intimidation was shown to lower the risk of depression, anxiety, and stress.
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17 8 This indicates that workplace environment plays a more substantial role in mental
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19 9 health. Havaei et al (2021) found that negative rating of workplace conditions such as
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21 10 workplace relations, workplace safety, organizational support and preparedness were
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23 11 associated with adverse mental health outcomes during COVID-19 pandemic ³⁹. A
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25 12 narrative review focusing on mental health of HCWs during the COVID-19 pandemic
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27 13 also stated that intrinsic high-risk professional, organizational factors such as lack of
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29 14 workplace support, and vulnerable workers such as frontline HCWs are at higher
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31 15 likelihood to experience a mental issue during pandemic ⁴⁰.
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40 HRQoL

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42 18 There are many established HRQoL questionnaires that can be used to this date. In
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44 19 previously published studies about HRQoL among HCWs during the COVID-19
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46 20 pandemic, several HRQoL questionnaires were used, i.e. WHOQOL-BREF ^{20, 24, 26},
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48 21 EQ-5D ^{27, 28}, SF36 ²¹, and SF12 ²⁵. Since we used SF12v2 to evaluate HRQoL in this
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50 22 study, we argue that it is better to compare our finding with previous studies that use
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52 23 either SF12 or SF36. The physical component and mental component summary scores
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54 24 in previous studies were higher compared to our study ^{21, 25}, indicating that the
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56 25 HRQoL in previous studies was better. We also found that 39.8% HCWs had an
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3 1 impairment in the mental component, and 90.3% of HCWs had an impairment in the
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5 2 physical component. However, we cannot compare the prevalence of our finding with
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7 3 previous studies since previous studies did not present the prevalence of HCWs with
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9 4 impaired physical and mental health components ^{21, 25}.

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14 6 Worse HRQoL in this study might be caused by the time difference of study period,
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16 7 where previous studies were conducted in the beginning of the pandemic and our
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18 8 study was conducted later ^{21, 25}. Similar to the mental health status, we would argue
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20 9 that the HRQoL of HCWs in the beginning of the pandemic was not as affected as in
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22 10 the later period. Compared to the beginning of the pandemic, the number of
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24 11 COVID-19 patients in the later period were significantly higher ⁶. Increasing number
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26 12 of patients will increase the workload of the HCWs, even if the working hour is not
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28 13 prolonged. Over time, increasing workload will lead to physical exhaustion of the
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30 14 HCWs. Other than that, the number of deaths of COVID-19 patients also increasing
31
32 15 over time. Constant exposure of dealing with death and dying, in addition to the high
33
34 16 workload, are considered as occupational stressors ⁴¹.

1 **Conclusion**

2 The prevalence of depression, anxiety, and stress among HCWs in Indonesia during
3 the COVID-19 pandemic were 29.4%, 44.9%, and 31.8%, respectively. Our study
4 suggests that workplace environment is where interventions to prevent and mitigate
5 mental issues are most needed. Other than that, more attention is needed for female
6 HCWs, since female HCWs seem at higher risk of developing mental health issues.
7 Notably, HRQoL, especially regarding physical component, was also affected. Thus,
8 we recommend policymakers to pay extra attention to HCWs' mental health and
9 HRQoL during COVID-19 pandemic. Future studies with larger sample sizes and also
10 periodical evaluation may further contribute to adequately monitor the mental health
11 and HRQoL of the HCWs throughout this pandemic and design corresponding
12 support and interventions.

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15 **Contributions:** ATS, SS, FFA, MK, MJP, FDP, and BA were involved in the
16 conceptualization and the design of the study. ATS, SS, FFA, YEP, MK, AK, and BA
17 carried out the data collection. SS, FFA, and AI conducted the analysis, and FDP, and
18 BA were the main consultants in the data interpretation. ATS, SS, FFA, and AI
19 drafted the manuscript, and all the authors revised it. All the authors read and
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24 pharmaceutical companies, all fully unrelated to this research. Other authors have no
25 conflict of interest to declare.

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3 **1 Figure legends**
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5 **2 Figure 1.** Flow chart of the study population selection.
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7 **3 Figure 2.** Prevalence of depression, anxiety, and stress among healthcare workers in
8 each severity level according to DASS-21 score.
9

10 **4 Figure 3.** The median [IQR] norm-based T-score of summary scores and each health
11 domain scale.
12

13 **5 Figure 4.** The prevalence of impairment in physical and mental components in
14 general and each health domain scale among HCWs. PCS, Physical Component
15 Summary; MCS, Mental Component Summary; PF, Physical-Function; RP,
16 Role-Physical; BP, Bodily Pain; GH, General Health; VT, Vitality; SF, Social
17 Functioning; RE, Role-Emotional; MH, Mental Health
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30 **13 Supplementary figure legends**
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32 **14 Supplementary figure 1.** Prevalence of depression, anxiety, and stress among male
33 healthcare workers in each severity level according to DASS-21 score.
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36 **15 Supplementary figure 2.** Prevalence of depression, anxiety, and stress among female
37 healthcare workers in each severity level according to DASS-21 score.
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Tables**Table 1.** Cut-off score for mental health status categorization

	Normal	Mild	Moderate	Severe	Extremely impaired
Depression	0 – 9	10 – 12	13 – 20	21 – 27	28 – 42
Anxiety	0 – 6	7 – 9	10 – 14	15 – 19	20 – 42
Stress	0 – 10	11 – 18	19 – 26	27 – 34	25 – 42

Table 2. Sociodemographic characteristic of the respondents

Variables	N = 392
Age in years, mean (SD)	33.5 (9.4)
Sex, n (%)	
Male	127 (32.4)
Female	265 (67.6)
Marital status, n (%)	
Single	146 (37.2)
Married	128 (32.7)
Married with children	118 (30.1)
Job, n (%)	
Nurse	52 (13.3)
Midwife	19 (4.9)
Doctor	227 (57.9)
Dentist	26 (6.6)
Pharmacist	20 (5.1)
Others	48 (12.2)
Workplace setting, n (%)	
COVID-19 Hospital or COVID-19 referral hospital	160 (40.8)
Non-COVID-19 hospital	76 (19.4)
Primary care facilities	138 (35.2)
Other healthcare facilities	18 (4.6)
Workplace island, n (%)	
Java Island	296 (75.5)
Outside Java Island	96 (24.5)
Working period during COVID-19 pandemic, n (%)	
Since the beginning of pandemic (March-April 2020)	310 (79.1)
In the middle of pandemic (May 2020 or later)	82 (20.9)
Working experience before COVID-19 pandemic, n (%)	
Not working	36 (9.2)
<1 year	67 (17.1)
1-3 years	92 (23.5)
>3 years	197 (50.2)
Income during COVID-19 pandemic, n (%)	
<3 million rupiah / month	77 (19.7)
3-5 million rupiah / month	107 (27.3)
5-10 million rupiah / month	111 (28.3)
10-20 million rupiah / month	51 (13.0)
>20 million rupiah / month	46 (11.7)
Working hour per week during COVID-19 pandemic, n (%)	
<40 hours / week	180 (45.9)
40 – 60 hours / week	181 (46.2)
>60 hours / week	31 (7.9)
History of COVID-19 infection, n (%)	
Yes	57 (14.5)
No	335 (85.5)
History of COVID-19 infection in the family, n (%)	
Yes	118 (30.1)
No	274 (69.9)
Any family member died because of COVID-19, n (%)	

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3	Yes	25 (6.4)
4	No	367 (93.6)
5	Having one or more comorbidities, n (%)	
6	Yes	276 (70.4)
7	No	116 (29.6)
8		
9	PPE availability in the workplace, n (%)	
10	Not available or not according to standard	134 (34.2)
11	Available and according to standard	258 (65.8)
12	Routine free COVID-19 PCR swab test for HCWs, n (%)	
13	No	177 (45.1)
14	Only if there is any symptoms	194 (49.5)
15	Routinely 1-3 times a month	20 (5.1)
16	At least once a week	1 (0.3)
17		
18	Verbal intimidation in the workplace, n (%)	
19	Never	243 (62.0)
20	Less than once a month	84 (21.4)
21	1-4 times a month	49 (12.5)
22	More than once a week	16 (4.1)
23		
24	Physical intimidation in the workplace, n (%)	
25	Never	379 (96.7)
26	Less than once a month	8 (2.0)
27	1-4 times a month	3 (0.8)
28	More than once a week	2 (0.5)
29		
30	Intimidation from the society outside workplace, n (%)	
31	Never	285 (72.7)
32	Less than once a month	77 (19.7)
33	1-4 times a month	26 (6.6)
34	More than once a week	4 (1.0)
35		
36	Workplace support from intimidation, n (%)	
37	Yes	322 (82.1)
38	No	70 (17.9)
39		
40	Has government given sufficient attention to the healthcare sector during COVID-19? n (%)	
41	No	98 (25.0)
42	Yes, but not sufficient	273 (69.6)
43	Yes	21 (5.4)
44		
45	How workplace treat HCWs with COVID-19 symptoms, n (%)	
46	Do not know	
47	The HCW is not allowed to come to work until the test result came	21 (5.3)
48	out	306 (78.1)
49	The HCW still come to work until the test result came out	65 (16.6)
50		
51	HCWs salary if they are infected with COVID-19, n (%)	
52	Do not know	136 (34.7)
53	Reduced by the number of the absence	67 (17.1)
54	Full payment	189 (48.2)
55		
56	Willingness to work during COVID-19 pandemic, n (%)	
57	Yes	330 (84.2)
58	No	62 (15.8)
59		
60	Reason for HCWs to work during COVID-19 pandemic, n (%)	
	Feeling responsible	285 (72.7)

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3	Financial matters	88 (22.4)
4	Already bound to work contract	36 (9.2)
5	<hr/>	
6	COVID-19, Coronavirus disease 2019; HCWs, healthcare workers; PPE, personal	
7	protective equipment.	
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Table 3. Determinants for depression in HCWs

Variables	<i>p</i> value	aOR	95%CI
Sex			
Male (ref)	-	-	-
Female	.033	1.777	1.048 – 3.013
Working experience before COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.801	0.893	0.369 – 2.162
1-3 years	.560	1.283	0.554 – 2.969
>3 years	.008	0.333	0.147 – 0.753
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.002	2.493	1.383 – 4.494
Work during COVID-19 pandemic because already bound to working contract			
Yes	.015	2.578	1.198 – 5.547
No (ref)	-	-	-

p value < .05 was considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019.

Table 4. Determinants for anxiety in HCWs

Variables	<i>p</i> value	aOR	95%CI
Age	< .001	0.938	0.913 – 0.964
Sex			
Male (ref)	-	-	-
Female	.010	1.874	1.163 – 3.021
Workplace setting			
COVID-19 Hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.001	0.356	0.189 – 0.669
Primary care or other healthcare facilities	.029	0.574	0.348 – 0.946
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.017	2.099	1.143 – 3.854
Willingness to work during COVID-19 pandemic			
Yes (ref)	-	-	-
No	.016	2.154	1.157 – 4.012

p value < .05 was considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019.

Table 5. Determinants for stress in HCWs

Variables	<i>p</i> value	aOR	95%CI
Age	.001	0.956	0.930 – 0.983
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.014	2.043	1.154 – 3.616
Willingness to work during COVID-19 pandemic			
Yes (ref)	-	-	-
No	.014	2.169	1.168 – 4.027
Work during COVID-19 pandemic because of financial matters			
Yes	.014	3.575	1.293 – 9.885
No (ref)	-	-	-
Work during COVID-19 pandemic because already bound to working contract			
Yes	.014	4.352	1.340 – 14.137
No (ref)	-	-	-

p value < .05 was considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019.

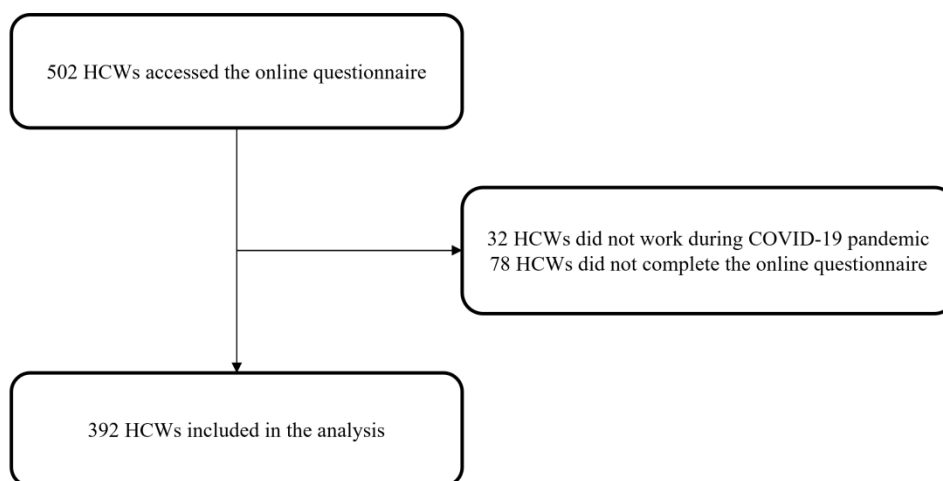


Figure 1

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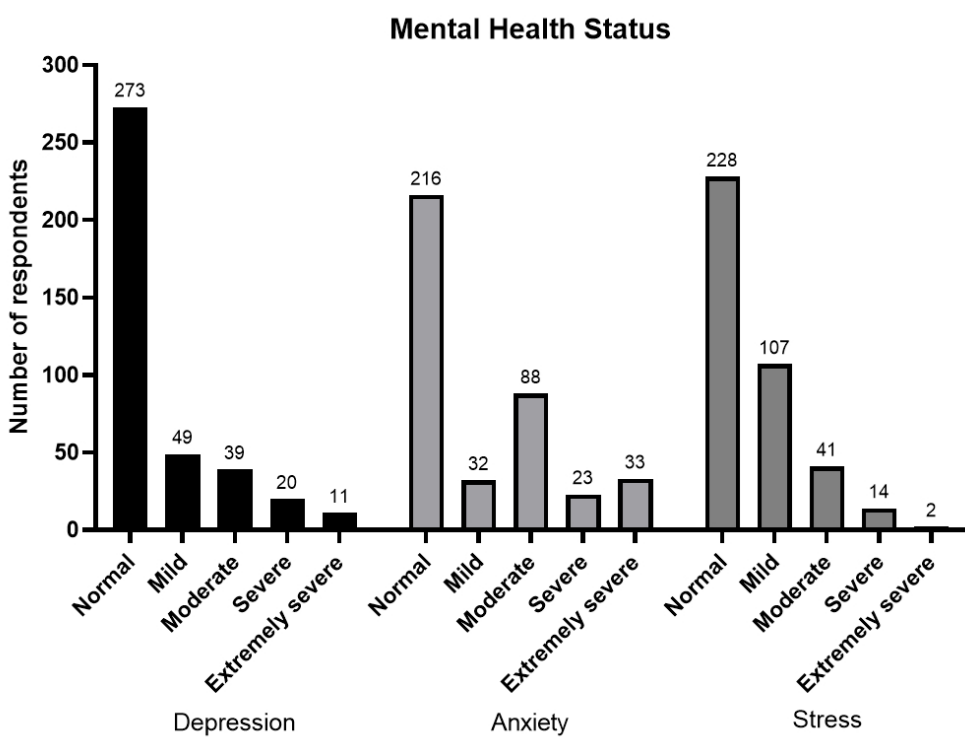


Figure 2

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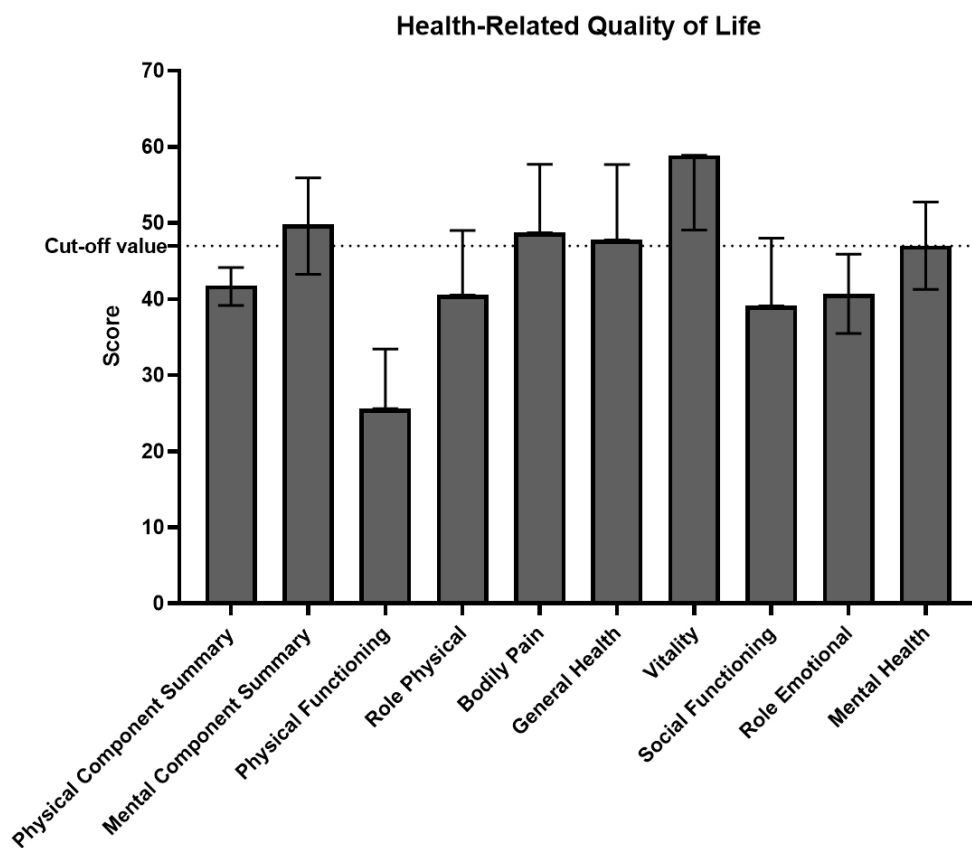


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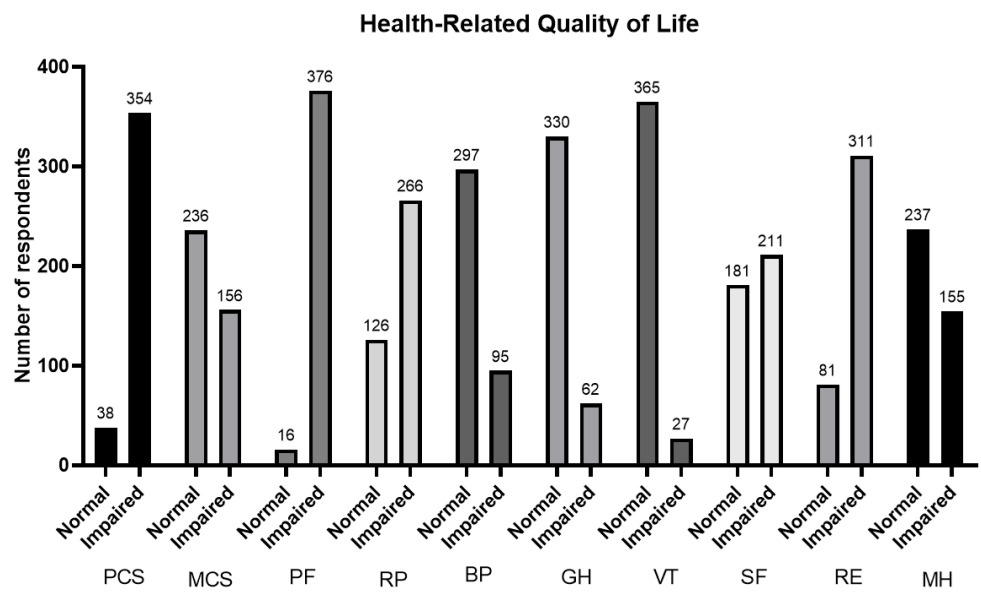
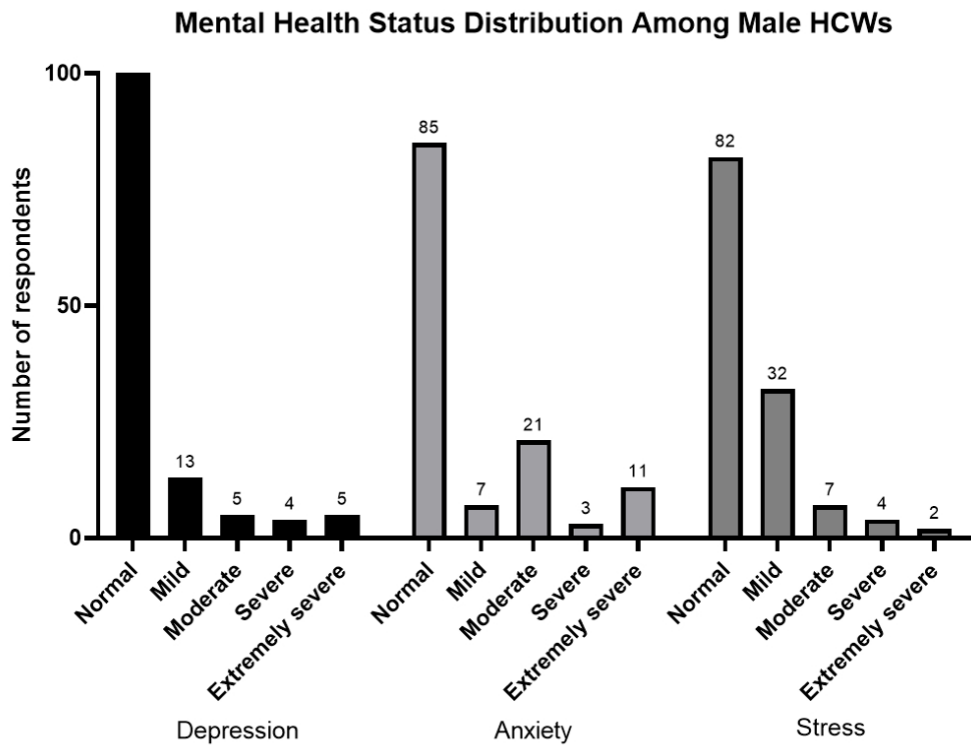


Figure 4

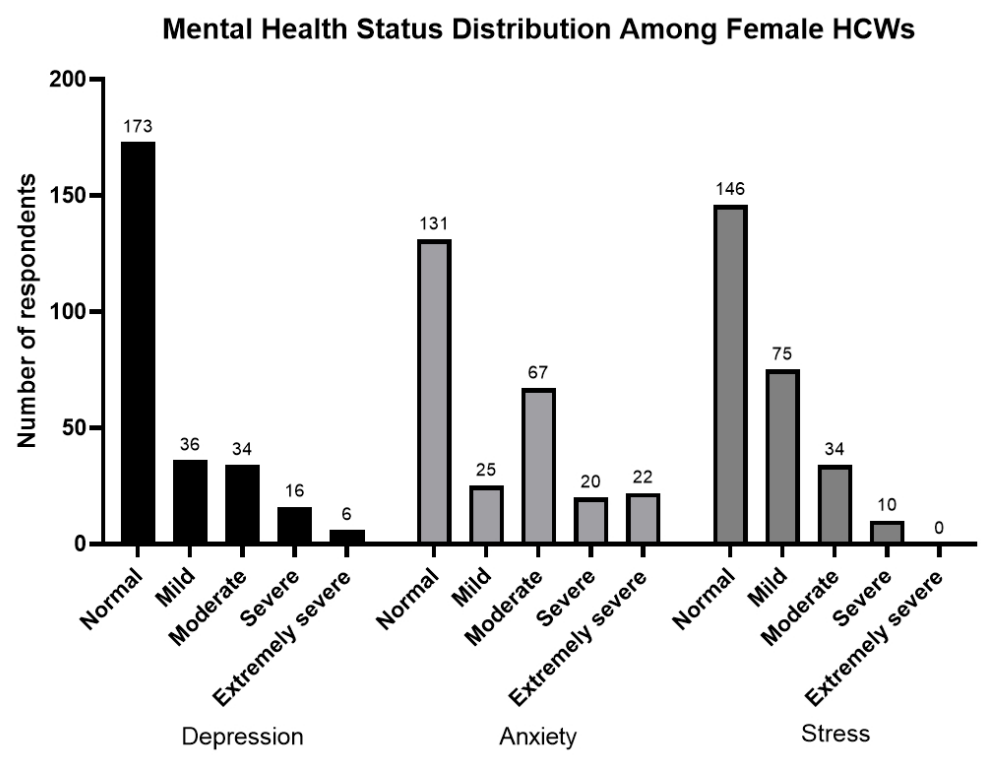
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Supplementary Table 1. Univariate analysis of determinants for depression among HCWs

Variables	p value	COR	95%CI
Age	.018	0.941	0.913 – 0.969
Sex			
Male (ref)	-	-	-
Female	.007	1.970	1.201 – 3.230
Marital status			
Single (ref)	-	-	-
Married	.013	0.524	0.315 – 0.873
Married with children	< .001	0.337	0.192 – 0.592
Job			
Doctor (ref)	-	-	-
Nurse	.262	0.676	0.340 – 1.341
Midwife	.133	0.380	0.107 – 1.345
Dentist	.872	1.073	0.457 – 2.520
Pharmacist	.464	0.676	0.237 – 1.929
Others	.603	0.835	0.422 – 1.649
Workplace setting			
COVID-19 Hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.156	0.645	0.353 – 1.181
Primary care or other healthcare facilities	.096	0.666	0.412 – 1.075
Residence island			
Java Island (ref)	-	-	-
Outside Java Island	.118	0.656	0.387 – 1.113
Working period during COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.268	1.338	0.799 – 2.238
Working experience before COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.666	0.833	0.364 – 1.906
1-3 years	.604	1.229	0.564 – 2.677
>3 years	.003	0.313	0.147 – 0.666
Income during COVID-19 pandemic			
<3 million rupiah / month (ref)	-	-	-
3-5 million rupiah / month	.322	1.377	0.731 – 2.594
5-10 million rupiah / month	.413	1.301	0.692 – 2.446
10-20 million rupiah / month	.918	1.042	0.478 – 2.271
>20 million rupiah / month	.052	0.375	0.139 – 1.010
Working hour per week during COVID-19 pandemic			
<40 hours / week (ref)	-	-	-
40 – 60 hours / week	.114	1.444	0.916 – 2.279

>60 hours per week	.064	2.104	0.957 – 4.627
History of COVID-19 infection			
Yes	.925	0.971	0.526 – 1.793
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.447	1.197	0.753 – 1.903
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.130	1.884	0.829 – 4.282
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.363	1.241	0.780 – 1.975
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.032	0.613	0.393 – 0.958
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.001	2.102	1.355 – 3.263
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.974	1.020	0.308 – 3.381
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.005	1.956	1.226 – 3.119
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.013	1.963	1.153 – 3.345
Willingness to work during COVID-19 pandemic			
Yes	-	-	-
No (ref)	.003	2.343	1.346 – 4.080
Reason for HCW to work during COVID-19 pandemic because feeling responsible			
Yes	< .001	0.364	0.228 – 0.581
No (ref)	-	-	-
Reason to work during COVID-19 pandemic because of financial matters			
Yes	.099	1.521	0.924 – 2.504
No (ref)	-	-	-
Reason to work during COVID-19			

pandemic because already bound to working contract			
Yes	.001	3.245	1.616 – 6.515
No (ref)	-	-	-

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Supplementary Table 2. Univariate analysis of determinants for anxiety among HCWs

Variables	p value	COR	95%CI
Age	< .001	0.942	0.919 – 0.966
Sex			
Male (ref)	-	-	-
Female	.001	2.070	1.332 – 3.218
Marital status			
Single (ref)	-	-	-
Married	.003	0.484	0.298 – 0.785
Married with children	.004	0.481	0.293 – 0.789
Job			
Doctor (ref)	-	-	-
Nurse	.092	0.583	0.311 – 1.039
Midwife	.186	0.509	0.187 – 1.385
Dentist	.545	1.285	0.570 – 2.901
Pharmacist	.516	0.735	0.289 – 1.865
Others	.826	0.932	0.499 – 1.741
Workplace setting			
COVID-19 Hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.024	0.524	0.299 – 0.920
Primary care or other healthcare facilities	.140	0.716	0.460 – 1.116
Residence island			
Java Island (ref)	-	-	-
Outside Java Island	.464	0.840	0.527 – 1.339
Working period during COVID-19 pandemic			
Since the beginning of pandemic (March-April 2020) (ref)	-	-	-
In the middle of pandemic (April 2020 or later)	.197	1.379	0.847 – 2.246
Working experience before COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.147	0.545	0.240 – 1.238
1-3 years	.792	1.111	0.507 – 2.433
>3 years	.012	0.394	0.191 – 0.812
Income during COVID-19 pandemic			
<3 million rupiah / month (ref)	-	-	-
3-5 million rupiah / month	.674	1.135	0.631 – 2.041
5-10 million rupiah / month	.851	1.058	0.590 – 1.895
10-20 million rupiah / month	.633	0.840	0.411 – 1.718
>20 million rupiah / month	.246	0.640	0.301 – 1.361
Working hour per week during COVID-19 pandemic			

<40 hours / week (ref)	-	-	-
40 – 60 hours / week	.263	1.268	0.836 – 1.923
>60 hours per week	.157	1.739	0.808 – 3.746
History of COVID-19 infection			
Yes	.206	1.438	0.819 – 2.526
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.996	1.001	0.649 – 1.545
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.462	1.356	0.602 – 3.051
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.670	1.099	0.711 – 1.699
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.036	0.638	0.419 – 0.970
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.002	1.940	1.283 – 2.933
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.926	1.054	0.348 – 3.195
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.024	1.675	1.071 – 2.620
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.003	2.263	1.332 – 3.845
Willingness to work during COVID-19 pandemic			
Yes	-	-	-
No (ref)	< .001	2.820	1.55 – 4.986
Reason for HCW to work during COVID-19 pandemic because feeling responsible			
Yes	.001	0.459	0.292 – 0.721
No (ref)	-	-	-
work during COVID-19 pandemic because of financial matters			
Yes	.040	1.650	1.024 – 2.660

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No (ref)	-	-	-
work during COVID-19 pandemic because already bound to working contract			
Yes	.093	1.815	1.906 – 3.637
No (ref)	-	-	-

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Supplementary Table 3. Univariate analysis of determinants for stress among HCWs

Variables	p value	COR	95%CI
Age	< .001	0.955	0.932 – 0.978
Sex			
Male (ref)	-	-	-
Female	.076	1.485	0.960 – 2.299
Marital status			
Single (ref)	-	-	-
Married	.020	0.561	0.345 – 0.911
Married with children	.055	0.616	0.376 – 1.009
Job			
Doctor (ref)	-	-	-
Nurse	.311	0.722	0.385 – 1.355
Midwife	.644	0.796	0.302 – 2.097
Dentist	.706	1.170	0.518 – 2.642
Pharmacist	.506	1.365	0.546 – 3.408
Others	.853	1.061	0.566 – 1.989
Workplace setting			
COVID-19 Hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.321	0.754	0.432 – 1.317
Primary care or other healthcare facilities	.407	0.828	0.530 – 1.294
Residence island			
Java Island (ref)	-	-	-
Outside Java Island	.607	0.884	0.553 – 1.414
Working period during COVID-19 pandemic			
Since the beginning of pandemic (March-April 2020) (ref)	-	-	-
In the middle of pandemic (April 2020 or later)	.742	0.920	0.561 – 1.511
Working experience before COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.261	0.624	0.274 – 1.421
1-3 years	.403	1.390	0.642 – 3.011
>3 years	.228	0.644	0.315 – 1.317
Income during COVID-19 pandemic			
<3 million rupiah / month (ref)	-	-	-
3-5 million rupiah / month	.100	1.655	0.909 – 3.013
5-10 million rupiah / month	.236	1.434	0.790 – 2.604
10-20 million rupiah / month	.584	1.225	0.593 – 2.531
>20 million rupiah / month	.357	0.89	0.312 – 1.522
Working hour per week during COVID-19 pandemic			

<40 hours / week (ref)	-	-	-
40 – 60 hours / week	.359	1.217	0.800 – 1.852
>60 hours per week	.321	1.473	0.685 – 3.168
History of COVID-19 infection			
Yes	.532	1.197	0.681 – 2.106
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.935	0.982	0.634 – 1.521
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.143	1.841	0.814 – 4.167
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.437	1.190	0.768 – 1.843
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.019	0.602	0.395 – 0.919
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.025	1.604	1.061 – 2.425
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.377	1.650	0.544 – 5.003
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.019	1.708	1.091 – 2.673
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.005	2.129	1.261 – 3.595
Willingness to work during COVID-19 pandemic			
Yes	-	-	-
No (ref)	< .001	2.781	1.586 – 4.874
Reason for HCW to work during COVID-19 pandemic because feeling responsible			
Yes	< .001	0.427	0.271 – 0.671
No (ref)	-	-	-
work during COVID-19 pandemic because of financial matters			
Yes	.001	2.193	1.355 – 3.549

No (ref)	-	-	-
work during COVID-19 pandemic because already bound to working contract			
Yes	.006	2.698	1.323 – 5.501
No (ref)	-	-	-

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Supplementary Table 4. Univariate analysis of determinants for impaired physical health component among HCWs

Variables	p value	COR	95%CI
Age	.134	1.033	0.990 – 1.079
Sex			
Male (ref)	-	-	-
Female	.633	0.836	0.401 – 1.744
Marital status			
Single (ref)	-	-	-
Married	.318	1.496	0.878 – 3.299
Married with children	.214	1.703	0.735 – 3.945
Job			
Doctor (ref)	-	-	-
Nurse	.310	0.621	0.248 – 1.557
Midwife	.802	0.821	0.177 – 3.813
Dentist	.285	0.531	0.167 – 1.695
Pharmacist	.564	1.836	0.233 – 14.441
Others	.915	1.063	0.346 – 3.263
Workplace setting			
COVID-19 Hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.298	0.633	0.267 – 1.499
Primary care or other healthcare facilities	.944	0.973	0.448 – 2.113
Residence island			
Java Island (ref)	-	-	-
Outside Java Island	.095	2.284	0.865 – 6.026
Working period during COVID-19 pandemic			
Since the beginning of pandemic (March-April 2020) (ref)	-	-	-
In the middle of pandemic (April 2020 or later)	.659	0.837	0.380 – 1.846
Working experience before COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.090	0.163	0.020 – 1.328
1-3 years	.143	0.210	0.026 – 1.693
>3 years	.281	0.323	0.042 – 2.517
Income during COVID-19 pandemic			
<3 million rupiah / month (ref)	-	-	-
3-5 million rupiah / month	.555	1.423	0.441 – 4.591
5-10 million rupiah / month	.052	0.385	0.147 – 1.008
10-20 million rupiah / month	.680	1.352	0.322 – 5.670
>20 million rupiah / month	.794	1.211	0.288 – 5.096
Working hour per week during COVID-			

19 pandemic			
<40 hours / week (ref)	-	-	-
40 – 60 hours / week	.706	1.146	0.565 – 2.325
>60 hours per week	.626	0.750	0.236 – 2.386
History of COVID-19 infection			
Yes	.818	0.898	0.357 – 2.255
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.342	0.713	0.35 – 1.433
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.278	0.536	0.174 – 1.653
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.778	0.901	0.438 – 1.854
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.285	0.662	0.312 – 1.408
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.876	1.057	0.528 – 2.113
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.805	1.298	0.164 – 10.268
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.366	1.456	0.645 – 3.285
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.589	0.796	0.348 – 1.820
Willingness to work during COVID-19 pandemic			
Yes	-	-	-
No (ref)	.996	1.002	0.400 – 2.509
Reason for HCW to work during COVID-19 pandemic because feeling responsible			
Yes	.080	1.857	0.929 – 3.712
No (ref)	-	-	-
work during COVID-19 pandemic because of financial matters			

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Yes	.071	0.517	0.252 – 1.059
No (ref)	-	-	-
work during COVID-19 pandemic because already bound to working contract			
Yes	.722	1.199	0.350 – 4.113
No (ref)	-	-	-

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Supplementary Table 5. Univariate analysis of determinants for impaired mental health component among HCWs

Variables	p value	COR	95%CI
Age	.973	1.000	0.978 – 1.021
Sex			
Male (ref)	-	-	-
Female	.748	0.932	0.605 – 1.434
Marital status			
Single (ref)	-	-	-
Married	.266	1.319	0.810 – 2.148
Married with children	.263	1.329	0.808 – 2.187
Job			
Doctor (ref)	-	-	-
Nurse	.057	1.804	0.983 – 3.310
Midwife	.958	0.975	0.369 – 2.571
Dentist	.777	0.884	0.377 – 2.072
Pharmacist	.273	1.671	0.668 – 4.179
Others	.994	1.002	0.527 – 1.907
Workplace setting			
COVID-19 Hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.752	1.093	0.629 – 1.898
Primary care or other healthcare facilities	.391	0.820	0.521 – 1.290
Residence island			
Java Island (ref)	-	-	-
Outside Java Island	.961	0.988	0.617 – 1.582
Working period during COVID-19 pandemic			
Since the beginning of pandemic (March-April 2020) (ref)	-	-	-
In the middle of pandemic (April 2020 or later)	.729	1.092	0.665 – 1.790
Working experience before COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.252	1.619	0.710 – 3.689
1-3 years	.502	0.760	0.342 – 1.691
>3 years	.937	1.030	0.497 – 2.134
Income during COVID-19 pandemic			
<3 million rupiah / month (ref)	-	-	-
3-5 million rupiah / month	.187	1.510	0.818 – 2.785
5-10 million rupiah / month	.050	1.833	1.001 – 3.358
10-20 million rupiah / month	.919	1.040	0.490 – 2.208
>20 million rupiah / month	.612	1.219	0.567 – 2.622
Working hour per week during COVID-			

19 pandemic			
<40 hours / week (ref)	-	-	-
40 – 60 hours / week	.177	1.338	0.877 – 2.040
>60 hours per week	.899	0.950	0.429 – 2.105
History of COVID-19 infection			
Yes	.841	0.943	0.430 – 1.678
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.829	0.953	0.612 – 1.482
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.388	1.429	0.635 – 3.220
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.475	0.850	0.544 – 1.328
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.424	0.841	0.550 – 1.286
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.626	0.901	0.593 – 1.369
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.920	0.944	0.303 – 2.939
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.893	0.969	0.615 – 1.527
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.099	1.548	0.920 – 2.604
Willingness to work during COVID-19 pandemic			
Yes	-	-	-
No (ref)	.300	0.740	0.418 – 1.308
Reason for HCW to work during COVID-19 pandemic because feeling responsible			
Yes	.307	0.791	0.504 – 1.240
No (ref)	-	-	-
work during COVID-19 pandemic because of financial matters			

Yes	.140	1.434	0.888 – 2.314
No (ref)	-	-	-
work during COVID-19 pandemic because already bound to working contract			
Yes	.238	0.640	0.305 – 1.342
No (ref)	-	-	-

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Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

Checklist Item	Explanation	Page Number
Describe survey design	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	7
IRB approval	Mention whether the study has been approved by an IRB.	7
Informed consent	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	7
Data protection	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	7
Development and testing	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	N/A
Open survey versus closed survey	An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	7
Contact mode	Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	7
Advertising the survey	How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	N/A
Web/E-mail	State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses?	N/A
Context	Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on an anti-immunization Web site will have different results from a Web survey conducted on a government Web site	N/A
Mandatory/voluntary	Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web site, or was it a voluntary survey?	N/A
Incentives	Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	N/A

Time/Date	In what timeframe were the data collected?	7
Randomization of items or questionnaires	To prevent biases items can be randomized or alternated.	N/A
Adaptive questioning	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.	N/A
Number of Items	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	7
Number of screens (pages)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	7
Completeness check	It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if "yes", how (usually JavaScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as "not applicable" or "rather not say", and selection of one response option should be enforced.	8
Review step	State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	8
Unique site visitor	If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	N/A
View rate (Ratio of unique survey visitors/unique site visitors)	Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary.	N/A
Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called "recruitment" rate.	N/A
Completion rate (Ratio of users who finished the survey/users who	The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate "informed consent" page or if the survey goes over several pages. This is a measure for attrition. Note that	Figure 1

1	agreed to participate)	"completion" can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word "completeness rate".)	
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6	Cookies used	Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	N/A
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11	IP check	Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	7
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18	Log file analysis	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	N/A
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21	Registration	In "closed" (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	N/A
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25	Handling of incomplete questionnaires	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	9
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28	Questionnaires submitted with an atypical timestamp	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	N/A
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32	Statistical correction	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	N/A
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36 This checklist has been modified from Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). J Med Internet Res. 2004 Sep 29;6(3):e34 [erratum in J Med Internet Res. 2012; 14(1): e8.]. Article available at
37 <https://www.jmir.org/2004/3/e34/>; erratum available <https://www.jmir.org/2012/1/e8/>. Copyright ©Gunther Eysenbach. Originally published in the
38 [Journal of Medical Internet](https://www.jmir.org/2004/3/e34/) Research, 29.9.2004 and 04.01.2012.
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5 Research, is properly cited.
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Mental Health and Health-Related Quality of Life among Healthcare Workers in Indonesia during the Coronavirus Disease 2019 Pandemic

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Complete List of Authors:	Syamlan, Adila T.; Faculty of Medicine Universitas Airlangga - Dr. Soetomo General Academic Hospital, Department of Psychiatry Salamah, Sovia; Faculty of Medicine Universitas Airlangga, Department of Public Health and Preventive Medicine; University Medical Centre Groningen, Division of Nephrology, Department of Internal Medicine, University Medical Center Groningen, Groningen, The Netherland. Alkaff, Firas; Faculty of Medicine Universitas Airlangga, Department of Anatomy, Histology, and Pharmacology; University Medical Centre Groningen, Division of Nephrology, Department of Internal Medicine, University Medical Center Groningen, Groningen, The Netherland. Prayudi, Yogi E.; Faculty of Medicine Universitas Airlangga Kamil, Muhammad; Faculty of Medicine Universitas Airlangga - Dr. Soetomo General Academic Hospital, Department of Neurosurgery Irzaldy, Abyan; Karolinska Institute Karimah, Azimatul; Faculty of Medicine Universitas Airlangga - Dr. Soetomo General Academic Hospital, Department of Psychiatry Postma, Maarten; University of Groningen, Pharmacoepidemiology and Pharmacoeconomics Purba, Fredrick; Padjadjaran University, Department of Developmental Psychology Arifin, Bustanul; University of Groningen, Pharmacoepidemiology and Pharmacoeconomics
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3 **1 Mental Health and Health-Related Quality of Life among Healthcare Workers in**
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5 **2 Indonesia during the Coronavirus Disease 2019 Pandemic**
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8 **3 Running title:** HCW mental health and HRQoL during pandemic
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13 5 Adila T. Syamlan^{1#}, Sovia Salamah^{2,3#*}, Firas F. Alkaff^{3,4*}, Yogi E. Prayudi⁵,
14
15 6 Muhammad Kamil⁶, Abyan Irzaldy⁷, Azimatul Karimah¹, Maarten J. Postma^{4,8,9,10,11},
16
17 7 Fredrick D. Purba¹², Bustanul Arifin^{8,13,14}
18

19
20
21
22 9 ¹Department of Psychiatry, Faculty of Medicine Universitas Airlangga – Dr. Soetomo
23
24 10 General Academic Hospital, Surabaya, Indonesia

25
26 11 ²Department of Public Health and Preventive Medicine, Faculty of Medicine
27
28 12 Universitas Airlangga, Surabaya, Indonesia

29
30
31 13 ³Department of Internal Medicine, University Medical Center Groningen, Groningen,
32
33 14 The Netherlands

34
35 15 ⁴Division of Pharmacology and Therapy, Department of Anatomy, Histology, and
36
37 16 Pharmacology, Faculty of Medicine Universitas Airlangga, Surabaya, Indonesia

38
39 17 ⁵Faculty of Medicine Universitas Airlangga, Surabaya, Indonesia

40
41
42 18 ⁶Department of Neurosurgery, Faculty of Medicine Universitas Airlangga, Surabaya,
43
44 19 Indonesia

45
46
47 20 ⁷Karolinska Institute, Solna, Sweden

48
49
50 21 ⁸Department of Health Sciences, University of Groningen, University Medical Center
51
52 22 Groningen, Groningen, The Netherlands

53
54 23 ⁹Institute of Science in Healthy Ageing & healthcaRE (SHARE), University Medical
55
56 24 Center Groningen, University of Groningen, Groningen, The Netherlands
57
58
59
60

1
2
3 25 ¹⁰Unit of PharmacoTherapy, Epidemiology and Economics (PTE2), Department of
4
5 26 Pharmacy, University of Groningen, Groningen, The Netherlands
6
7

8 27 ¹¹Department of Economics, Econometrics and Finance, Faculty of Economics &
9
10 28 Business, University of Groningen, Groningen, The Netherlands
11

12 29 ¹²Department of Developmental Psychology, Faculty of Psychology, Universitas
13
14 30 Padjadjaran, Bandung, Indonesia
15

16
17 31 ¹³Pharmacy Faculty, Universitas Hasanuddin, Makassar, Sulawesi Selatan, Indonesia
18

19 32 ¹⁴Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada,
20
21 33 Yogyakarta, Indonesia
22

23
24 34 #Co-first author, these authors contributed equally to this work.
25

26 35 *Corresponding authors:
27

28 36 Sovia Salamah
29

30
31 37 Hanzeplein 1, 9713GZ, Groningen, The Netherlands / Jl. Mayjen Prof. Dr. Moestopo
32
33 38 No 47, Surabaya, East Java 60132, Indonesia.
34

35 39 Email: s.salamah@umcg.nl / sovia.salamah@fk.unair.ac.id
36

37 40 Telephone: +31651114511 / +6282244485448
38
39

40 41

41 42 Firas Farisi Alkaff
43

44 43 Hanzeplein 1, 9713GZ, Groningen, The Netherlands / Jl. Mayjen Prof. Dr. Moestopo
45
46 44 No 47, Surabaya, East Java 60132, Indonesia.
47

48 45 Email: f.f.alkaff@umcg.nl / firasfarisialkaff@fk.unair.ac.id
49

50 46 Telephone: +31616383945 / +6281330101993
51
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58 49 **Word count:** 3458 words
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2
3 **Abstract**
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51 **Objectives:** Healthcare workers (HCWs) are the front lines during the coronavirus
52 disease 2019 (COVID-19) pandemic. They are more exposed to COVID-19 than other
53 professions. Studies from other countries have shown that the mental health and
54 health-related quality of life (HRQoL) of HCWs were affected during this pandemic.
55 However, studies on mental health in Indonesia remain scarce and no study has
56 evaluated the HRQoL among HCWs. Thus, this study was designed to explore the
57 mental health status and HRQoL among HCWs in Indonesia.

58 **Design:** This was a cross-sectional study.

59 **Setting:** This was an open online survey in Indonesia conducted from December 2020
60 to February 2021.

61 **Participants:** This study involved HCWs who worked during the COVID-19
62 pandemic. Of the 502 respondents who filled the online questionnaire, 392 were
63 included in the analysis.

64 **Outcomes:** Mental health status was measured using the 21-item Depression, Anxiety,
65 and Stress Scale (DASS-21) and HRQoL was measured using the second version of
66 the 12-item Short-Form Health Survey (SF12v2).

67 **Results:** The prevalence of depression, anxiety, and stress among HCWs was 29.4%,
68 44.9%, and 31.8%, respectively. Using the SF12v2 questionnaire, 354 (90.3%) HCWs
69 were found to have impaired physical component and 156 (39.8%) HCWs have
70 impaired mental component.

71 **Conclusion:** The prevalence of mental health problems among HCWs was high in
72 Indonesia. HRQoL, particularly the physical component, was affected in most HCWs.
73 Thus, policymakers should give more attention to the mental health and HRQoL of
74 HCWs during the COVID-19 pandemic.

75

76 Strength and limitations of this study

- 77 • This study assessed the prevalence of and determinants for mental health
78 problems and impaired Health-related quality of life (HRQoL) among
79 healthcare workers (HCWs) during the coronavirus disease 2019 (COVID-19)
80 pandemic in Indonesia.
- 81 • We performed univariate logistic regression analysis, followed by multivariate
82 logistic regression analysis using backward selection, to determine the
83 determinants for mental health problems and impaired HRQoL.
- 84 • The cross-sectional nature of this study could not identify temporal
85 relationships between the course of the COVID-19 pandemic and mental
86 health problems and HRQoL impairment.
- 87 • Because of the nonprobability purposive sampling method, generalization of
88 this study's findings to all HCWs in Indonesia should be done cautiously.

89 **Background**

90 Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome
91 coronavirus 2 (SARS-CoV-2), emerged in December 2019 in Wuhan, Hubei Province
92 of China ¹. This virus is related to SARS-CoV-1, which was the cause of SARS in
93 2002 and Middle East Respiratory Syndrome (Mers-CoV) in 2012 ². As of March 11,
94 2020, the World Health Organization characterized COVID-19 as a pandemic ³. To
95 this date, over 428 million were affected by this disease with over 5 million of deaths
96 worldwide ⁴. In Indonesia, the first official case of COVID-19 was on March 2, 2020 ⁵.
97 After that, the number of reported cases in Indonesia has been exponentially
98 increasing. Currently, over 3.9 million individuals are positive for the disease with
99 more than 121,000 deaths ⁶.

100

101 Healthcare workers (HCWs) are the front lines during the COVID-19 pandemic and
102 thus are more exposed to COVID-19 than other professions. Worldwide, the total
103 number of deaths among HCWs is over 155 ,000 ⁷. In Indonesia, the total number of
104 deaths among HCWs is 2,066 to this date ⁸. Although the reported mortality rate
105 among HCWs is lower than that in the general population ^{9,10}, higher levels of mental
106 health problems were found among HCWs ¹¹. Heavy workload and lack of personal
107 protective equipment (PPE) are highlighted as profession-related contributing risk
108 factors ¹².

109

110 A recently published systematic review has revealed that the prevalence of depression
111 and anxiety among HCWs during the COVID-19 pandemic was 37% and 40%,
112 respectively ¹³. This prevalence was higher than that observed in non-pandemic
113 situations, where the prevalence of depression and anxiety was 11.3% and 17.3%,

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3 114 respectively ¹⁴. However, no study from Indonesia was included in this meta-analysis
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5 115 ^{13, 15}. To this date, studies on mental health among HCWs in Indonesia remain scarce
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8 116 and are either focusing on a certain HCW profession or conducted only in one part of
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10 117 the country ¹⁶⁻²⁰. Other than that, all studies have adopted a cross-sectional study
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12 118 design, thus only illustrating a particular moment of the pandemic. However, no study
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14
15 119 has been conducted during the later stage of the COVID-19 pandemic in Indonesia
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17 120 when the number of cases and deaths was increasing ²¹.

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21 122 Besides mental health problems, health-related quality of life (HRQoL) is also
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23 123 affected during the COVID-19 pandemic ²². Currently, few published studies have
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25 124 evaluated the HRQoL of HCWs during the COVID-19 pandemic ²³⁻³¹; however, no
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27 125 such studies have been conducted in Indonesia. Thus, this study was designed to
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29 126 explore the mental health status and HRQoL among HCWs in Indonesia and identify
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31 127 the determining factors.
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3 128 **Methods**

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5 129 Study design

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8 130 This study was a cross-sectional study using an open online questionnaire.
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10 131 SurveyMonkey® was used as the survey platform. Using this survey platform, each
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12 132 respondent can only participate in the questionnaire once because the Internet
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14 133 Protocol address was used to identify potential duplicate entries from the same
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16 134 respondent. The questionnaire link was distributed through social media, that is,
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18 135 WhatsApp and Instagram, the most popular and accessible social media platforms in
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20 136 Indonesia.
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26 138 Participants

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28 139 The study participants were HCWs in Indonesia and were recruited using a
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30 140 nonprobability purposive snowball sampling technique. The inclusion criteria were as
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32 141 follows: HCWs who were actively working during the COVID-19 pandemic and
33
34 142 agreed to participate in this study. The HCWs in this study were defined as those who
35
36 143 worked in the healthcare sector ³². Informed consent was obtained from each
37
38 144 respondent. Data collection was conducted from December 2020 to February 2021.
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40 145 The minimum required sample size was calculated using EpiInfo™ ³³. Using an
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42 146 expected frequency of 50%, a minimum of 384 samples were needed to obtain
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44 147 sufficient statistical power, assuming 95% confidence intervals.
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51 149 Ethics

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53 150 This study was performed according to the principles of the Declaration of Helsinki
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55 151 and approved by the relevant Institutional Review Board. The data were kept
56
57 152 confidential and no personally identifiable information was reported.
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154 Instruments

155 The questionnaire contained 60 questions, separated into 4 pages. The time needed to
156 complete the questionnaire was 15-20 minutes. All questions were mandatory to
157 answer and respondents could not move to the next page if all questions on the
158 previous page had not been answered. Before submitting the questionnaire, the
159 respondents could review and change their answers.

160

161 The background and demographic characteristics of each respondent were obtained
162 using a questionnaire that contained questions on the respondent's gender, age,
163 marital status, specific job, workplace setting during the pandemic, workplace
164 location, working experience as an HCW before the COVID-19 pandemic, working
165 hours per week, monthly income, history of COVID-19 infection, comorbidities,
166 availability of personal protective equipment in the workplace, verbal or physical
167 intimidation in the workplace, intimidation from the society outside the workplace,
168 support from the workplace if there is any intimidation, willingness to work during
169 the COVID-19 pandemic, and reason for working during the COVID-19 pandemic.

170

171 Mental health was measured using the Indonesian version of 21-item Depression,
172 Anxiety, and Stress Scale (DASS-21)³⁴. This questionnaire has been adapted to
173 Bahasa Indonesia previously and showed good validity and reliability³⁵. The
174 DASS-21 is a self-administered questionnaire consisting of depression, anxiety, and
175 stress subscales, each composed of 7 items. Every item could have a score ranging
176 from 0, indicating a lack of symptoms in the past week, to 3, indicating the presence
177 of symptoms for almost every day in the past week. To calculate the final score of

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3 178 each subscale, the score was multiplied by 2. The minimum final score was 0 and the
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5 179 maximum score was 42 for each subscale. Based on the total score, mental health can
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8 180 be categorized into normal or mild, moderate, severe, or extremely impaired (**Table 1**)
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10 181 ³⁴.

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12 182
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14 183 HRQoL was evaluated using the second version of the 12-item Short-Form Health
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16 184 Survey (SF12v2) (license number: QM054173) ³⁶. The use of SF12v2 to evaluate
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18 185 HRQoL was based on the consideration that it can be used in nonpatient populations
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20 186 and has fewer questions than other HRQoL questionnaires. The SF12v2 has been
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22 187 adapted to Bahasa Indonesia previously and showed good validity and reliability.³⁷
23
24 188 This questionnaire measures both the physical and mental health components, which
25
26 189 are divided into 8 health domain scales, that is, physical functioning (PF), role
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28 190 physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning
29
30 191 (SF), role emotional (RE), and mental health (MH). PF, RP, BP, and GH have the
31
32 192 greatest physical component among the health domains, whereas VT, SF, RE, and
33
34 193 MH have the greatest mental component ³⁶. The explanations of each domain scale
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36 194 have been described elsewhere ³⁷. The SF12v2 was scored using Optum® PRO CoRE
37
38 195 software (Optum PROCoRE 1.3 Smart Measurement System. Optum Inc., USA). The
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40 196 software will generate the score for each health domain and the summary scores of the
41
42 197 physical and mental components. Scores of less than 47 indicate significant
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44 198 impairment in the associated health domain ³⁶.

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200 Data analysis

201 Only completed questionnaires were included in the data analysis. Acquired data were
202 analyzed using IBM SPSS Statistics for Windows version 25.0. (IBM Corp., Armonk,

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3 203 NY, USA). Differences with p values $< .05$ were considered statistically significant.
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5 204 The one-sample Kolmogorov-Smirnov test was used to evaluate the data distribution.
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8 205 Normally distributed data was presented as mean \pm SD, skewed data was presented as
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10 206 median [interquartile range (IQR)], and nominal data was presented as n (%). To
11
12 207 discover the determinants of mental health and HRQoL, multiple logistic regression
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14 208 analysis using backward selection was used. Data analysis was conducted in two
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16
17 209 phases. In the first phase, univariate logistic regression was used to identify
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19 210 independent variables associated with mental health status and HRQoL. Variables
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21 211 with p values $< .1$ were included in the next phase. In the second phase, multivariate
22
23 212 logistic regression using backward selection was used. Variables with p values $< .05$
24
25 213 from multivariate regression analysis were considered as the determinants³⁸. During
26
27 214 the analysis to determine the determinants, mental health variables were recategorized
28
29 215 into dichotomous (normal or not) variables with the cutoff as follows: 9 for
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31 216 depression, 6 for anxiety, and 10 for stress³⁴.
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38 Patient and public involvement

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40 219 Patients and the public were not involved in this study.
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220 **Results**

221 Of the 502 HCWs who accessed the online questionnaire, 392 were included for the
222 analysis. The total response rate for this study was 78% (**Figure 1**). The detailed
223 sociodemographic characteristics of the respondents are summarized in **Table 2**.

225 Mental Health

226 The median scores of the depression, anxiety, and stress subscales were 6 [2–10], 6
227 [2–12], and 10 [4–10], respectively. Of the 392 respondents, 119 (29.4%) experienced
228 depression, 176 (44.9%) experienced anxiety, and 164 (31.8%) experienced stress
229 (**Figure 2**). Stratified by gender, the prevalence of depression, anxiety, and stress
230 among male HCWs was 27 (21.3%), 42 (33.1%), and 45 (35.4%), respectively,
231 whereas the prevalence of depression, anxiety, and stress among female HCWs was
232 92 (34.7%), 134 (50.6%), and 119 (44.9%), respectively (**Supplementary Figure 1**
233 **and 2**).

234
235 To find the determinants of depression among HCWs, multivariate logistic regression
236 analysis was performed by including all variables that had a *p* value of < .1 in the
237 univariate analysis (**Supplementary Table 1**). Female HCWs, HCWs who did not
238 receive support from the workplace when intimidated by the patients or patients'
239 family members because of COVID-19-related issues, and HCWs that worked during
240 the pandemic because they were bound by working contracts were more likely to be
241 depressed. Meanwhile, HCWs with working experience of more than 3 years in
242 healthcare facilities were less likely to be depressed (**Table 3**).

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3 244 To find the determinants of anxiety among HCWs, multivariate logistic regression
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5 245 analysis was performed by including all variables that had a *p* value of < .1 in the
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7 246 univariate analysis (**Supplementary Table 2**). Female HCWs, HCWs who did not
8
9 247 receive support from the workplace when intimidated by the patients or patients'
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11 248 family members, and HCWs who were not willing to work during the COVID-19
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13 249 pandemic were more likely to be anxious. Meanwhile, older HCWs and HCWs who
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15 250 worked in healthcare facilities other than COVID-19 hospitals or referral hospitals for
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17 251 COVID-19 were less likely to be anxious (**Table 4**).
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24 253 To find the determinants of stress among HCWs, multivariate logistic regression
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26 254 analysis was performed by including all variables that had a *p* value of < .1 in the
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28 255 univariate analysis (**Supplementary Table 3**). HCWs who did not receive support
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30 256 from the workplace when intimidated by the patients or patients' family members,
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32 257 HCWs who are not willing to work during the COVID-19 pandemic, and HCWs who
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34 258 worked during the pandemic because of financial matters or because they were bound
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36 259 by working contracts were more likely to be stressed. Meanwhile, older HCWs were
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38 260 less likely to be stressed (**Table 5**).
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44 262 HRQoL

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47 263 The median score of the physical component summary (PCS) was 41.80 [39.15–44.14]
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49 264 and the median score of the mental component summary (MCS) was 49.81 [43.25–
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51 265 55.95]. The detailed scores of the PCS, MCS, and each health domain scale are
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53 266 summarized in **Figure 3**. Of the 392 HCWs, 354 (90.3%) had an impairment in the
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55 267 physical component and 156 (39.8%) had an impairment in the mental component
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58 268 (**Figure 4**).
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5 270 To find the determinants of impaired physical and mental health components among
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8 271 HCWs, multivariate logistic regression analysis was performed by including all
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10 272 variables that had a p value of $< .1$ in the univariate analysis (**Supplementary Table**
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12 273 **4 and 5**). However, no determinants were found in the multivariate analysis.
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274 **Discussion**

275 The results of this study provided additional information on the mental health
276 conditions and HRQoL among Indonesian HCWs. Moreover, this study identified
277 several significant determinants of stress, anxiety, and depression among HCWs. This
278 may also act as a guide for relevant actions that can be taken by relevant authorities to
279 provide preventive efforts regarding mental health matters.

281 Mental health

282 The prevalence of depression, anxiety, and stress observed in this study was 29.4%,
283 44.9%, and 31.8%, respectively, which were higher than that reported in previous
284 studies from Indonesia that also used the DASS-21 as the study instrument, wherein
285 the prevalence was 2.4–13.2% for depression, 6.8–20.6% for anxiety, and 5.7–11%
286 for stress^{16, 17, 19}. The discrepancy between this study and previous studies might be
287 attributed to the time difference in data collection. In this study, data collection was
288 performed in the later time of the pandemic, whereas in previous studies, data
289 collection was performed at the beginning of the pandemic.

291 Indeed, a recent systematic review and meta-analysis of longitudinal studies has
292 shown that the prevalence of mental health problems was higher only at the beginning
293 of the pandemic and continuously declined after 2 months³⁹. In HCWs, the high
294 prevalence of mental health problems at the beginning of the pandemic may be
295 because of the sudden escalation of the workload and lack of understanding of the
296 disease. At the later stage, as there are more information about the disease and HCWs
297 have adapted to the new workload, the prevalence of mental health problems
298 decreased⁴⁰. However, note that most studies included in that review were from

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3 299 countries where the peak of the first wave occurred at the beginning of the pandemic
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5 300 and that there is a lack of studies conducted in the later period of the pandemic when
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7 301 the number of cases surged again ^{39, 40}. In a single-center longitudinal study in Italy,
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9 302 the prevalence of anxiety and stress remained high even during the third wave,
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11 303 whereas the prevalence of depression increased from the first wave to the third wave
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13 304 ⁴¹. As the number of cases increases, the workload of the HCWs also increases. This
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15 305 will negatively affect their mental health condition ^{42, 43}. In Indonesia, the peak of the
16
17 306 first wave occurred not at the beginning of the pandemic but during the data collection
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19 307 of this study, that is, from December 2020 to February 2021 ²¹. This explained the
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21 308 higher prevalence of mental health problems in this study than in previous studies.
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310 Several studies were conducted during the same period as this study. Ménard et al
311 (2022) have shown that the prevalence of depression, anxiety, and stress among
312 Canadian HCWs was 14.4%, 21.8%, and 13.5%, respectively ⁴⁴. The lower
313 prevalence in Canada might be explained by the difference in the healthcare systems.
314 Different healthcare systems across countries can lead to differences in the prevalence
315 of mental health problems among HCWs ⁴⁵. Unlike Canada, the capacity of the
316 current Indonesia's healthcare system to respond to the COVID-19 pandemic is far
317 from adequate ⁴⁶. Another study from Italia has revealed that the prevalence of
318 depression, anxiety, and stress was 63%, 31%, and 80%, respectively ⁴¹. The higher
319 prevalence in that study might be explained by the difference in the study population
320 where that study only included frontline HCWs (intensivist) caring exclusively for
321 COVID-19 patients, whereas the HCWs in this study also treat non-COVID-19
322 patients and some of them were not frontline HCWs. It has been shown previously

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3 323 that frontline HCWs and those who worked in the intensive care unit during the
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5 324 COVID-19 pandemic were more likely to develop mental health problems^{47, 48}.

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10 326 In this study, the prevalence of depression, anxiety, and stress was higher in female
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12 327 HCWs than that in male HCWs (**Supplementary Figure 1 and 2**). Moreover, the
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14 328 female sex was an independent risk factor for depression and anxiety (**Table 3 and 4**).
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17 329 Similarly, other studies have also reported gender differences in mental health
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19 330 problems among HCWs during the COVID-19 pandemic, where it is more prevalent
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21 331 in female HCWs^{49, 50}. This can be because females have higher rates of mood and
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23 332 anxiety disorders due to a higher mean level of internalizing⁵¹ and potentially by the
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25 333 influence of sex hormones⁵².

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30 335 A recent study in Indonesia among nurses who worked during the COVID-19
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32 336 pandemic has shown that rejection from family and/or neighbors is a risk factor for
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34 337 depression, anxiety, and stress¹⁷. We also found a similar finding where intimidation
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36 338 from society was a risk factor for depression, anxiety, and stress in the univariate
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38 339 analysis (**Supplementary Tables 1, 2, and 3**). However, this variable lost its
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40 340 significance in the multivariate analysis, whereas workplace support towards potential
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42 341 intimidation was shown to lower the risk of depression, anxiety, and stress. This
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44 342 indicates that the workplace environment plays a more substantial role in mental
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46 343 health. Havaei et al. (2021) have found that negative ratings of workplace conditions
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48 344 such as workplace relations, workplace safety, organizational support, and
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50 345 preparedness were associated with poor mental health outcomes during the
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52 346 COVID-19 pandemic⁵³. A narrative review focusing on the mental health of HCWs
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54 347 during the COVID-19 pandemic has also stated that intrinsic high-risk professional,
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3 348 organizational factors such as lack of workplace support, and vulnerable workers such
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5 349 as frontline HCWs are at a higher risk of mental issues during the pandemic ⁵⁴.
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10 351 HRQoL

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12 352 To this date, many established questionnaires can be used to assess HRQoL. In
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14 353 previously published studies on HRQoL among HCWs during the COVID-19
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16 354 pandemic, several HRQoL questionnaires were used, that is, WHOQOL-BREF ^{23, 27, 29},
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18 355 EQ-5D ^{30, 31}, SF36 ²⁴, and SF12 ²⁸. Since we used the SF12v2 to evaluate HRQoL in
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20 356 this study, we argue that comparing our findings with those of previous studies that
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22 357 have used either the SF12 or SF36 is essential. The PCS and MCS scores in previous
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24 358 studies were higher than those in this study ^{24, 28}, indicating that HRQoL in previous
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26 359 studies was better. Moreover, we found that 39.8% of the HCWs included in this
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28 360 study had an impairment in the mental component and 90.3% had an impairment in
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30 361 the physical component. However, we cannot compare our findings with those of
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32 362 previous studies since they did not present the prevalence of HCWs with impaired
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34 363 physical and mental health components ^{24, 28}.
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42 365 The worse HRQoL in this study might be caused by the time difference of the study
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44 366 period where previous studies were conducted at the beginning of the pandemic and
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46 367 this study was conducted in the later time of the pandemic ^{24, 28}. Similar to the mental
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48 368 health status, we would argue that the HRQoL of HCWs at the beginning of the
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50 369 pandemic was not as affected as that at the later period. The number of COVID-19
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52 370 patients at the later period was significantly higher than at the beginning of the
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54 371 pandemic ⁶. This increased number of patients will increase the workload of HCWs,
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56 372 even if the working hour is not prolonged. Over time, increasing workload will lead to
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3 373 physical exhaustion of HCWs. Moreover, the number of deaths of COVID-19 patients
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5 374 increases over time. Constant exposure to dealing with dying and death, in addition to
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8 375 the high workload, is considered as an occupational stressor^{55, 56}.

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11 12 377 **Study limitations**

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14 378 This study has some limitations to consider. First, the study design was
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17 379 cross-sectional study, whereas the prevalence of mental health problems during the
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19 380 COVID-19 pandemic is dynamic. Second, as the sampling technique used in this
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22 381 study was nonprobability purposive snowball sampling and that only those who had
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24 382 internet access and spare time can enroll in this study, this study was prone to
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26 383 selection bias. Furthermore, although the number of respondents in this study had
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28 384 surpassed the minimum required number of samples, the number of respondents was
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31 385 small compared with the total number of HCWs in Indonesia. Therefore,
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33 386 generalization of this study's findings to all HCWs in Indonesia should be done
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35 387 cautiously. Third, the respondents were not only frontline HCWs but also second-line
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38 388 HCWs, and they worked not only in COVID-19 hospitals but also in other healthcare
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40 389 sectors. This may underestimate the prevalence of mental health problems. Fourth, the
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42 390 diagnosis of depression, anxiety, stress, and HRQoL impairment in this study was
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44 391 based on self-reported questionnaires. This may also underestimate the prevalence of
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47 392 mental health problems. Fifth, 78 (16%) respondents accessed the online
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49 393 questionnaire but did not finish it. The possible explanation for this high loss is
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51 394 because it takes quite a long time (approximately 15–20 minutes) to complete the
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54 395 questionnaire.

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3 396 **Conclusion**
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5 397 This is the first study that evaluated the prevalence of and determinants for both
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7 398 mental health status and HRQoL during the COVID-19 pandemic in Indonesia. The
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10 399 prevalence of depression, anxiety, and stress among HCWs was 29.4%, 44.9%, and
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12 400 31.8%, respectively, whereas the prevalence of impaired HRQoL was 90.3% for PCS
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14 401 and 39.8% for MCS. The results of this study suggest that the workplace environment
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16 402 is where interventions to prevent and mitigate mental issues are most needed.
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18 403 Additionally, more attention is also needed for female HCWs, since female HCWs are
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20 404 at a higher risk of developing mental health issues. Based on our findings, we
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22 405 recommend that more attention towards HCWs should be given by the policymakers
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24 406 in Indonesia. This can be done by providing psychological support and also by
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26 407 assigning sufficient number of security guards or polices in healthcare facilities in
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28 408 order to provide safer workplace. Studies with larger sample sizes and periodical
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30 409 evaluation may further contribute to adequately monitor the mental health and
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32 410 HRQoL of HCWs throughout this pandemic and develop corresponding support and
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34 411 interventions.
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414 **Contributions:** ATS, SS, FFA, MK, MJP, FDP, and BA were involved in the
415 conceptualization and the design of the study. ATS, SS, FFA, YEP, MK, AK, and BA
416 carried out the data collection. SS, FFA, and AI conducted the analysis, and FDP, and
417 BA were the main consultants in the data interpretation. ATS, SS, FFA, and AI
418 drafted the manuscript, and all the authors revised it. All authors read and approved
419 the final manuscript to be submitted.

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6

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9
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11
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14
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16
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21
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3 591 **Figure legends**
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5 592 **Figure 1.** Flow diagram of study participants.
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8 593 **Figure 2.** Prevalence of depression, anxiety, and stress among healthcare workers in
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10 594 each severity level according to DASS-21 scores.
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12 595 **Figure 3.** The median [interquartile range] norm-based T-score of summary scores
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14 596 and each health domain scale.
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17 597 **Figure 4.** The prevalence of impairment in physical and mental components in
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19 598 general and each health domain scale among healthcare workers. PCS, physical
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21 599 component summary; MCS, mental component summary; PF, physical function; RP,
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23 600 role physical; BP, bodily pain; GH, general health; VT, vitality; SF, social functioning;
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25 601 RE, role emotional; MH, mental health.
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Tables**Table 1.** Cut-off score for mental health status categorization

	Normal	Mild	Moderate	Severe	Extremely impaired
Depression	0–9	10–12	13–20	21–27	28–42
Anxiety	0–6	7–9	10–14	15–19	20–42
Stress	0–10	11–18	19–26	27–34	25–42

Table 2. Sociodemographic characteristics of the respondents (N = 392)

Variables	n (%)
Age in years, mean ± SD	33.5 ± 9.4
Sex	
Male	127 (32.4)
Female	265 (67.6)
Marital status	
Single	146 (37.2)
Married	128 (32.7)
Married with children	118 (30.1)
Job	
Nurse	52 (13.3)
Midwife	19 (4.9)
Doctor	227 (57.9)
Dentist	26 (6.6)
Pharmacist	20 (5.1)
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, and health educators)	48 (12.2)
Workplace setting	
COVID-19 hospital or COVID-19 referral hospital	160 (40.8)
Non-COVID-19 hospital	76 (19.4)
Primary care facilities	138 (35.2)
Other healthcare facilities	18 (4.6)
Workplace island	
Java Island	296 (75.5)
Outside Java Island	96 (24.5)
Working period during the COVID-19 pandemic	
Since the beginning of the pandemic (March–April 2020)	310 (79.1)
In the middle of the pandemic (May 2020 or later)	82 (20.9)
Working experience before the COVID-19 pandemic	
Not working	36 (9.2)
<1 year	67 (17.1)
1–3 years	92 (23.5)
>3 years	197 (50.2)
Income during the COVID-19 pandemic	
<3 million rupiah/month	77 (19.7)
3–5 million rupiah/month	107 (27.3)
5–10 million rupiah/month	111 (28.3)
10–20 million rupiah/month	51 (13.0)
>20 million rupiah/month	46 (11.7)
Working hours per week during the COVID-19 pandemic	
<40 hours/week	180 (45.9)
40–60 hours/week	181 (46.2)
>60 hours/week	31 (7.9)
History of COVID-19 infection	
Yes	57 (14.5)
No	335 (85.5)
History of COVID-19 infection in the family	
Yes	118 (30.1)
No	274 (69.9)

Any family member died because of COVID-19

Yes	25 (6.4)
No	367 (93.6)

Having one or more comorbidities

Yes	276 (70.4)
No	116 (29.6)

PPE availability in the workplace

Not available or not according to standard	134 (34.2)
Available and according to standard	258 (65.8)

Free routine COVID-19 PCR swab test for HCWs

No	177 (45.1)
Only if there are any symptoms	194 (49.5)
Routinely 1–3 times a month	20 (5.1)
At least once a week	1 (0.3)

Verbal intimidation in the workplace

Never	243 (62.0)
Less than once a month	84 (21.4)
1–4 times a month	49 (12.5)
More than once a week	16 (4.1)

Physical intimidation in the workplace

Never	379 (96.7)
Less than once a month	8 (2.0)
1–4 times a month	3 (0.8)
More than once a week	2 (0.5)

Intimidation from the society outside the workplace

Never	285 (72.7)
Less than once a month	77 (19.7)
1–4 times a month	26 (6.6)
More than once a week	4 (1.0)

Workplace support from intimidation

Yes	322 (82.1)
No	70 (17.9)

How the workplace treats HCWs with COVID-19 symptoms

Do not know	21 (5.3)
HCWs are not allowed to come to work until the test result came out	306 (78.1)
HCWs still come to work until the test result came out	65 (16.6)

HCWs' salary if they are infected with COVID-19

Do not know	136 (34.7)
Reduced by the number of the absence	67 (17.1)
Full payment	189 (48.2)

Willingness to work during the COVID-19 pandemic

Yes	330 (84.2)
No	62 (15.8)

Reason for HCWs to work during the COVID-19 pandemic

Feeling responsible	285 (72.7)
Financial matters	88 (22.4)
Already bound to work contracts	36 (9.2)

COVID-19, coronavirus disease 2019; HCWs, healthcare workers; PPE, personal protective equipment; PCR, polymerase chain reaction.

Table 3. Determinants of depression among healthcare workers (N = 392)

Variables	<i>p</i> value	aOR	95%CI
Sex			
Male (ref)	-	-	-
Female	.033	1.777	1.048 – 3.013
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.801	0.893	0.369 – 2.162
1-3 years	.560	1.283	0.554 – 2.969
>3 years	.008	0.333	0.147 – 0.753
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.002	2.493	1.383 – 4.494
Work during the COVID-19 pandemic because already bound to working contracts			
Yes	.015	2.578	1.198 – 5.547
No (ref)	-	-	-

p values < .05 were considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019; CI, confidence interval.

Table 4. Determinants of anxiety among healthcare workers (N = 392)

Variables	p value	aOR	95%CI
Age	< .001	0.938	0.913 – 0.964
Sex			
Male (ref)	-	-	-
Female	.010	1.874	1.163 – 3.021
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.001	0.356	0.189 – 0.669
Primary care or other healthcare facilities	.029	0.574	0.348 – 0.946
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.017	2.099	1.143 – 3.854
Willingness to work during the COVID-19 pandemic			
Yes (ref)	-	-	-
No	.016	2.154	1.157 – 4.012

p values < .05 were considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019; CI, confidence interval.

Table 5. Determinants of stress among healthcare workers (N = 392)

Variables	p value	aOR	95%CI
Age	.001	0.956	0.930 – 0.983
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.014	2.043	1.154 – 3.616
Willingness to work during COVID-19 pandemic			
Yes (ref)	-	-	-
No	.014	2.169	1.168 – 4.027
Work during COVID-19 pandemic because of financial matters			
Yes	.014	3.575	1.293 – 9.885
No (ref)	-	-	-
Work during COVID-19 pandemic because already bound to working contract			
Yes	.014	4.352	1.340 – 14.137
No (ref)	-	-	-

p values < .05 were considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019; CI, confidence interval.

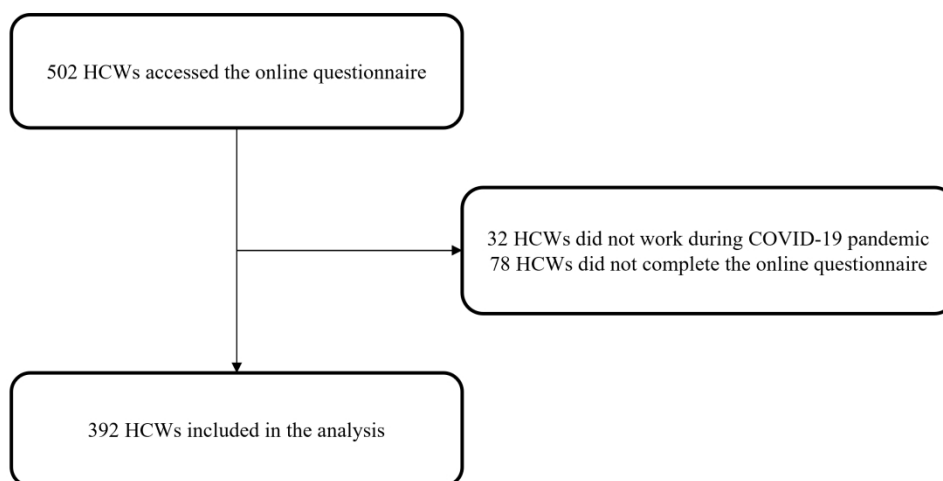


Figure 1

512x270mm (130 x 130 DPI)

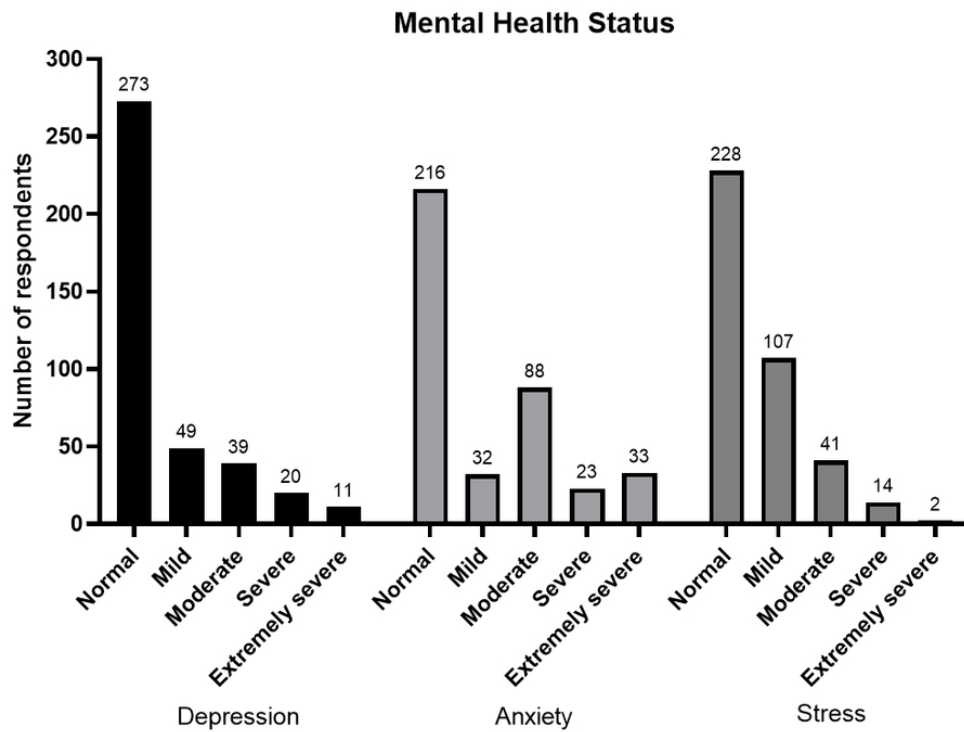


Figure 2

78x59mm (300 x 300 DPI)

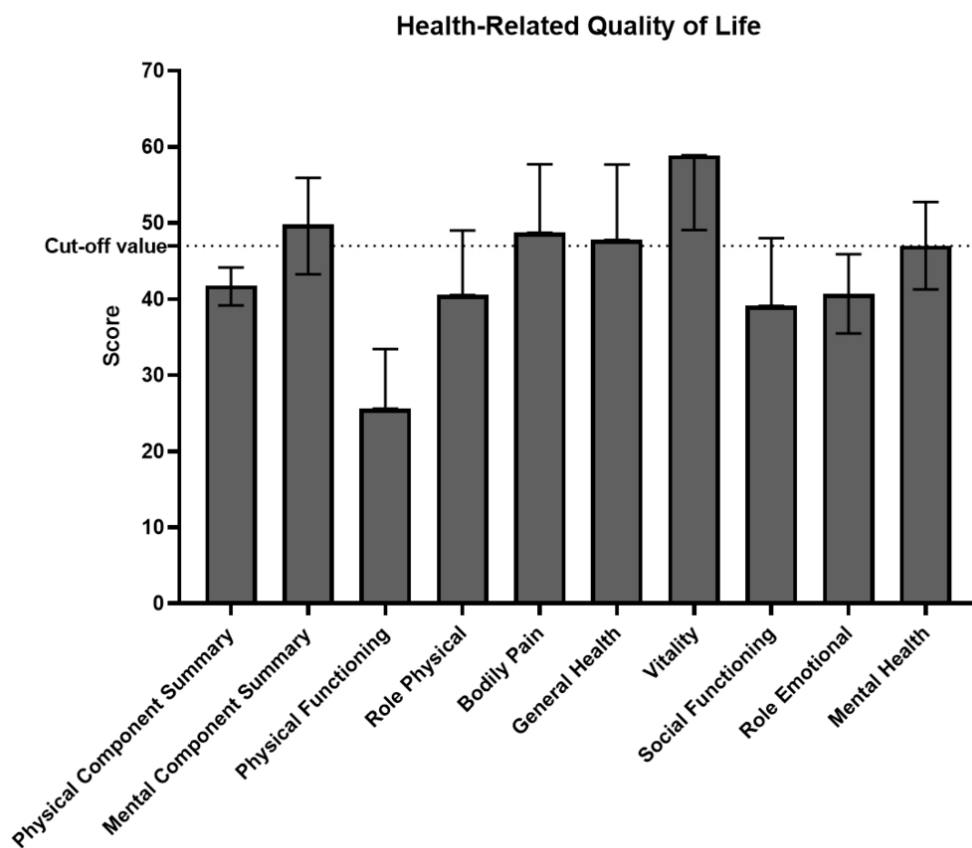


Figure 3

85x74mm (300 x 300 DPI)

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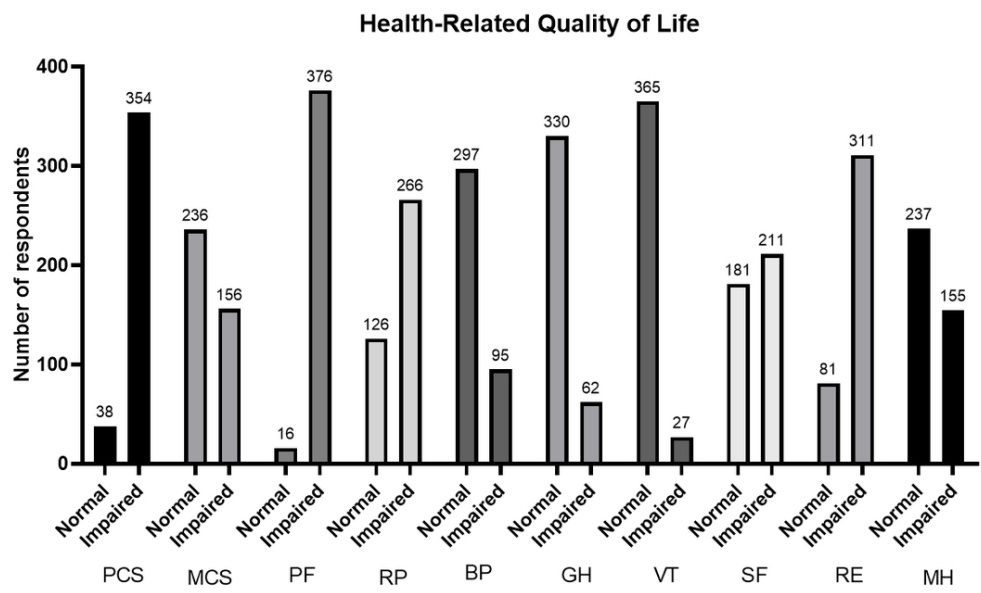
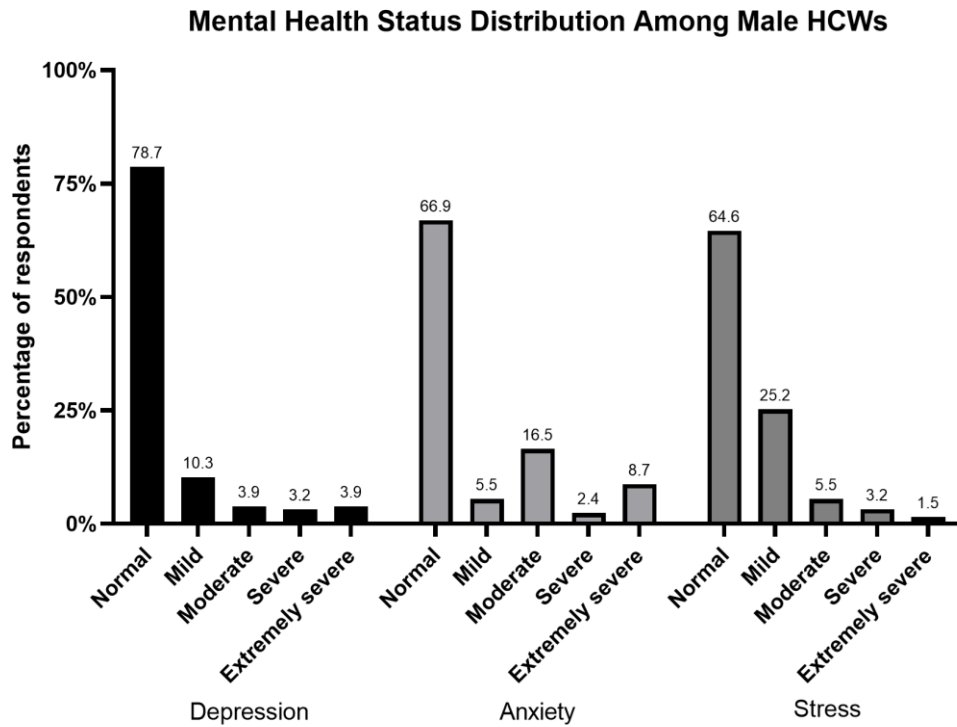
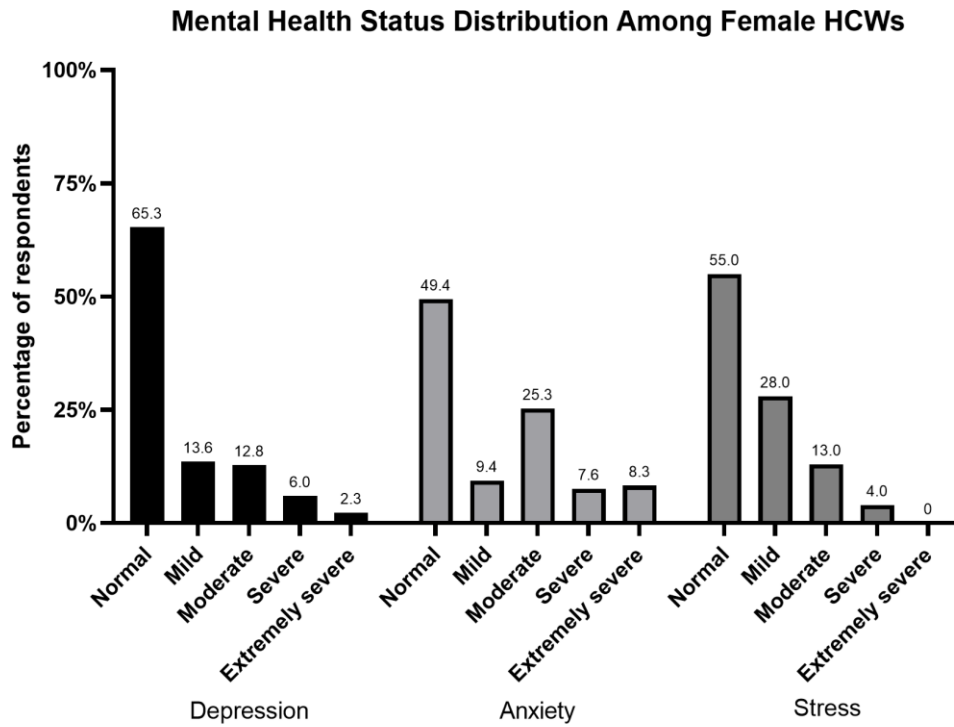


Figure 4

91x56mm (300 x 300 DPI)



Supplementary figure 1. Prevalence of depression, anxiety, and stress among male healthcare workers in each severity level according to DASS-21 scores.



Supplementary figure 2. Prevalence of depression, anxiety, and stress among female healthcare workers in each severity level according to DASS-21 scores.

Supplementary Table 1. Univariate analysis of determinants for depression among HCWs

Variables	p value	COR	95%CI
Age	.018	0.941	0.913 – 0.969
Sex			
Male (ref)	-	-	-
Female	.007	1.970	1.201 – 3.230
Marital status			
Single (ref)	-	-	-
Married	.013	0.524	0.315 – 0.873
Married with children	< .001	0.337	0.192 – 0.592
Job			
Doctor (ref)	-	-	-
Nurse	.262	0.676	0.340 – 1.341
Midwife	.133	0.380	0.107 – 1.345
Dentist	.872	1.073	0.457 – 2.520
Pharmacist	.464	0.676	0.237 – 1.929
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, and health educators)	.603	0.835	0.422 – 1.649
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.156	0.645	0.353 – 1.181
Primary care or other healthcare facilities	.096	0.666	0.412 – 1.075
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.118	0.656	0.387 – 1.113
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.268	1.338	0.799 – 2.238
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.666	0.833	0.364 – 1.906
1–3 years	.604	1.229	0.564 – 2.677
>3 years	.003	0.313	0.147 – 0.666
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.322	1.377	0.731 – 2.594
5-10 million rupiah/month	.413	1.301	0.692 – 2.446
10-20 million rupiah/month	.918	1.042	0.478 – 2.271
>20 million rupiah/month	.052	0.375	0.139 – 1.010
Working hour per week during the COVID-19 pandemic			

<40 hours/week (ref)	-	-	-
40–60 hours/week	.114	1.444	0.916 – 2.279
>60 hours/week	.064	2.104	0.957 – 4.627
History of COVID-19 infection			
Yes	.925	0.971	0.526 – 1.793
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.447	1.197	0.753 – 1.903
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.130	1.884	0.829 – 4.282
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.363	1.241	0.780 – 1.975
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.032	0.613	0.393 – 0.958
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.001	2.102	1.355 – 3.263
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.974	1.020	0.308 – 3.381
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.005	1.956	1.226 – 3.119
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.013	1.963	1.153 – 3.345
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	.003	2.343	1.346 – 4.080
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	< .001	0.364	0.228 – 0.581
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			
Yes	.099	1.521	0.924 – 2.504

No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.001	3.245	1.616 – 6.515
No (ref)	-	-	-

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Supplementary Table 2. Univariate analysis of determinants for anxiety among HCWs

Variables	p value	COR	95%CI
Age	< .001	0.942	0.919 – 0.966
Sex			
Male (ref)	-	-	-
Female	.001	2.070	1.332 – 3.218
Marital status			
Single (ref)	-	-	-
Married	.003	0.484	0.298 – 0.785
Married with children	.004	0.481	0.293 – 0.789
Job			
Doctor (ref)	-	-	-
Nurse	.092	0.583	0.311 – 1.039
Midwife	.186	0.509	0.187 – 1.385
Dentist	.545	1.285	0.570 – 2.901
Pharmacist	.516	0.735	0.289 – 1.865
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, and health educators)	.826	0.932	0.499 – 1.741
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.024	0.524	0.299 – 0.920
Primary care or other healthcare facilities	.140	0.716	0.460 – 1.116
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.464	0.840	0.527 – 1.339
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.197	1.379	0.847 – 2.246
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.147	0.545	0.240 – 1.238
1–3 years	.792	1.111	0.507 – 2.433
>3 years	.012	0.394	0.191 – 0.812
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.674	1.135	0.631 – 2.041
5-10 million rupiah/month	.851	1.058	0.590 – 1.895
10-20 million rupiah/month	.633	0.840	0.411 – 1.718
>20 million rupiah/month	.246	0.640	0.301 – 1.361
Working hour per week during the COVID-19 pandemic			

<40 hours/week (ref)	-	-	-
40–60 hours/week	.263	1.268	0.836 – 1.923
>60 hours/week	.157	1.739	0.808 – 3.746
History of COVID-19 infection			
Yes	.206	1.438	0.819 – 2.526
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.996	1.001	0.649 – 1.545
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.462	1.356	0.602 – 3.051
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.670	1.099	0.711 – 1.699
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.036	0.638	0.419 – 0.970
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.002	1.940	1.283 – 2.933
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.926	1.054	0.348 – 3.195
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.024	1.675	1.071 – 2.620
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.003	2.263	1.332 – 3.845
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	< .001	2.820	1.55 – 4.986
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	.001	0.459	0.292 – 0.721
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			
Yes	.040	1.650	1.024 – 2.660

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No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.093	1.815	1.906 – 3.637
No (ref)	-	-	-

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Supplementary Table 3. Univariate analysis of determinants for stress among HCWs

Variables	p value	COR	95%CI
Age	< .001	0.955	0.932 – 0.978
Sex			
Male (ref)	-	-	-
Female	.076	1.485	0.960 – 2.299
Marital status			
Single (ref)	-	-	-
Married	.020	0.561	0.345 – 0.911
Married with children	.055	0.616	0.376 – 1.009
Job			
Doctor (ref)	-	-	-
Nurse	.311	0.722	0.385 – 1.355
Midwife	.644	0.796	0.302 – 2.097
Dentist	.706	1.170	0.518 – 2.642
Pharmacist	.506	1.365	0.546 – 3.408
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, and health educators)	.853	1.061	0.566 – 1.989
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.321	0.754	0.432 – 1.317
Primary care or other healthcare facilities	.407	0.828	0.530 – 1.294
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.607	0.884	0.553 – 1.414
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.742	0.920	0.561 – 1.511
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.261	0.624	0.274 – 1.421
1–3 years	.403	1.390	0.642 – 3.011
>3 years	.228	0.644	0.315 – 1.317
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.100	1.655	0.909 – 3.013
5-10 million rupiah/month	.236	1.434	0.790 – 2.604
10-20 million rupiah/month	.584	1.225	0.593 – 2.531
>20 million rupiah/month	.357	0.89	0.312 – 1.522
Working hour per week during the COVID-19 pandemic			

<40 hours/week (ref)	-	-	-
40–60 hours/week	.359	1.217	0.800 – 1.852
>60 hours/week	.321	1.473	0.685 – 3.168
History of COVID-19 infection			
Yes	.532	1.197	0.681 – 2.106
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.935	0.982	0.634 – 1.521
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.143	1.841	0.814 – 4.167
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.437	1.190	0.768 – 1.843
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.019	0.602	0.395 – 0.919
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.025	1.604	1.061 – 2.425
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.377	1.650	0.544 – 5.003
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.019	1.708	1.091 – 2.673
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.005	2.129	1.261 – 3.595
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	< .001	2.781	1.586 – 4.874
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	< .001	0.427	0.271 – 0.671
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			
Yes	.001	2.193	1.355 – 3.549

No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.006	2.698	1.323 – 5.501
No (ref)	-	-	-

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Supplementary Table 4. Univariate analysis of determinants for impaired physical health component among HCWs

Variables	p value	COR	95%CI
Age	.134	1.033	0.990 – 1.079
Sex			
Male (ref)	-	-	-
Female	.633	0.836	0.401 – 1.744
Marital status			
Single (ref)	-	-	-
Married	.318	1.496	0.878 – 3.299
Married with children	.214	1.703	0.735 – 3.945
Job			
Doctor (ref)	-	-	-
Nurse	.310	0.621	0.248 – 1.557
Midwife	.802	0.821	0.177 – 3.813
Dentist	.285	0.531	0.167 – 1.695
Pharmacist	.564	1.836	0.233 – 14.441
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, and health educators)	.915	1.063	0.346 – 3.263
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.298	0.633	0.267 – 1.499
Primary care or other healthcare facilities	.944	0.973	0.448 – 2.113
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.095	2.284	0.865 – 6.026
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.659	0.837	0.380 – 1.846
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.090	0.163	0.020 – 1.328
1–3 years	.143	0.210	0.026 – 1.693
>3 years	.281	0.323	0.042 – 2.517
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.555	1.423	0.441 – 4.591
5-10 million rupiah/month	.052	0.385	0.147 – 1.008
10-20 million rupiah/month	.680	1.352	0.322 – 5.670
>20 million rupiah/month	.794	1.211	0.288 – 5.096
Working hour per week during the			

COVID-19 pandemic			
<40 hours/week (ref)	-	-	-
40–60 hours/week	.706	1.146	0.565 – 2.325
>60 hours/week	.626	0.750	0.236 – 2.386
History of COVID-19 infection			
Yes	.818	0.898	0.357 – 2.255
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.342	0.713	0.35 – 1.433
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.278	0.536	0.174 – 1.653
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.778	0.901	0.438 – 1.854
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.285	0.662	0.312 – 1.408
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.876	1.057	0.528 – 2.113
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.805	1.298	0.164 – 10.268
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.366	1.456	0.645 – 3.285
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.589	0.796	0.348 – 1.820
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	.996	1.002	0.400 – 2.509
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	.080	1.857	0.929 – 3.712
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			

Yes	.071	0.517	0.252 – 1.059
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.722	1.199	0.350 – 4.113
No (ref)	-	-	-

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Supplementary Table 5. Univariate analysis of determinants for impaired mental health component among HCWs

Variables	p value	COR	95%CI
Age	.973	1.000	0.978 – 1.021
Sex			
Male (ref)	-	-	-
Female	.748	0.932	0.605 – 1.434
Marital status			
Single (ref)	-	-	-
Married	.266	1.319	0.810 – 2.148
Married with children	.263	1.329	0.808 – 2.187
Job			
Doctor (ref)	-	-	-
Nurse	.057	1.804	0.983 – 3.310
Midwife	.958	0.975	0.369 – 2.571
Dentist	.777	0.884	0.377 – 2.072
Pharmacist	.273	1.671	0.668 – 4.179
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, and health educators)	.994	1.002	0.527 – 1.907
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.752	1.093	0.629 – 1.898
Primary care or other healthcare facilities	.391	0.820	0.521 – 1.290
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.961	0.988	0.617 – 1.582
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.729	1.092	0.665 – 1.790
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.252	1.619	0.710 – 3.689
1–3 years	.502	0.760	0.342 – 1.691
>3 years	.937	1.030	0.497 – 2.134
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.187	1.510	0.818 – 2.785
5-10 million rupiah/month	.050	1.833	1.001 – 3.358
10-20 million rupiah/month	.919	1.040	0.490 – 2.208
>20 million rupiah/month	.612	1.219	0.567 – 2.622
Working hour per week during the			

COVID-19 pandemic			
<40 hours/week (ref)	-	-	-
40–60 hours/week	.177	1.338	0.877 – 2.040
>60 hours/week	.899	0.950	0.429 – 2.105
History of COVID-19 infection			
Yes	.841	0.943	0.430 – 1.678
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.829	0.953	0.612 – 1.482
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.388	1.429	0.635 – 3.220
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.475	0.850	0.544 – 1.328
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.424	0.841	0.550 – 1.286
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.626	0.901	0.593 – 1.369
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.920	0.944	0.303 – 2.939
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.893	0.969	0.615 – 1.527
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.099	1.548	0.920 – 2.604
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	.300	0.740	0.418 – 1.308
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	.307	0.791	0.504 – 1.240
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			

Yes	.140	1.434	0.888 – 2.314
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.238	0.640	0.305 – 1.342
No (ref)	-	-	-

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STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	3 (line 58)
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3 (line 71-74)
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-6 (line 90-125)
Objectives	3	State specific objectives, including any prespecified hypotheses	6 (line 125-127)
Methods			
Study design	4	Present key elements of study design early in the paper	7 (line 130)
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7 (130-144)
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	7 (140-143)
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9 (line 161-198)
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9 (line 161-198)
Bias	9	Describe any efforts to address potential sources of bias	7 (line 131-134)
Study size	10	Explain how the study size was arrived at	7 (line 145-147)
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	10 (line 204-206)
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9-10 (line 201-216)
		(b) Describe any methods used to examine subgroups and interactions	10 (line 206-216)
		(c) Explain how missing data were addressed	9 (line 201)

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(d) *Cohort study*—If applicable, explain how loss to follow-up was addressed

N/A

Case-control study—If applicable, explain how matching of cases and controls was addressed

Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy

(e) Describe any sensitivity analyses

N/A

Continued on next page

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Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	11 (line 221-222)
		(b) Give reasons for non-participation at each stage	Figure 1
		(c) Consider use of a flow diagram	Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 2
		(b) Indicate number of participants with missing data for each variable of interest	Table 2
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	N/A
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	N/A
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	11 (line 227-228); 12 (line 266-267)
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 3, 4, and 5; supplementary tables 1, 2, 3
		(b) Report category boundaries when continuous variables were categorized	Table 1; 9 (line 197-198); 10 (line 215-216)
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	11 (line 229-233)
Discussion			
Key results	18	Summarise key results with reference to study objectives	14 (line 275-279)
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18 (line 378-395)
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14-18 (line 282-395)
Generalisability	21	Discuss the generalisability (external validity) of the study results	18 (line 380-387)
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20 (line 420-421)

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2 *Give information separately for cases and controls in case-control studies and, if applicable, for exposed and
3 unexposed groups in cohort and cross-sectional studies.
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6 **Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and
7 published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely
8 available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at
9 <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is
10 available at www.strobe-statement.org.
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Mental Health and Health-Related Quality of Life among Healthcare Workers in Indonesia during the Coronavirus Disease 2019 Pandemic: A Cross-Sectional Study

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Complete List of Authors:	Syamlan, Adila T.; Faculty of Medicine Universitas Airlangga - Dr. Soetomo General Academic Hospital, Department of Psychiatry Salamah, Sovia; Faculty of Medicine Universitas Airlangga, Department of Public Health and Preventive Medicine; University Medical Centre Groningen, Division of Nephrology, Department of Internal Medicine, University Medical Center Groningen, Groningen, The Netherland. Alkaff, Firas; Faculty of Medicine Universitas Airlangga, Department of Anatomy, Histology, and Pharmacology; University Medical Centre Groningen, Division of Nephrology, Department of Internal Medicine, University Medical Center Groningen, Groningen, The Netherland. Prayudi, Yogi E.; Faculty of Medicine Universitas Airlangga Kamil, Muhammad; Faculty of Medicine Universitas Airlangga - Dr. Soetomo General Academic Hospital, Department of Neurosurgery Irzaldy, Abyan; Karolinska Institute Karimah, Azimatul; Faculty of Medicine Universitas Airlangga - Dr. Soetomo General Academic Hospital, Department of Psychiatry Postma, Maarten; University of Groningen, Pharmacoepidemiology and Pharmacoeconomics Purba, Fredrick; Padjadjaran University, Department of Developmental Psychology Arifin, Bustanul; University of Groningen, Pharmacoepidemiology and Pharmacoeconomics
Primary Subject Heading:	Public health
Secondary Subject Heading:	Epidemiology, Mental health
Keywords:	COVID-19, MENTAL HEALTH, PUBLIC HEALTH, EPIDEMIOLOGY

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1 **Mental Health and Health-Related Quality of Life among Healthcare Workers in**
2 **Indonesia during the Coronavirus Disease 2019 Pandemic: A Cross-Sectional**
3 **Study**

4 **Running title:** HCW mental health and HRQoL during pandemic

5
6 Adila T. Syamlan^{1#}, Sovia Salamah^{2,3##}, Firas F. Alkaff^{3,4*}, Yogi E. Prayudi⁵,
7 Muhammad Kamil⁶, Abyan Irzaldy⁷, Azimatul Karimah¹, Maarten J. Postma^{4,8,9,10,11},
8 Fredrick D. Purba¹², Bustanul Arifin^{8,13,14}

9
10 ¹Department of Psychiatry, Faculty of Medicine Universitas Airlangga – Dr. Soetomo
11 General Academic Hospital, Surabaya, Indonesia

12 ²Department of Public Health and Preventive Medicine, Faculty of Medicine
13 Universitas Airlangga, Surabaya, Indonesia

14 ³Department of Internal Medicine, University Medical Center Groningen, Groningen,
15 The Netherlands

16 ⁴Division of Pharmacology and Therapy, Department of Anatomy, Histology, and
17 Pharmacology, Faculty of Medicine Universitas Airlangga, Surabaya, Indonesia

18 ⁵Faculty of Medicine Universitas Airlangga, Surabaya, Indonesia

19 ⁶Department of Neurosurgery, Faculty of Medicine Universitas Airlangga, Surabaya,
20 Indonesia

21 ⁷Karolinska Institute, Solna, Sweden

22 ⁸Department of Health Sciences, University of Groningen, University Medical Center
23 Groningen, Groningen, The Netherlands

24 ⁹Institute of Science in Healthy Ageing & healthcaRE (SHARE), University Medical
25 Center Groningen, University of Groningen, Groningen, The Netherlands

1
2
3 26 ¹⁰Unit of Pharmacotherapy, Epidemiology and Economics (PTE2), Department of
4
5
6 27 Pharmacy, University of Groningen, Groningen, The Netherlands

7
8 28 ¹¹Department of Economics, Econometrics and Finance, Faculty of Economics &
9
10 29 Business, University of Groningen, Groningen, The Netherlands

11
12 30 ¹²Department of Developmental Psychology, Faculty of Psychology, Universitas
13
14 31 Padjadjaran, Bandung, Indonesia

15
16
17 32 ¹³Pharmacy Faculty, Universitas Hasanuddin, Makassar, Sulawesi Selatan, Indonesia

18
19 33 ¹⁴Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada,
20
21 34 Yogyakarta, Indonesia

22
23
24 35 #Co-first author, these authors contributed equally to this work.

25
26 36 *Corresponding authors:

27
28 37 Sovia Salamah

29
30 38 Hanzeplein 1, 9713GZ, Groningen, The Netherlands / Jl. Mayjen Prof. Dr. Moestopo
31
32 39 No 47, Surabaya, East Java 60132, Indonesia.

33
34 40 Email: s.salamah@umcg.nl / sovia.salamah@fk.unair.ac.id

35
36 41 Telephone: +31651114511 / +6282244485448

37
38
39 42
40
41 43 Firas Farisi Alkaff

42
43 44 Hanzeplein 1, 9713GZ, Groningen, The Netherlands / Jl. Mayjen Prof. Dr. Moestopo
44
45 45 No 47, Surabaya, East Java 60132, Indonesia.

46
47 46 Email: f.f.alkaff@umcg.nl / firasfarisialkaff@fk.unair.ac.id

48
49 47 Telephone: +31616383945 / +6281330101993

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54 49 **Keywords:** anxiety; COVID-19; depression; Indonesia; Quality of life; stress

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56
57 50 **Word count:** 3444 words

1
2
3 51 **Abstract**
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5 52 **Objectives:** Healthcare workers (HCWs) are the front lines during the coronavirus
6 disease 2019 (COVID-19) pandemic. They are more exposed to COVID-19 than other
7
8 53 professions. Studies from other countries have shown that the mental health and
9
10 54 health-related quality of life (HRQoL) of HCWs were affected during this pandemic.
11
12 55 However, studies on mental health in Indonesia remain scarce and no study has
13
14 56 evaluated the HRQoL among HCWs. Thus, this study was designed to explore the
15
16 57 mental health status and HRQoL among HCWs in Indonesia.
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20 59 **Design:** This was a cross-sectional study.
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23 60 **Setting:** This was an open online survey in Indonesia conducted from December 2020
24
25 61 to February 2021.
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27 62

28 62 **Participants:** This study involved HCWs who worked during the COVID-19
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30 63 pandemic. Of the 502 respondents who filled the online questionnaire, 392 were
31
32 64 included in the analysis.
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34 65

35 65 **Outcomes:** Mental health status was measured using the 21-item Depression, Anxiety,
36
37 66 and Stress Scale (DASS-21) and HRQoL was measured using the second version of
38
39 67 the 12-item Short-Form Health Survey (SF12v2).
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41 68

42 68 **Results:** The prevalence of depression, anxiety, and stress among HCWs was 29.4%,
43
44 69 44.9%, and 31.8%, respectively. Using the SF12v2 questionnaire, 354 (90.3%) HCWs
45
46 70 were found to have impaired physical component and 156 (39.8%) HCWs have
47
48 71 impaired mental component.
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50 72

51 72 **Conclusion:** The prevalence of mental health problems among HCWs was high in
52
53 73 Indonesia. HRQoL, particularly the physical component, was affected in most HCWs.
54
55 74 Thus, policymakers should give more attention to the mental health and HRQoL of
56
57 75 HCWs during the COVID-19 pandemic.
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76

77 Strength and limitations of this study

- 78 • This study assessed the prevalence of and determinants for mental health
79 problems and impaired Health-related quality of life (HRQoL) among
80 healthcare workers (HCWs) during the coronavirus disease 2019 (COVID-19)
81 pandemic in Indonesia.
- 82 • We performed univariate logistic regression analysis, followed by multivariate
83 logistic regression analysis using backward selection, to determine the
84 determinants for mental health problems and impaired HRQoL.
- 85 • The cross-sectional nature of this study could not identify temporal
86 relationships between the course of the COVID-19 pandemic and mental
87 health problems and HRQoL impairment.
- 88 • Because of the nonprobability purposive sampling method, generalization of
89 this study's findings to all HCWs in Indonesia should be done cautiously.

90 **Background**

91 Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome
92 coronavirus 2 (SARS-CoV-2), emerged in December 2019 in Wuhan, Hubei Province
93 of China.¹ This virus is related to SARS-CoV-1, which was the cause of SARS in
94 2002 and Middle East Respiratory Syndrome (Mers-CoV) in 2012.² As of March 11,
95 2020, the World Health Organization characterized COVID-19 as a pandemic.³ To
96 this date, over 428 million were affected by this disease with over 5 million of deaths
97 worldwide.⁴ In Indonesia, the first official case of COVID-19 was on March 2, 2020.⁵
98 After that, the number of reported cases in Indonesia has been exponentially
99 increasing. Currently, over 3.9 million individuals are positive for the disease with
100 more than 121,000 deaths.⁶

101
102 Healthcare workers (HCWs) are the front lines during the COVID-19 pandemic and
103 thus are more exposed to COVID-19 than other professions. Worldwide, the total
104 number of deaths among HCWs is over 155 ,000.⁷ In Indonesia, the total number of
105 deaths among HCWs is 2,066 to this date.⁸ Although the reported mortality rate
106 among HCWs is lower than that in the general population,^{9, 10} higher levels of mental
107 health problems were found among HCWs.¹¹ Heavy workload and lack of personal
108 protective equipment (PPE) are highlighted as profession-related contributing risk
109 factors.¹²

110
111 A recently published systematic review has revealed that the prevalence of depression
112 and anxiety among HCWs during the COVID-19 pandemic was 37% and 40%,
113 respectively.¹³ This prevalence was higher than that observed in non-pandemic
114 situations, where the prevalence of depression and anxiety was 11.3% and 17.3%,

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2
3 115 respectively.¹⁴ However, no study from Indonesia was included in this
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5 116 meta-analysis.^{13, 15} To this date, studies on mental health among HCWs in Indonesia
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7 117 remain scarce and are either focusing on a certain HCW profession or conducted only
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10 118 in one part of the country.¹⁶⁻²⁰ Other than that, all studies have adopted a
11
12 119 cross-sectional study design, thus only illustrating a particular moment of the
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14 120 pandemic. However, no study has been conducted during the later stage of the
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16
17 121 COVID-19 pandemic in Indonesia when the number of cases and deaths was
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19 122 increasing.²¹

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24 124 Besides mental health problems, health-related quality of life (HRQoL) is also
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26 125 affected during the COVID-19 pandemic.²² Currently, few published studies have
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28 126 evaluated the HRQoL of HCWs during the COVID-19 pandemic²³⁻³¹; however, no
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30 127 such studies have been conducted in Indonesia. Thus, this study was designed to
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33 128 explore the mental health status and HRQoL among HCWs in Indonesia and identify
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35 129 the determining factors.
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3 130 **Methods**
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5 131 Study design
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8 132 This study was a cross-sectional study using an open online questionnaire.
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10 133 SurveyMonkey® was used as the survey platform. Using this survey platform, each
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12 134 respondent can only participate in the questionnaire once because the Internet
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14 135 Protocol address was used to identify potential duplicate entries from the same
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16 136 respondent. The questionnaire link was distributed through social media, that is,
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18 137 WhatsApp and Instagram, the most popular and accessible social media platforms in
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20 138 Indonesia.
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26 140 Participants
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28 141 The study participants were HCWs in Indonesia and were recruited using a
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30 142 nonprobability purposive snowball sampling technique. The inclusion criteria were as
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32 143 follows: HCWs who were actively working during the COVID-19 pandemic and
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34 144 agreed to participate in this study. The HCWs aimed to be included in this study were
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36 145 doctor, dentist, midwife, pharmacist, nutritionist, physiotherapist, laboratory analyst,
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38 146 acupuncturist, health educator, and hospital administrator.³² Informed consent was
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40 147 obtained from each respondent. Data collection was conducted from December 2020
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42 148 to February 2021. The minimum required sample size was calculated using
43
44 149 EpiInfo™.³³ According to the Indonesia National Disaster Management Agency, the
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46 150 total number of HCWs in Indonesia was 528,714 on September 2020.³⁴ Using an
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48 151 expected frequency of 50%, acceptable margin of error of 5%, and design effect of
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50 152 1.0, a minimum of 384 samples were needed to obtain sufficient statistical power,
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52 153 assuming 95% confidence intervals.
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3 155 Ethics
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5 156 This study was performed according to the principles of the Declaration of Helsinki
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7 157 and approved by the relevant Institutional Review Board. The data were kept
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9 158 confidential and no personally identifiable information was reported.
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15 160 Instruments
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17 161 The questionnaire contained 60 questions, separated into 4 pages. The time needed to
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19 162 complete the questionnaire was 15-20 minutes. All questions were mandatory to
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21 163 answer, and respondents could not move to the next page if all questions on the
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23 164 previous page had not been answered. Before submitting the questionnaire, the
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25 165 respondents could review and change their answers.
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30 167 The background and demographic characteristics of each respondent were obtained
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32 168 using a questionnaire that contained questions on the respondent's gender, age,
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34 169 marital status, specific job, workplace setting during the pandemic, workplace
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36 170 location, working experience as an HCW before the COVID-19 pandemic, working
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38 171 hours per week, monthly income, history of COVID-19 infection, comorbidities,
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40 172 availability of personal protective equipment in the workplace, verbal or physical
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42 173 intimidation in the workplace, intimidation from the society outside the workplace,
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44 174 support from the workplace if there is any intimidation, willingness to work during
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46 175 the COVID-19 pandemic, and reason for working during the COVID-19 pandemic.
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52 177 Mental health was measured using the Indonesian version of 21-item Depression,
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54 178 Anxiety, and Stress Scale (DASS-21).³⁵ This questionnaire has been adapted to
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56 179 Bahasa Indonesia previously and showed good validity and reliability.³⁶ The
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3 180 DASS-21 is a self-administered questionnaire consisting of depression, anxiety, and
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5 181 stress subscales, each composed of 7 items. Every item could have a score ranging
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7 182 from 0, indicating a lack of symptoms in the past week, to 3, indicating the presence
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9 183 of symptoms for almost every day in the past week. To calculate the final score of
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11 184 each subscale, the score was multiplied by 2. The minimum final score was 0 and the
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13 185 maximum score was 42 for each subscale. Based on the total score, mental health can
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15 186 be categorized into normal or mild, moderate, severe, or extremely impaired (**Table**
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17 187 **1**).³⁵
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24 189 HRQoL was evaluated using the second version of the 12-item Short-Form Health
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26 190 Survey (SF12v2) (license number: QM054173).³⁷ The use of SF12v2 to evaluate
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28 191 HRQoL was based on the consideration that it can be used in nonpatient populations
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30 192 and has fewer questions than other HRQoL questionnaires. The SF12v2 has been
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32 193 adapted to Bahasa Indonesia previously and showed good validity and reliability.³⁸
33
34 194 This questionnaire measures both the physical and mental health components, which
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36 195 are divided into 8 health domain scales, that is, physical functioning (PF), role
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38 196 physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning
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40 197 (SF), role emotional (RE), and mental health (MH). PF, RP, BP, and GH have the
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42 198 greatest physical component among the health domains, whereas VT, SF, RE, and
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44 199 MH have the greatest mental component.³⁷ The explanations of each domain scale
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46 200 have been described elsewhere.³⁸ The SF12v2 was scored using Optum® PRO CoRE
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48 201 software (Optum PROCoRE 1.3 Smart Measurement System. Optum Inc., USA). The
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50 202 software will generate the score for each health domain and the summary scores of the
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52 203 physical and mental components. Scores of less than 47 indicate significant
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54 204 impairment in the associated health domain.³⁷
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206 Data analysis

207 Only completed questionnaires were included in the data analysis. Acquired data were
208 analyzed using IBM SPSS Statistics for Windows version 25.0. (IBM Corp., Armonk,
209 NY, USA). Differences with p values $< .05$ were considered statistically significant.
210 The one-sample Kolmogorov-Smirnov test was used to evaluate the data distribution.
211 Normally distributed data was presented as mean \pm SD, skewed data was presented as
212 median [interquartile range (IQR)], and nominal data was presented as frequency (%).
213 To discover the determinants of mental health and HRQoL, multiple logistic
214 regression analysis using backward selection was used. Data analysis was conducted
215 in two phases. In the first phase, univariate logistic regression was used to identify
216 independent variables associated with mental health status and HRQoL. Variables
217 with p values $< .1$ were included in the next phase. In the second phase, multivariate
218 logistic regression using backward selection was used. Variables with p values $< .05$
219 from multivariate regression analysis were considered as the determinants.³⁹ During
220 the analysis to determine the determinants, mental health variables were recategorized
221 into dichotomous (normal or not) variables with the cutoff as follows: 9 for
222 depression, 6 for anxiety, and 10 for stress.³⁵

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224 Patient and public involvement

225 Patients and the public were not involved in this study.

226 **Results**

227 Of the 502 HCWs who accessed the online questionnaire, 392 were included for the
228 analysis. The total response rate for this study was 78% (**Figure 1**). The detailed
229 sociodemographic characteristics of the respondents are summarized in **Table 2**.

231 Mental Health

232 The median scores of the depression, anxiety, and stress subscales were 6 [2–10], 6
233 [2–12], and 10 [4–10], respectively. Of the 392 respondents, 119 (29.4%) experienced
234 depression, 176 (44.9%) experienced anxiety, and 164 (31.8%) experienced stress
235 (**Figure 2**). Stratified by gender, the prevalence of depression, anxiety, and stress
236 among male HCWs was 27 (21.3%), 42 (33.1%), and 45 (35.4%), respectively,
237 whereas the prevalence of depression, anxiety, and stress among female HCWs was
238 92 (34.7%), 134 (50.6%), and 119 (44.9%), respectively (**Supplementary Figure 1**
239 **and 2**).

241 To find the determinants of depression among HCWs, multivariate logistic regression
242 analysis was performed by including all variables that had a *p* value of < .1 in the
243 univariate analysis (**Supplementary Table 1**). Female HCWs, HCWs who did not
244 receive support from the workplace when intimidated by the patients or patients'
245 family members because of COVID-19-related issues, and HCWs that worked during
246 the pandemic because they were bound by working contracts were more likely to be
247 depressed. Meanwhile, HCWs with working experience of more than 3 years in
248 healthcare facilities were less likely to be depressed (**Table 3**).

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3 250 To find the determinants of anxiety among HCWs, multivariate logistic regression
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5 251 analysis was performed by including all variables that had a p value of $< .1$ in the
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8 252 univariate analysis (**Supplementary Table 2**). Female HCWs, HCWs who did not
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10 253 receive support from the workplace when intimidated by the patients or patients'
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12 254 family members, and HCWs who were not willing to work during the COVID-19
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14 255 pandemic were more likely to be anxious. Meanwhile, older HCWs and HCWs who
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16 256 worked in healthcare facilities other than COVID-19 hospitals or referral hospitals for
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18 257 COVID-19 were less likely to be anxious (**Table 4**).
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24 259 To find the determinants of stress among HCWs, multivariate logistic regression
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26 260 analysis was performed by including all variables that had a p value of $< .1$ in the
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28 261 univariate analysis (**Supplementary Table 3**). HCWs who did not receive support
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30 262 from the workplace when intimidated by the patients or patients' family members,
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32 263 HCWs who are not willing to work during the COVID-19 pandemic, and HCWs who
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34 264 worked during the pandemic because of financial matters or because they were bound
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36 265 by working contracts were more likely to be stressed. Meanwhile, older HCWs were
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38 266 less likely to be stressed (**Table 5**).
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43 268 HRQoL

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46 269 The median score of the physical component summary (PCS) was 41.80 [39.15–44.14]
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48 270 and the median score of the mental component summary (MCS) was 49.81 [43.25–
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50 271 55.95]. The detailed scores of the PCS, MCS, and each health domain scale are
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52 272 summarized in **Figure 3**. Of the 392 HCWs, 354 (90.3%) had an impairment in the
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54 273 physical component and 156 (39.8%) had an impairment in the mental component
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56 274 (**Figure 4**).
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5 276 To find the determinants of impaired physical and mental health components among
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8 277 HCWs, multivariate logistic regression analysis was performed by including all
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10 278 variables that had a p value of $< .1$ in the univariate analysis (**Supplementary Table**
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12 279 **4 and 5**). However, no determinants were found in the multivariate analysis.
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280 **Discussion**

281 The results of this study provided additional information on the mental health
282 conditions and HRQoL among Indonesian HCWs. Moreover, this study identified
283 several significant determinants of stress, anxiety, and depression among HCWs. This
284 may also act as a guide for relevant actions that can be taken by relevant authorities to
285 provide preventive efforts regarding mental health matters.

287 Mental health

288 The prevalence of depression, anxiety, and stress observed in this study was 29.4%,
289 44.9%, and 31.8%, respectively, which were higher than that reported in previous
290 studies from Indonesia that also used the DASS-21 as the study instrument, wherein
291 the prevalence was 2.4–13.2% for depression, 6.8–20.6% for anxiety, and 5.7–11%
292 for stress.^{16, 17, 19} The discrepancy between this study and previous studies might be
293 attributed to the time difference in data collection. In this study, data collection was
294 performed in the later time of the pandemic, whereas in previous studies, data
295 collection was performed at the beginning of the pandemic.

297 Indeed, a recent systematic review and meta-analysis of longitudinal studies has
298 shown that the prevalence of mental health problems was higher only at the beginning
299 of the pandemic and continuously declined after 2 months.⁴⁰ In HCWs, the high
300 prevalence of mental health problems at the beginning of the pandemic may be
301 because of the sudden escalation of the workload and lack of understanding of the
302 disease. At the later stage, as there are more information about the disease and HCWs
303 have adapted to the new workload, the prevalence of mental health problems
304 decreased.⁴¹ However, note that most studies included in that review were from

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3 305 countries where the peak of the first wave occurred at the beginning of the pandemic
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5 306 and that there is a lack of studies conducted in the later period of the pandemic when
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7 307 the number of cases surged again.^{40, 41} In a single-center longitudinal study in Italy,
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9 308 the prevalence of anxiety and stress remained high even during the third wave,
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11 309 whereas the prevalence of depression increased from the first wave to the third
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13 310 wave.⁴² As the number of cases increases, the workload of the HCWs also increases.
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15 311 This will negatively affect their mental health condition.^{43, 44} In Indonesia, the peak of
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17 312 the first wave occurred not at the beginning of the pandemic but during the data
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19 313 collection of this study, that is, from December 2020 to February 2021.²¹ This
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21 314 explained the higher prevalence of mental health problems in this study than in
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23 315 previous studies.
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31 317 Several studies were conducted during the same period as this study. Ménard et al
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33 318 (2022) have shown that the prevalence of depression, anxiety, and stress among
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35 319 Canadian HCWs was 14.4%, 21.8%, and 13.5%, respectively.⁴⁵ The lower prevalence
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37 320 in Canada might be explained by the difference in the healthcare systems. Different
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39 321 healthcare systems across countries can lead to differences in the prevalence of mental
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41 322 health problems among HCWs.⁴⁶ Unlike Canada, the capacity of the current
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43 323 Indonesia's healthcare system to respond to the COVID-19 pandemic is far from
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45 324 adequate.⁴⁷ Another study from Italia has revealed that the prevalence of depression,
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47 325 anxiety, and stress was 63%, 31%, and 80%, respectively.⁴² The higher prevalence in
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49 326 that study might be explained by the difference in the study population where that
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51 327 study only included frontline HCWs (intensivist) caring exclusively for COVID-19
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53 328 patients, whereas the HCWs in this study also treat non-COVID-19 patients and some
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55 329 of them were not frontline HCWs. It has been shown previously that frontline HCWs
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3 330 and those who worked in the intensive care unit during the COVID-19 pandemic were
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5 331 more likely to develop mental health problems.^{48, 49}
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10 333 In this study, the prevalence of depression, anxiety, and stress was higher in female
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12 334 HCWs than that in male HCWs (**Supplementary Figure 1 and 2**). Moreover, the
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14 335 female sex was an independent risk factor for depression and anxiety (**Table 3 and 4**).
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16 336 Similarly, other studies have also reported gender differences in mental health
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18 337 problems among HCWs during the COVID-19 pandemic, where it is more prevalent
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20 338 in female HCWs.^{50, 51} This can be because females have higher rates of mood and
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22 339 anxiety disorders due to a higher mean level of internalizing and potentially by the
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24 340 influence of sex hormones.^{52, 53}
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30 342 A previous study in Indonesia among nurses who worked during the COVID-19
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32 343 pandemic has shown that rejection from family and/or neighbors is a risk factor for
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34 344 depression, anxiety, and stress.¹⁷ We also found a similar finding where intimidation
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36 345 from society was a risk factor for depression, anxiety, and stress in the univariate
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38 346 analysis (**Supplementary Tables 1, 2, and 3**). However, this variable lost its
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40 347 significance in the multivariate analysis, whereas workplace support towards potential
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42 348 intimidation was shown to lower the risk of depression, anxiety, and stress. This
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44 349 indicates that the workplace environment plays a more substantial role in mental
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46 350 health. Havaei et al. (2021) have found that negative ratings of workplace conditions
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48 351 such as workplace relations, workplace safety, organizational support, and
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50 352 preparedness were associated with poor mental health outcomes during the
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52 353 COVID-19 pandemic.⁵⁴ A narrative review focusing on the mental health of HCWs
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54 354 during the COVID-19 pandemic has also stated that intrinsic high-risk professional,
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3 355 organizational factors such as lack of workplace support, and vulnerable workers such
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5 356 as frontline HCWs are at a higher risk of mental issues during the pandemic.⁵⁵
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10 358 HRQoL

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12 359 To this date, many established questionnaires can be used to assess HRQoL. In
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14 360 previously published studies on HRQoL among HCWs during the COVID-19
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16 361 pandemic, several HRQoL questionnaires were used, that is, WHOQOL-BREF,^{23, 27, 29}
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18 362 EQ-5D,^{30, 31} SF36,²⁴ and SF12.²⁸ Since we used the SF12v2 to evaluate HRQoL in
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20 363 this study, we argue that comparing our findings with those of previous studies that
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22 364 have used either the SF12 or SF36 is essential. The PCS and MCS scores in previous
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24 365 studies were higher than those in this study,^{24, 28} indicating that HRQoL in previous
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26 366 studies was better. Moreover, we found that 39.8% of the HCWs included in this
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28 367 study had an impairment in the mental component and 90.3% had an impairment in
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30 368 the physical component. However, we cannot compare our findings with those of
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32 369 previous studies since they did not present the prevalence of HCWs with impaired
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34 370 physical and mental health components.^{24, 28}
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42 372 The worse HRQoL in this study might be caused by the time difference of the study
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44 373 period where previous studies were conducted at the beginning of the pandemic and
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46 374 this study was conducted in the later time of the pandemic.^{24, 28} Similar to the mental
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48 375 health status, we would argue that the HRQoL of HCWs at the beginning of the
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50 376 pandemic was not as affected as that at the later period. The number of COVID-19
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52 377 patients at the later period was significantly higher than at the beginning of the
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54 378 pandemic.⁶ This increased number of patients will increase the workload of HCWs,
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56 379 even if the working hour is not prolonged. Over time, increasing workload will lead to
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3 380 physical exhaustion of HCWs. Moreover, the number of deaths of COVID-19 patients
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5 381 increases over time. Constant exposure to dealing with dying and death, in addition to
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7 382 the high workload, is considered as an occupational stressor.^{56, 57}
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11 384 **Study limitations**

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14 385 This study has some limitations to consider. First, the study design was
15
16 386 cross-sectional study, whereas the prevalence of mental health problems during the
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18 387 COVID-19 pandemic is dynamic. Second, as the sampling technique used in this
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20 388 study was nonprobability purposive snowball sampling and that only those who had
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22 389 internet access and spare time can enroll in this study, this study was prone to
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24 390 selection bias. Furthermore, although the number of respondents in this study had
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26 391 surpassed the minimum required number of samples, the number of respondents was
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28 392 small compared with the total number of HCWs in Indonesia. Therefore,
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30 393 generalization of this study's findings to all HCWs in Indonesia should be done
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32 394 cautiously. Third, the respondents were not only frontline HCWs but also second-line
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34 395 HCWs, and they worked not only in COVID-19 hospitals but also in other healthcare
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36 396 sectors. This may underestimate the prevalence of mental health problems. Fourth, the
37
38 397 diagnosis of depression, anxiety, stress, and HRQoL impairment in this study was
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40 398 based on self-reported questionnaires. This may also underestimate the prevalence of
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42 399 mental health problems. Fifth, 78 (16%) respondents accessed the online
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44 400 questionnaire but did not finish it. The possible explanation for this high loss is
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46 401 because it takes quite a long time (approximately 15–20 minutes) to complete the
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48 402 questionnaire.
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403 **Conclusion**

404 This is the first study that evaluated the prevalence of and determinants for both
405 mental health status and HRQoL during the COVID-19 pandemic in Indonesia. The
406 prevalence of depression, anxiety, and stress among HCWs was 29.4%, 44.9%, and
407 31.8%, respectively, whereas the prevalence of impaired HRQoL was 90.3% for PCS
408 and 39.8% for MCS. The results of this study suggest that the workplace environment
409 is where interventions to prevent and mitigate mental issues are most needed.
410 Additionally, more attention is also needed for female HCWs, since female HCWs are
411 at a higher risk of developing mental health issues. Based on our findings, we
412 recommend that more attention towards HCWs should be given by the policymakers
413 in Indonesia. This can be done by providing psychological support and also by
414 assigning sufficient number of security guards or policies in healthcare facilities in
415 order to provide a safer workplace. Studies with larger sample sizes and periodical
416 evaluation may further contribute to adequately monitor the mental health and
417 HRQoL of HCWs throughout this pandemic and develop corresponding support and
418 interventions.

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420
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422 conceptualization and the design of the study. ATS, SS, FFA, YEP, MK, AK, and BA
423 carried out the data collection. SS, FFA, and AI conducted the analysis, and FDP and
424 BA were the main consultants in the data interpretation. ATS, SS, FFA, and AI
425 drafted the manuscript, and all the authors revised it. All authors read and approved
426 the final manuscript to be submitted.

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6

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8
9 430 pharmaceutical companies, all fully unrelated to this research. Other authors have no
10
11 431 conflict of interest to declare.
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14 432 **Ethics approval:** Approval was granted by the Institutional Review Board of Faculty
15
16 433 of Medicine Universitas Airlangga (Date 5 October 2020 / No.
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18 434 251/EC/KEPK/FKUA/2020).
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22
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3 588 **Figure legends**
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5 589 **Figure 1.** Flow diagram of study participants.
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8 590 **Figure 2.** Prevalence of depression, anxiety, and stress among healthcare workers in
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10 591 each severity level according to DASS-21 scores.
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12 592 **Figure 3.** The median [interquartile range] norm-based T-score of summary scores
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14 593 and each health domain scale.
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17 594 **Figure 4.** The prevalence of impairment in physical and mental components in
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19 595 general and each health domain scale among healthcare workers. PCS, physical
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21 596 component summary; MCS, mental component summary; PF, physical function; RP,
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23 597 role physical; BP, bodily pain; GH, general health; VT, vitality; SF, social functioning;
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25 598 RE, role emotional; MH, mental health.
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3 **Tables**
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5 **Table 1.** Cut-off score for mental health status categorization ³⁵
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	Normal	Mild	Moderate	Severe	Extremely impaired
8 Depression	0–9	10–12	13–20	21–27	28–42
9 Anxiety	0–6	7–9	10–14	15–19	20–42
10 Stress	0–10	11–18	19–26	27–34	25–42

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Table 2. Sociodemographic characteristics of the respondents (n=392)

Variables	n (%)
Age in years, mean ± SD	33.5 ± 9.4
Sex	
Male	127 (32.4)
Female	265 (67.6)
Marital status	
Single	146 (37.2)
Married	128 (32.7)
Married with children	118 (30.1)
Job	
Nurse	52 (13.3)
Midwife	19 (4.9)
Doctor	227 (57.9)
Dentist	26 (6.6)
Pharmacist	20 (5.1)
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, health educator, and hospital administrator)	48 (12.2)
Workplace setting	
COVID-19 hospital or COVID-19 referral hospital	160 (40.8)
Non-COVID-19 hospital	76 (19.4)
Primary care facilities	138 (35.2)
Other healthcare facilities	18 (4.6)
Workplace island	
Java Island	296 (75.5)
Outside Java Island	96 (24.5)
Working period during the COVID-19 pandemic	
Since the beginning of the pandemic (March–April 2020)	310 (79.1)
In the middle of the pandemic (May 2020 or later)	82 (20.9)
Working experience before the COVID-19 pandemic	
Not working	36 (9.2)
<1 year	67 (17.1)
1–3 years	92 (23.5)
>3 years	197 (50.2)
Income during the COVID-19 pandemic	
<3 million rupiah/month	77 (19.7)
3–5 million rupiah/month	107 (27.3)
5–10 million rupiah/month	111 (28.3)
10–20 million rupiah/month	51 (13.0)
>20 million rupiah/month	46 (11.7)
Working hours per week during the COVID-19 pandemic	
<40 hours/week	180 (45.9)
40–60 hours/week	181 (46.2)
>60 hours/week	31 (7.9)
History of COVID-19 infection	
Yes	57 (14.5)
No	335 (85.5)
History of COVID-19 infection in the family	
Yes	118 (30.1)
No	274 (69.9)

Any family member died because of COVID-19

Yes 25 (6.4)
 No 367 (93.6)

Having one or more comorbidities

Yes 276 (70.4)
 No 116 (29.6)

PPE availability in the workplace

Not available or not according to standard 134 (34.2)
 Available and according to standard 258 (65.8)

Free routine COVID-19 PCR swab test for HCWs

No 177 (45.1)
 Only if there are any symptoms 194 (49.5)
 Routinely 1–3 times a month 20 (5.1)
 At least once a week 1 (0.3)

Verbal intimidation in the workplace

Never 243 (62.0)
 Less than once a month 84 (21.4)
 1–4 times a month 49 (12.5)
 More than once a week 16 (4.1)

Physical intimidation in the workplace

Never 379 (96.7)
 Less than once a month 8 (2.0)
 1–4 times a month 3 (0.8)
 More than once a week 2 (0.5)

Intimidation from the society outside the workplace

Never 285 (72.7)
 Less than once a month 77 (19.7)
 1–4 times a month 26 (6.6)
 More than once a week 4 (1.0)

Workplace support from intimidation

Yes 322 (82.1)
 No 70 (17.9)

How the workplace treats HCWs with COVID-19 symptoms

Do not know 21 (5.3)
 HCWs are not allowed to come to work until the test result came out 306 (78.1)
 HCWs still come to work until the test result came out 65 (16.6)

HCWs' salary if they are infected with COVID-19

Do not know 136 (34.7)
 Reduced by the number of the absence 67 (17.1)
 Full payment 189 (48.2)

Willingness to work during the COVID-19 pandemic

Yes 330 (84.2)
 No 62 (15.8)

Reason for HCWs to work during the COVID-19 pandemic

Feeling responsible 285 (72.7)
 Financial matters 88 (22.4)
 Already bound to work contracts 36 (9.2)

COVID-19, coronavirus disease 2019; HCWs, healthcare workers; PPE, personal protective equipment; PCR, polymerase chain reaction.

Table 3. Determinants of depression among healthcare workers (n=392)

Variables	<i>p</i> value	aOR	95%CI
Sex			
Male (ref)	-	-	-
Female	.033	1.777	1.048 – 3.013
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.801	0.893	0.369 – 2.162
1-3 years	.560	1.283	0.554 – 2.969
>3 years	.008	0.333	0.147 – 0.753
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.002	2.493	1.383 – 4.494
Work during the COVID-19 pandemic because already bound to working contracts			
Yes	.015	2.578	1.198 – 5.547
No (ref)	-	-	-

p values < .05 were considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019; CI, confidence interval.

Table 4. Determinants of anxiety among healthcare workers (n=392)

Variables	p value	aOR	95%CI
Age	< .001	0.938	0.913 – 0.964
Sex			
Male (ref)	-	-	-
Female	.010	1.874	1.163 – 3.021
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.001	0.356	0.189 – 0.669
Primary care or other healthcare facilities	.029	0.574	0.348 – 0.946
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.017	2.099	1.143 – 3.854
Willingness to work during the COVID-19 pandemic			
Yes (ref)	-	-	-
No	.016	2.154	1.157 – 4.012

p values < .05 were considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019; CI, confidence interval.

Table 5. Determinants of stress among healthcare workers (n=392)

Variables	p value	aOR	95%CI
Age	.001	0.956	0.930 – 0.983
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.014	2.043	1.154 – 3.616
Willingness to work during COVID-19 pandemic			
Yes (ref)	-	-	-
No	.014	2.169	1.168 – 4.027
Work during COVID-19 pandemic because of financial matters			
Yes	.014	3.575	1.293 – 9.885
No (ref)	-	-	-
Work during COVID-19 pandemic because already bound to working contract			
Yes	.014	4.352	1.340 – 14.137
No (ref)	-	-	-

p values < .05 were considered statistically significant. aOR, adjusted odds ratio; COVID-19, coronavirus disease 2019; CI, confidence interval.

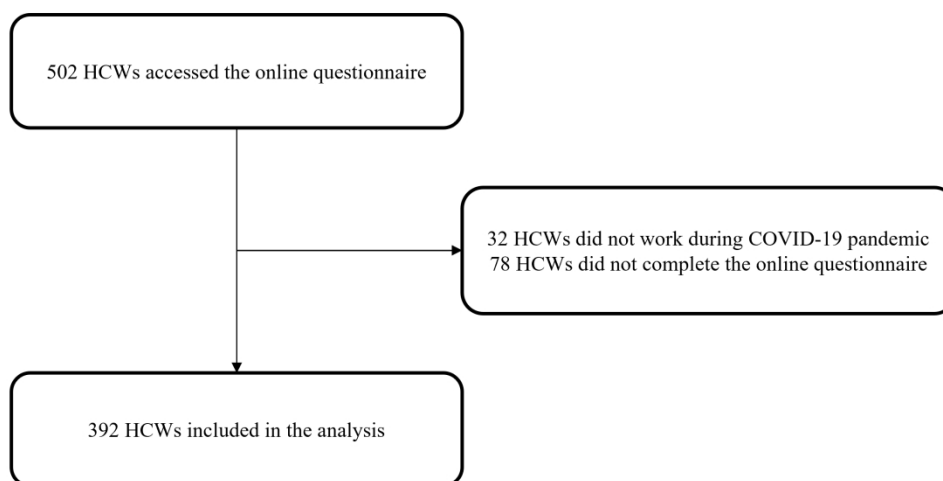


Figure 1

512x270mm (130 x 130 DPI)

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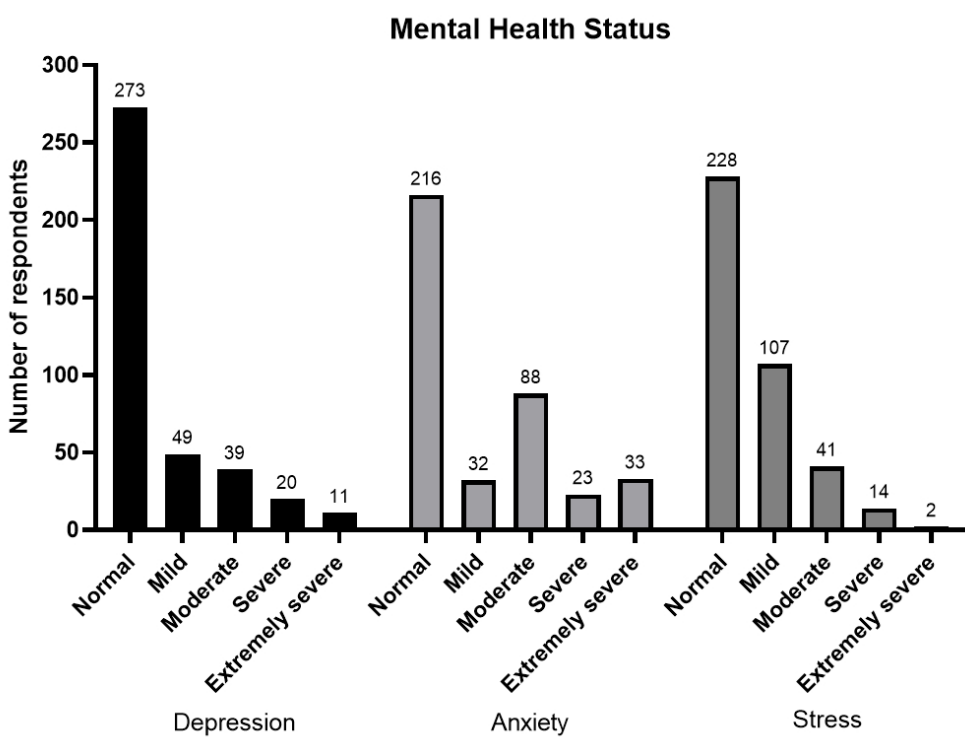


Figure 2

78x59mm (330 x 330 DPI)

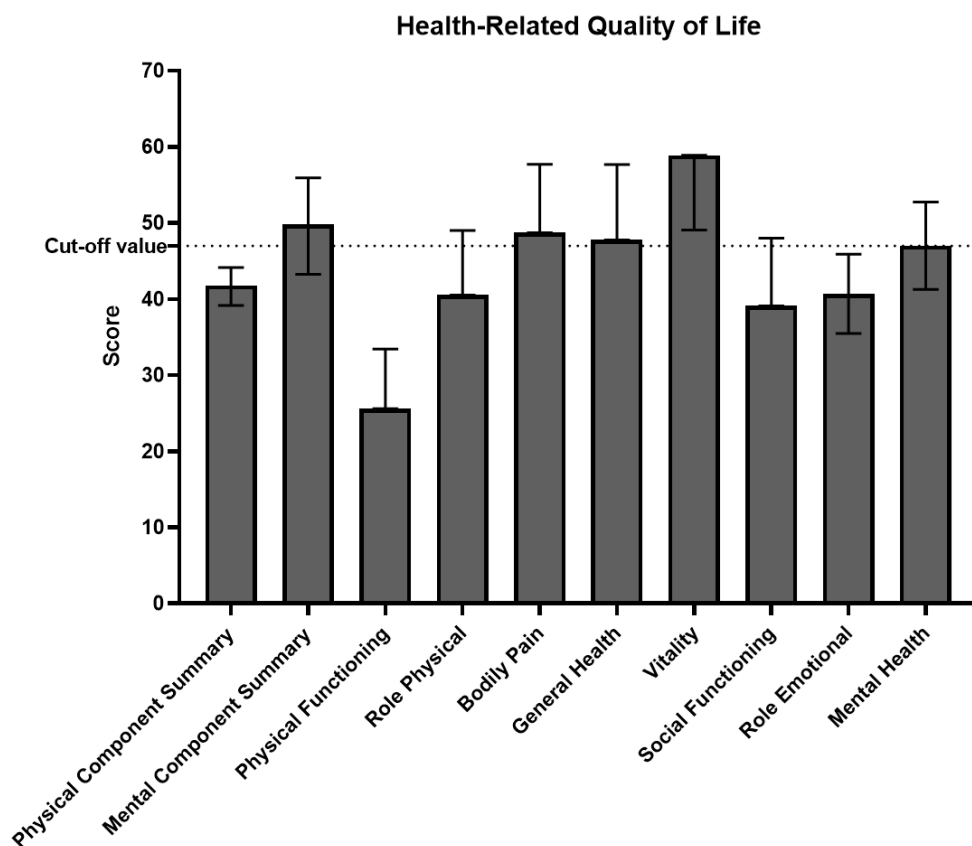


Figure 3

85x74mm (330 x 330 DPI)

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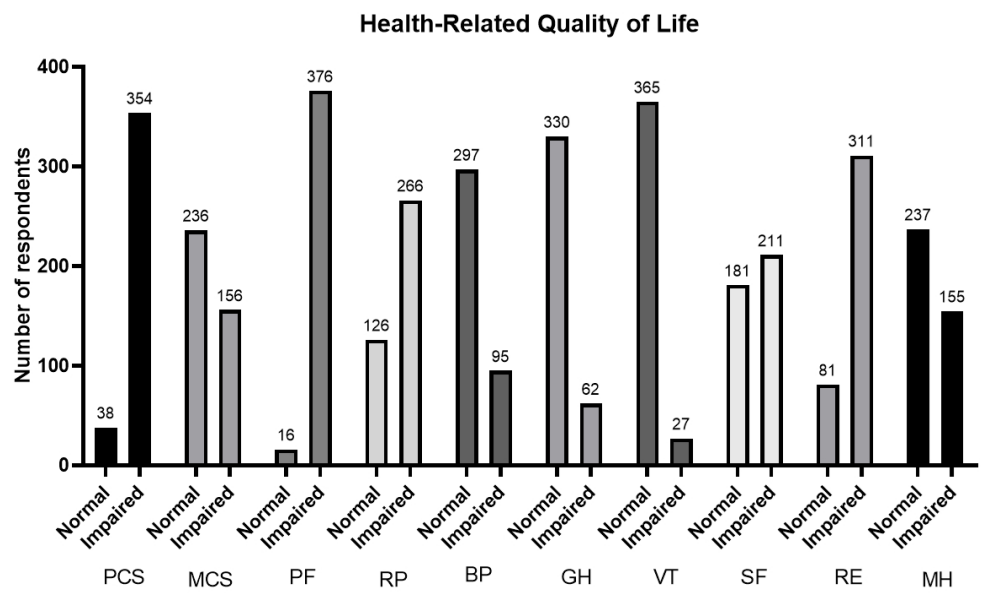
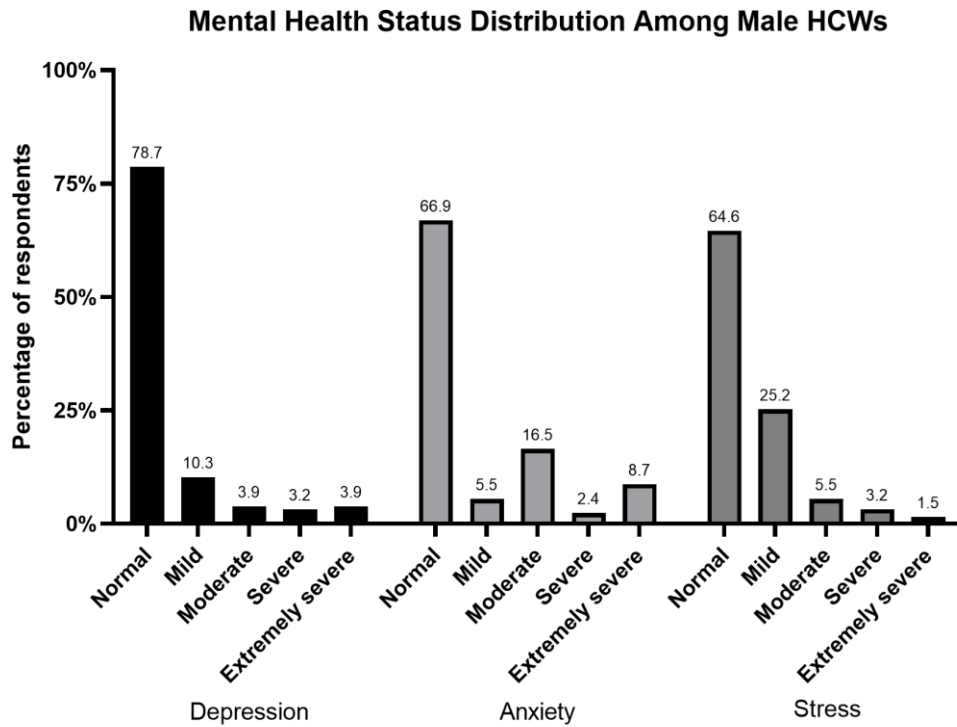
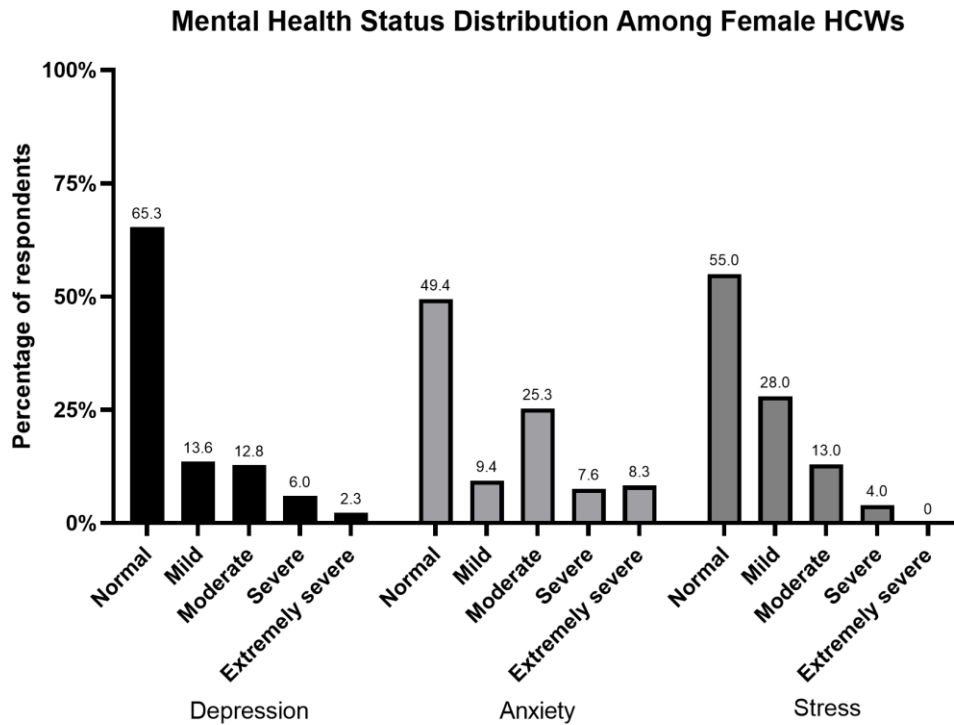


Figure 4

91x56mm (330 x 330 DPI)



Supplementary figure 1. Prevalence of depression, anxiety, and stress among male healthcare workers in each severity level according to DASS-21 scores.



Supplementary figure 2. Prevalence of depression, anxiety, and stress among female healthcare workers in each severity level according to DASS-21 scores.

Supplementary Table 1. Univariate analysis of determinants for depression among HCWs

Variables	p value	COR	95%CI
Age	.018	0.941	0.913 – 0.969
Sex			
Male (ref)	-	-	-
Female	.007	1.970	1.201 – 3.230
Marital status			
Single (ref)	-	-	-
Married	.013	0.524	0.315 – 0.873
Married with children	< .001	0.337	0.192 – 0.592
Job			
Doctor (ref)	-	-	-
Nurse	.262	0.676	0.340 – 1.341
Midwife	.133	0.380	0.107 – 1.345
Dentist	.872	1.073	0.457 – 2.520
Pharmacist	.464	0.676	0.237 – 1.929
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, health educator, and hospital administrator)	.603	0.835	0.422 – 1.649
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.156	0.645	0.353 – 1.181
Primary care or other healthcare facilities	.096	0.666	0.412 – 1.075
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.118	0.656	0.387 – 1.113
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.268	1.338	0.799 – 2.238
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.666	0.833	0.364 – 1.906
1–3 years	.604	1.229	0.564 – 2.677
>3 years	.003	0.313	0.147 – 0.666
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.322	1.377	0.731 – 2.594
5-10 million rupiah/month	.413	1.301	0.692 – 2.446
10-20 million rupiah/month	.918	1.042	0.478 – 2.271
>20 million rupiah/month	.052	0.375	0.139 – 1.010
Working hour per week during the COVID-19 pandemic			

<40 hours/week (ref)	-	-	-
40–60 hours/week	.114	1.444	0.916 – 2.279
>60 hours/week	.064	2.104	0.957 – 4.627
History of COVID-19 infection			
Yes	.925	0.971	0.526 – 1.793
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.447	1.197	0.753 – 1.903
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.130	1.884	0.829 – 4.282
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.363	1.241	0.780 – 1.975
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.032	0.613	0.393 – 0.958
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.001	2.102	1.355 – 3.263
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.974	1.020	0.308 – 3.381
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.005	1.956	1.226 – 3.119
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.013	1.963	1.153 – 3.345
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	.003	2.343	1.346 – 4.080
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	< .001	0.364	0.228 – 0.581
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			
Yes	.099	1.521	0.924 – 2.504

No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.001	3.245	1.616 – 6.515
No (ref)	-	-	-

For peer review only

Supplementary Table 2. Univariate analysis of determinants for anxiety among HCWs

Variables	p value	COR	95%CI
Age	< .001	0.942	0.919 – 0.966
Sex			
Male (ref)	-	-	-
Female	.001	2.070	1.332 – 3.218
Marital status			
Single (ref)	-	-	-
Married	.003	0.484	0.298 – 0.785
Married with children	.004	0.481	0.293 – 0.789
Job			
Doctor (ref)	-	-	-
Nurse	.092	0.583	0.311 – 1.039
Midwife	.186	0.509	0.187 – 1.385
Dentist	.545	1.285	0.570 – 2.901
Pharmacist	.516	0.735	0.289 – 1.865
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, health educator, and hospital administrator)	.826	0.932	0.499 – 1.741
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.024	0.524	0.299 – 0.920
Primary care or other healthcare facilities	.140	0.716	0.460 – 1.116
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.464	0.840	0.527 – 1.339
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.197	1.379	0.847 – 2.246
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.147	0.545	0.240 – 1.238
1–3 years	.792	1.111	0.507 – 2.433
>3 years	.012	0.394	0.191 – 0.812
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.674	1.135	0.631 – 2.041
5-10 million rupiah/month	.851	1.058	0.590 – 1.895
10-20 million rupiah/month	.633	0.840	0.411 – 1.718
>20 million rupiah/month	.246	0.640	0.301 – 1.361
Working hour per week during the COVID-19 pandemic			

<40 hours/week (ref)	-	-	-
40–60 hours/week	.263	1.268	0.836 – 1.923
>60 hours/week	.157	1.739	0.808 – 3.746
History of COVID-19 infection			
Yes	.206	1.438	0.819 – 2.526
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.996	1.001	0.649 – 1.545
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.462	1.356	0.602 – 3.051
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.670	1.099	0.711 – 1.699
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.036	0.638	0.419 – 0.970
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.002	1.940	1.283 – 2.933
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.926	1.054	0.348 – 3.195
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.024	1.675	1.071 – 2.620
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.003	2.263	1.332 – 3.845
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	< .001	2.820	1.55 – 4.986
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	.001	0.459	0.292 – 0.721
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			
Yes	.040	1.650	1.024 – 2.660

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No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.093	1.815	1.906 – 3.637
No (ref)	-	-	-

For peer review only

Supplementary Table 3. Univariate analysis of determinants for stress among HCWs

Variables	p value	COR	95%CI
Age	< .001	0.955	0.932 – 0.978
Sex			
Male (ref)	-	-	-
Female	.076	1.485	0.960 – 2.299
Marital status			
Single (ref)	-	-	-
Married	.020	0.561	0.345 – 0.911
Married with children	.055	0.616	0.376 – 1.009
Job			
Doctor (ref)	-	-	-
Nurse	.311	0.722	0.385 – 1.355
Midwife	.644	0.796	0.302 – 2.097
Dentist	.706	1.170	0.518 – 2.642
Pharmacist	.506	1.365	0.546 – 3.408
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, health educator, and hospital administrator)	.853	1.061	0.566 – 1.989
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.321	0.754	0.432 – 1.317
Primary care or other healthcare facilities	.407	0.828	0.530 – 1.294
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.607	0.884	0.553 – 1.414
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.742	0.920	0.561 – 1.511
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.261	0.624	0.274 – 1.421
1–3 years	.403	1.390	0.642 – 3.011
>3 years	.228	0.644	0.315 – 1.317
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.100	1.655	0.909 – 3.013
5-10 million rupiah/month	.236	1.434	0.790 – 2.604
10-20 million rupiah/month	.584	1.225	0.593 – 2.531
>20 million rupiah/month	.357	0.89	0.312 – 1.522
Working hour per week during the COVID-19 pandemic			

<40 hours/week (ref)	-	-	-
40–60 hours/week	.359	1.217	0.800 – 1.852
>60 hours/week	.321	1.473	0.685 – 3.168
History of COVID-19 infection			
Yes	.532	1.197	0.681 – 2.106
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.935	0.982	0.634 – 1.521
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.143	1.841	0.814 – 4.167
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.437	1.190	0.768 – 1.843
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.019	0.602	0.395 – 0.919
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.025	1.604	1.061 – 2.425
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.377	1.650	0.544 – 5.003
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.019	1.708	1.091 – 2.673
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.005	2.129	1.261 – 3.595
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	< .001	2.781	1.586 – 4.874
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	< .001	0.427	0.271 – 0.671
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			
Yes	.001	2.193	1.355 – 3.549

No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.006	2.698	1.323 – 5.501
No (ref)	-	-	-

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Supplementary Table 4. Univariate analysis of determinants for impaired physical health component among HCWs

Variables	p value	COR	95%CI
Age	.134	1.033	0.990 – 1.079
Sex			
Male (ref)	-	-	-
Female	.633	0.836	0.401 – 1.744
Marital status			
Single (ref)	-	-	-
Married	.318	1.496	0.878 – 3.299
Married with children	.214	1.703	0.735 – 3.945
Job			
Doctor (ref)	-	-	-
Nurse	.310	0.621	0.248 – 1.557
Midwife	.802	0.821	0.177 – 3.813
Dentist	.285	0.531	0.167 – 1.695
Pharmacist	.564	1.836	0.233 – 14.441
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, health educator, and hospital administrator)	.915	1.063	0.346 – 3.263
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.298	0.633	0.267 – 1.499
Primary care or other healthcare facilities	.944	0.973	0.448 – 2.113
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.095	2.284	0.865 – 6.026
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.659	0.837	0.380 – 1.846
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.090	0.163	0.020 – 1.328
1–3 years	.143	0.210	0.026 – 1.693
>3 years	.281	0.323	0.042 – 2.517
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.555	1.423	0.441 – 4.591
5-10 million rupiah/month	.052	0.385	0.147 – 1.008
10-20 million rupiah/month	.680	1.352	0.322 – 5.670
>20 million rupiah/month	.794	1.211	0.288 – 5.096
Working hour per week during the			

COVID-19 pandemic			
<40 hours/week (ref)	-	-	-
40–60 hours/week	.706	1.146	0.565 – 2.325
>60 hours/week	.626	0.750	0.236 – 2.386
History of COVID-19 infection			
Yes	.818	0.898	0.357 – 2.255
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.342	0.713	0.35 – 1.433
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.278	0.536	0.174 – 1.653
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.778	0.901	0.438 – 1.854
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.285	0.662	0.312 – 1.408
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.876	1.057	0.528 – 2.113
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.805	1.298	0.164 – 10.268
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.366	1.456	0.645 – 3.285
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.589	0.796	0.348 – 1.820
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	.996	1.002	0.400 – 2.509
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	.080	1.857	0.929 – 3.712
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			

Yes	.071	0.517	0.252 – 1.059
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.722	1.199	0.350 – 4.113
No (ref)	-	-	-

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Supplementary Table 5. Univariate analysis of determinants for impaired mental health component among HCWs

Variables	p value	COR	95%CI
Age	.973	1.000	0.978 – 1.021
Sex			
Male (ref)	-	-	-
Female	.748	0.932	0.605 – 1.434
Marital status			
Single (ref)	-	-	-
Married	.266	1.319	0.810 – 2.148
Married with children	.263	1.329	0.808 – 2.187
Job			
Doctor (ref)	-	-	-
Nurse	.057	1.804	0.983 – 3.310
Midwife	.958	0.975	0.369 – 2.571
Dentist	.777	0.884	0.377 – 2.072
Pharmacist	.273	1.671	0.668 – 4.179
Others (nutritionist, physiotherapist, laboratory analyst, acupuncturist, health educator, and hospital administrator)	.994	1.002	0.527 – 1.907
Workplace setting			
COVID-19 hospital or referral hospital (ref)	-	-	-
Non-COVID-19 hospital	.752	1.093	0.629 – 1.898
Primary care or other healthcare facilities	.391	0.820	0.521 – 1.290
Workplace island			
Java Island (ref)	-	-	-
Outside Java Island	.961	0.988	0.617 – 1.582
Working period during the COVID-19 pandemic			
Since the beginning of pandemic (ref)	-	-	-
In the middle of pandemic	.729	1.092	0.665 – 1.790
Working experience before the COVID-19 pandemic			
Not working (ref)	-	-	-
<1 year	.252	1.619	0.710 – 3.689
1–3 years	.502	0.760	0.342 – 1.691
>3 years	.937	1.030	0.497 – 2.134
Income during the COVID-19 pandemic			
<3 million rupiah/month (ref)	-	-	-
3-5 million rupiah/month	.187	1.510	0.818 – 2.785
5-10 million rupiah/month	.050	1.833	1.001 – 3.358
10-20 million rupiah/month	.919	1.040	0.490 – 2.208
>20 million rupiah/month	.612	1.219	0.567 – 2.622
Working hour per week during the			

COVID-19 pandemic			
<40 hours/week (ref)	-	-	-
40–60 hours/week	.177	1.338	0.877 – 2.040
>60 hours/week	.899	0.950	0.429 – 2.105
History of COVID-19 infection			
Yes	.841	0.943	0.430 – 1.678
No (ref)	-	-	-
History of COVID-19 infection in the family			
Yes	.829	0.953	0.612 – 1.482
No (ref)	-	-	-
Any family member died because of COVID-19			
Yes	.388	1.429	0.635 – 3.220
No (ref)	-	-	-
Having one or more comorbidities			
Yes	.475	0.850	0.544 – 1.328
No (ref)	-	-	-
PPE availability in the workplace			
Not available or not according to standard (ref)	-	-	-
Available and according to standard	.424	0.841	0.550 – 1.286
Verbal intimidation in the workplace			
Never (ref)	-	-	-
At least once	.626	0.901	0.593 – 1.369
Physical intimidation in the workplace			
Never (ref)	-	-	-
At least once	.920	0.944	0.303 – 2.939
Intimidation from the society outside workplace			
Never (ref)	-	-	-
At least once	.893	0.969	0.615 – 1.527
Workplace support from intimidation			
Yes (ref)	-	-	-
No	.099	1.548	0.920 – 2.604
Willingness to work during the COVID-19 pandemic			
Yes	-	-	-
No (ref)	.300	0.740	0.418 – 1.308
Reason for HCW to work during the COVID-19 pandemic because feeling responsible			
Yes	.307	0.791	0.504 – 1.240
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because of financial matters			

Yes	.140	1.434	0.888 – 2.314
No (ref)	-	-	-
Reason to work during the COVID-19 pandemic because already bound to working contract			
Yes	.238	0.640	0.305 – 1.342
No (ref)	-	-	-

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STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1 (line 2-3) 3 (line 59)
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3 (line 72-75)
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-6 (line 90-127)
Objectives	3	State specific objectives, including any prespecified hypotheses	6 (line 127-129)
Methods			
Study design	4	Present key elements of study design early in the paper	7 (line 132)
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7 (132-148)
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants	7 (141-146)
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9 (line 161-198)
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9 (line 161-204)
Bias	9	Describe any efforts to address potential sources of bias	7 (line 133-136)
Study size	10	Explain how the study size was arrived at	7 (line 148-153)
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	10 (line 210-212)
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	10 (line 210-219)
		(b) Describe any methods used to examine subgroups and interactions	10 (line 213-219)
		(c) Explain how missing data were addressed	10 (line 207)

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(d) *Cohort study*—If applicable, explain how loss to follow-up was addressed

N/A

Case-control study—If applicable, explain how matching of cases and controls was addressed

Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy

(e) Describe any sensitivity analyses

N/A

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Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	11 (line 227-228)
		(b) Give reasons for non-participation at each stage	Figure 1
		(c) Consider use of a flow diagram	Figure 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 2
		(b) Indicate number of participants with missing data for each variable of interest	Table 2
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time	N/A
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure	N/A
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	11 (line 233-234); 12 (line 272-273)
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 3, 4, and 5; supplementary tables 1, 2, 3
		(b) Report category boundaries when continuous variables were categorized	Table 1; 9 (line 203-204); 10 (line 221-222)
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	11 (line 235-239)
Discussion			
Key results	18	Summarise key results with reference to study objectives	14 (line 281-285)
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18 (line 385-402)
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14-18 (line 288-402)
Generalisability	21	Discuss the generalisability (external validity) of the study results	18 (line 387-394)
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20 (line 427-428)

1
2 *Give information separately for cases and controls in case-control studies and, if applicable, for exposed and
3 unexposed groups in cohort and cross-sectional studies.
4

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6 **Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and
7 published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely
8 available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at
9 <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is
10 available at www.strobe-statement.org.
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