

Psychological Burden of the COVID-19 Pandemic – the Voice of the Young Doctors’ Generation: an International Survey.

Katarzyna Czerwińska-Jelonkiewicz (✉ kasia_czerwinska@vp.pl)

Intensive Therapy Unit, Harefield Hospital, Royal Brompton & Harefield NHS Foundation Trust
<https://orcid.org/0000-0002-6988-4946>

Anna Beneria

Vall d'Hebron Hospital: Vall d'Hebron Hospital Universitari

Jordi Baneras

Vall d'Hebron University Hospital: Vall d'Hebron Hospital Universitari

Przemysław Kwasiborski

Medical University of Warsaw: Warszawski Uniwersytet Medyczny

Poonam Velagapudi

Nebraska Medicine-Nebraska Medical Center: Nebraska Medicine

Nkechinyere Ijioma

Mayo Clinic Rochester: Mayo Clinic Minnesota

Maria Trêpa

Universidade do Porto Centro de CIM do Porto: Universidade Do Porto

Chala Fekadu

Addis Ababa University Faculty of Medicine: Addis Ababa University School of Medicine

Christophe Vandenbriele

Katholieke Universiteit Leuven Universitaire Ziekenhuizen Leuven Campus Gasthuisberg

Maria Stratinaki

Helena Venizelou general and Maternity District Hospital: Geniko Nosokomeio Elena Benizelou

Han Naung Tun

Tufts Medical Center

Diego Araiza Garaygordobil

Ignacio Chavez National Institute for Cardiology: Instituto Nacional de Cardiologia Ignacio Chavez

Monica Verdoia

Ospedale degli Infermi: Nuovo Ospedale degli Infermi

Sara Moscatelli

Brompton Hospital: Royal Brompton Hospital

Anastasia Shchendrygina

Sechenov University: Pervyj Moskovskij gosudarstvennyj medicinskij universitet imeni I M Secenova

Alice Wood

Glenfield Hospital

Victoria Johnson

University Hospitals Giessen and Marburg Campus Giessen: Universitätsklinikum Giessen und Marburg GmbH Standort Giessen

Sebastian Reinstadler

Medical University of Innsbruck: Medizinische Universität Innsbruck

Milica Aleksic

Clinical Hospital Center Bežanijska kosa: Klinicko Bolnicki Centar Bežanijska kosa

Michał Pazdernik

Institut klinické a experimentální medicíny

Alex Rosenberg

Royal Brompton and Harefield NHS Foundation Trust

Research article

Keywords: COVID-19, psychological distress, young doctors

Posted Date: September 1st, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-856227/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: Young doctors have made up a substantial part of healthcare forces during the Coronavirus Disease 2019 (COVID-19) pandemic. The aim of this study was to determine the rate and level of psychological distress among young doctors during the COVID-19 outbreak.

Methods: This cross-sectional cohort study, dedicated to doctors, at or below the age of 40, was conducted in 62 countries as an online survey between September – November 2020. Survey questions covered the following areas: 1. demographics 2. work environment 3. the 'Hospital Anxiety and Depression Scale (HADS)' and the 'Perceived Stress Scale 10 (PSS-10)'. The primary outcome was the rate and level of anxiety/depression and stress among surveyed population defined according to adopted cut off values (HADS>13, PSS-10>14). Secondary outcomes included risk factors for increased HADS and PSS-10 scores.

Results: Among 1186 respondents, median aged 32 [29–36], 675 (44.5%) females, 96% reported a high level of anxiety/depression and 97% reported a high level of stress. Factors associated with significantly higher scores for anxiety/depression were increased work hours [OR 1.61 95%CI (1.12–2.34);p=0.01] and loss of pay [OR 5.53, 95% CI (1.57–19.47);p=0.008], while reduced work hours [OR 0.68 95% CI (0.48 - 0.98);p=0.03], increased salaries [OR 0.54 95% CI (0.35–0.85);p=0.003] and good training [OR 0.99 95%CI (0.99– 1.00);p=0.002] were associated with lower scores. Higher scores for stress were associated with higher professional experience [OR 1.08 95% CI (1.02–1.14);p=0.008], reduced salaries [OR 1.74 95% CI (1.01–2.92);p=0.04] and living with a partner [OR 1.53 95% CI (1.08–2.17);p=0.01].

Conclusions: A high rate of young doctors working clinically during the COVID-19 pandemic reported a persistently high level of psychological distress more than six months after the initial outbreak. Improvements in work organization, including reduced work hours and financial security are essential to prevent further psychological suffering among young doctors worldwide.

Background:

The Coronavirus Disease 2019 (COVID-19) pandemic has had a dramatic impact on the worldwide health workforce. Frontline healthcare professionals have been exposed to an enormous workload with a personal risk of infection, facing at the same time a high rate of mortality among their patients. These factors had substantial emotional consequences and the COVID-19 outbreak related psychological distress among frontline healthcare workers have already been reported [1–9].

Young and middle-aged adults (20–50 years old) represent the majority of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infected population [10–14]. Despite asymptomatic or mild clinical course of COVID-19 reported by the earliest studies [10, 11], later data suggested that up to 40% of younger demographics would require hospital admission and up to 18.5% required intensive care [13, 14].

Young doctors have made up a substantial part of the healthcare forces during the pandemic [16–20]. Given their lower level of professional experience, redeployment, frequent exposure to COVID-19 patients and unpredictable course of the infection in this age group, young doctors seem to be particularly vulnerable to psychological disorders in this context [16–20]. Despite actual threat and potential long-term consequences on their future clinical practice, the emotional impact of COVID-19 on young doctors has not been investigated.

The aim of this study was to assess the psychological burden of the pandemic on young doctors.

Methods:

Study sample and methods:

This is an international, prospective, cross-sectional cohort study performed as a survey between September – November 2020. The survey was designed by and dedicated to young doctors, at or below the age of 40, working clinically during the COVID-19 pandemic. The project was officially endorsed by 11 National Cardiac Societies and their Young Communities and supported by the Early Career Section of the American College of Cardiology and the Intensive Care Society and Royal College of Physicians Trainees Committee of United Kingdom. The survey was emailed to all doctors who were registered Members of partner Societies who met the age and professional criteria. The survey was further disseminated by the Societies' official social media channels and through individual professional collaboration. In the vast majority of countries, the survey was spread among young cardiologists. Other specialties, including internal medicine, intensive care and emergency medicine doctors were included in the United Kingdom, Africa and Serbia.

For detailed information about participating countries and numbers surveyed see Fig. 1.

The survey was structured in 5 domains. The questions inquiring about demographics, work environment, protective measures, details of COVID-19 infection and emotional sequelae of the pandemic as well as future perspective, including the most important aspects of work that required improvement, means to spread scientific COVID-related content and need for psychological preparation. The first 3 domains included 32 best choices, grading and open questions. The 4th domain included Likert scales for the assessment of the level of anxiety/depression and stress [21–25]. See Supplementary Table 1 for the full list of questions.

Aims and analyzes:

The main aim of the study was to assess the rate and level of anxiety, depression and stress among young doctors working clinically during the pandemic and to define the risk factors for this psychological distress.

Potential risk factors for psychological suffering included demographics, direct contact with COVID patients, redeployment, change in salary or work hours, work organization, prior training in protective

measures and the chance to influence the work organization during the pandemic (Supplementary Table 2, Supplementary Table 3).

Instruments:

Psychological tools used in the project were:

a) Hospital Anxiety and Depression Scale (HADS) – a self-assessment scale with a four-point Likert scale (0–3), designed to assess cognitive, emotional, and behavioral features of anxiety and depression over the week prior to the survey [21–23]. The tool is under license and was used based on manual obtained previously for work and nonprofit research purpose [24, 25].

b) Perceived Stress Scale 10 (PSS-10) – a self-assessment scale with a five-point Likert scale (0–4), providing a measure for the degree of perceived stress in the last month, being at the same time a predictor of health status and determining if stress is an etiological or risk factor for behavioral disorders [26, 27]. The tool is not under license for nonprofit research, and as such was used in the project.

To reduce the proportion of false positives the cut off values used were > 13 for HADS and > 14 for PSS-10 based on the previous literature [21, 28, 29, 30].

All data were entered into an online survey platform SurveyMonkey, secure data capture web-based application. Participation in the survey was voluntary. The participants could be surveyed only once, and no sensitive information was requested. The data was anonymized at the level of the questionnaire and stored in a Microsoft Excel 2018 Excel sheet.

Patient and Public Involvement

This research was done without patient and public involvement due to the nature of the study.

Statistical analyzes:

All data were analyzed for normality. Non-Gaussian distributed variables were presented as median and interquartile range (IQR). Subsequently, comparative analyzes to test difference between prespecified subgroups of the study population were performed. For comparison of continuous variables nonparametric U Mann-Whitney or Kruskal-Wallis ANOVA tests were used. For comparison of categorical variables, the Fisher exact test or Chi² test with appropriate correction were used. Univariate logistic regression analysis was performed to extract variables that were significantly associated with the HADS or PSS-10 results. All significant variables were included into a multivariable logistic regression model that was performed using stepwise backward elimination method. The p value < 0.05 was considered statistically significant for all tests. Statistical analyzes and figures were done using the Statistica 13.1 (TIBICO Software Inc., 2016)

Results:

Demographics, work environment and rate of infection among young doctors

Among 1385 respondents from 62 countries, a total of 1186 young doctors (57.7% cardiologists) participated in the survey (Fig. 1). The median age of these respondents was 32 [29–36] with 675 (44.5%) being females. Only 12.9% of participants had comorbidities.

Among the respondents 54.26% were young specialists, while 46.65% were fellows with 63.7% of them being in their first 4 years of specialty training – 3 [1–7]. Most of the respondents – 82.5% - had household of who 65.8% had a partner. Importantly, 13.2% of young doctors lost someone close to COVID-19 and only half of them received any bereavement support.

In terms of work environment – 73.47% of young doctors managed COVID-19 patients, usually 5 or less (62.17%), however, 17.7% had to manage over 10 patients daily. Protective measures available differed. Only 59.1% doctors reported being provided full personal protective equipment (PPE), 30.4% used droplet precaution measures and 8.98% were provided only hand washing/sanitization and gloves. Training in donning and doffing of PPE was provided to only 53.04% and 57.8% of young doctors received specific training in the care of COVID-19 patients while 24.66% did not receive any training. Only 29.7% doctors had debriefings after emergencies and 48.5% had daily briefings to plan teamwork on COVID units.

Importantly, due to the pandemic 52.78% of young doctors were redeployed. Work hours increased for 61.32% of the respondents, including more night shifts. Despite increased workload, the salaries did not change for 71.6% and even decreased for 16% of young doctors who managed of COVID-19 patients. Furthermore, only 52.9% of those covering COVID-19 facilities had the chance to influence their working environment.

All details of descriptive analyzes are presented in Supplementary Table 2.

Emotional burden of COVID-19 and opinion on work environment

Among respondents 792 (67%) completed psychological distress scales. Median level of HADS among young doctors was 20 [18–23], with 96 % of the respondents having values above 13, indicating high level of psychological distress (Fig. 2). Median level of anxiety was 11 [9–13] and median level of depression was 9 [8–10] (Supplementary Fig. 1, Supplementary Fig. 2).

Median value of PSS-10 score was 25 [22–28], with 97% of the respondents reporting values > 14, being predominantly moderately and severely stressed (Fig. 3).

Respondents generally had positive opinions about their work environment during the pandemic. Effectiveness of protective measures and teamwork was graded high at 74 [53–90] and 75.5 [50–90] of 100, respectively. However, effectiveness of briefings to plan work and COVID-19 related training was graded at only 53 [14–78] and 54 [10–80] of 100 (Supplementary Table 2).

Aspects of work environment that were perceived as being the most important in case of new pandemic were protective measures and work organization, including teamwork and work hours, reported by 46.2%

and 40.2% of the young doctors. The same aspects were suggested as the most important to improve in case of future pandemics by 38.9% and 34.5% doctors respectively (Supplementary Table 2).

Risk factors of emotional burden

Comparing the level of anxiety/depression and stress among the specific subgroups of respondents, significantly higher HADS scores were identified for the respondents whose work hours increased in comparison to those whose work hours were unchanged or reduced (21 [19–24] vs 25 [23–28]; $p = 0.003$) and for the respondents whose salaries decreased in comparison to those with higher salaries during the pandemic (22 [19–25] vs 18 [16–20]; $p = 0.044$). Stress level was higher among those who managed COVID-19 patients in comparison to those who did not (22 [20 – 26] vs 25 [22 – 28]; $p = 0.056$) (Supplementary Table 3).

Univariate logistic regression analysis for HADS showed that positive opinion on COVID-19 related training, teamwork and on regular briefings to plan work were associated with reduced levels of anxiety/depression. Similarly, debriefings after emergencies, raise in salaries and reduced work hours were associated with lower risk of anxiety or depression. On the contrary, increased work hours and loss of income during the pandemic were associated with higher risk of anxiety/depression (Table 1). Multivariable logistic regression analysis confirmed that reduced work hours, increased salaries for current job and good teamwork were associated with lower scores for anxiety/depression, while increased work hours and loss of pay were associated with significantly higher scores for anxiety/depression. The same risk factors were identified among doctors directly involved in COVID-19 patients' management, with additional positive impact of full PPE on reduced level of anxiety/depression. In case of stress, being more advanced in specialty training, having reduced salaries due to the pandemic and living with a partner were significantly associated with higher level of stress. Living with flatmates however, was associated with a lower level of stress (Table 1).

Table 1
Risk factors for psychological disorders in young doctors' population.

Variables	HADS > 13	
	Univariate analysis OR [95%CI]; p-value	Multivariate analysis OR [95%CI]; p-value
Opinion on effectiveness of COVID-19 training	0.99 [0.990–0.999]; 0.016	0.99 [0.993 – 1.003]; 0.002
Opinion on teamwork during the pandemic	0.98 [0.983–0.994]; 0.0001	0.99 [0.987–0.999]; 0.003
Opinion on effectiveness of briefings to plan teamwork	0.98 [0.99–1.00]; 0.03	1.00 [0.996–1.006]; 0.66
Debriefings after emergencies	0.67 [0.49–0.89]; 0.006	0.73 [0.52–1.01]; 0.06
Increase in work hours, including night shifts	1.62 [1.14–2.3];0.006	1.61 [1.116–2.341]; 0.01
Decrease in work hours	0.71 [0.51–0.99]; 0.04	0.687 [0.484–0.976]; 0.03
Loss of pay during the pandemic	5.36 [1.55–18.53]; 0.008	5.53 [1.575–19.468]; 0.008
Increase in salaries during the pandemic	0.56 [0.36–0.83]; 0.008	0.54 [0.345 – 0.846]; 0.003
Full PPE*	0.70 [0.510–0.963]; 0.02	0.81 [0.578–1.152]; 0.24
Variables	PSS-10 score > 14	
	Univariate analysis OR [95%CI]; p-value	Multivariate analysis OR [95%CI]; p-value
Year of training	1.078 [1.019 – 1.141]; 0.008	1.05 [0.992–1.117]; 0.09
Loss of pay during the pandemic	1.74 [1.007–2.916]; 0.04	1.54 [0.887–2.722]; 0.13
Living with partner	1.536 [1.087–2.171]; 0.01	1.39 [0.976 – 2.002]; 0.06
Living with flat mates*	0.50 [0.257–0.995]; 0.04	0.68 [0.435–1.034]; 0.05
*– doctors directly managing COVID-19 patients		

Discussion:

The COVID-19 pandemic has led to a persistently high global atmosphere of anxiety and depression [15, 32, 33]. Most of the mental health studies published recently have emphasized the COVID-19 consequences for healthcare professionals, however, thorough analyzes of psychological burden of the pandemic on young doctors are still lacking [1–9].

Our study is the first worldwide analysis of COVID-19 related mental suffering among this population. Based on our findings, almost all of young doctors working clinically during the pandemic, presented high level of psychological distress. Adopting the unidimensional measure of HADS, nearly all surveyed had a level of psychological distress that twice exceeded the cut off value identified for the general and clinical population before the COVID-19 era [21, 30, 31]. Splitting HADS factors, significant anxiety and depression affected nearly 80% and 60% of respondents, respectively. In terms of self-perceived stress, nearly all of respondents reported high level of stress. These rates are twice those reported for the general population within the last year of the pandemic [32, 33].

Our results are consistent with the limited evidence in the field, which revealed that combination of age and profession put young doctors in a highly unfavorable psychological situation. Several previous studies showed frontline healthcare workers to experience high levels of psychological suffering during the COVID-19 outbreak, significantly outweighing the levels noted among non-frontline workers, the general population, and the level of mental health disorders during the previous outbreaks [4, 8]. Young adults are at particular risk of developing COVID-19 related post-traumatic stress disorder (PTSD) with significantly higher level of PTSD as compared to middle age population [15]. Unfortunately, only five national surveys dedicated to mental impact of the pandemic on specific young doctors' cohorts have been performed [16–20]. Physicians in their first-year of training in China, presented significantly higher level of depression and anxiety than before the outbreak [16]. Similarly, nearly half of French residents and fellows in surgery and Romanian young gastroenterologists had increased level of psychological distress [17, 18]. Furthermore, COVID-19 related redeployment disrupted training, which resulted in lower confidence and increased concern about career progression [19, 20].

Interestingly, the level and prevalence of mental suffering among our respondents substantially outweighed the level among other young doctors' groups and among all frontline healthcare workers during the current pandemic [4, 9, 35]. Furthermore, the enormously high frequency of relevant mental disorders identified by our survey was reported more than 6 months after the initial outbreak of the pandemic. Surprisingly, these high rates of anxiety/depression and stress in following months after the initial outbreak outweigh rates among the healthcare workers during the peak phase of the COVID-19 pandemic and the previous SARS outbreak [34–39]. This finding may confirm the previous observation that high-risk healthcare workers may present not only sustained but aggravating levels of mental disorders that persist beyond the health care emergency [37].

No previous studies thoroughly elucidate predictors of the pandemic related psychological suffering and potential protective factors for mental well-being of young doctors. Our findings revealed that excessive workload and reduced salaries were the main factors associated with higher risk of anxiety/depression,

while increased salaries, reduced work hours as well as proper protective measures, adequate medical training and teamwork appeared to be protective.

The adverse impact of increasing work hours and reduced salaries as well as the beneficial effect of efficient organizational support and adequacy of training were previously identified as relevant modifying factors of psychological wellbeing among healthcare workers during the pandemic [15, 40–45]. However, these factors seem to be of paramount importance for young professionals.

The recent workload of young doctors has been considerable with the working pattern of a quarter of junior doctors being associated with twice the risk of common mental health problems and suicidal ideation [43].

Financial considerations appear important. As it was shown previously, salaries determine the willingness to seek new posts, including immigration and reduction in household income is a risk factor for stress, anxiety as well as depression [15, 44]. Furthermore, a monetary incentive increased prosocial behavior and level of self-recognition and others' recognition of their professional competence [45].

The importance of infection control measures and adequate work organization for the level of mental distress was also previously reported [46]. Routine use of PPE and COVID-19 related training nearly halved the risk of anxiety and depression among French young surgeons [17] and was also related with lower level of PTSD, anxiety and depression in general population [46, 47]. We also demonstrated that loss of salaries, higher professional experience and living with a partner were associated with a higher risk of significant stress. An association between professional experience and PSS scores was previously reported [37]. This association potentially reflects the level of professional self-confidence as well as awareness of the risk of infection and responsibility for patients or family members.

Interestingly, redeployment and direct exposure to higher number of COVID-19 patients were not associated with higher mental distress, which may suggest good medical preparation of young doctors.

All of the factors identified in our study represent lack of support, lack of control and uncertainty in young doctors personal and professional lives, which are known triggers of mental disorders [48, 49].

Some of our findings sit at odds with presumed understanding of what motivates millennials in the workplace. A large survey commissioned by Price Waterhouse Cooper in 2008 suggested that millennials value flexibility in the workplace and tend to prioritize job satisfaction over increased salaries [50]. In our population manageable work hours and salary conferred protection against psychological morbidity even when the work done is of tremendous importance for society. Perhaps a lesson from our study is that ensuring adequate pay for this demographic is essential for their psychological wellbeing. Job satisfaction, opportunities and flexibility are not enough, perhaps millennials are not as different to previous generations as previously thought. This brings up again many questions about the remuneration of all healthcare workers in cash strapped health systems.

Further studies are warranted to better understand the long-term detrimental effects of the pandemic on the healthcare workforce.

Limitations:

We acknowledge several limitations of our study. Firstly, the study is limited by its cross-sectional design and lack of longitudinal follow-up. Similarly, the self-reporting of the levels of anxiety, depression and stress may not always be aligned with objective assessment by mental health professionals. Furthermore, the voluntary nature of the survey might have led to a selection bias and the respondents may not represent the general population. The survey was completed by participants from different countries and of different specialties with different work practice, which surely generate additional confounders. We investigated only depression/anxiety and stress levels of young doctors with the limited reliability of a mobile app-based questionnaire. The dynamic nature of the pandemic limits the strength of association between mental suffering and identified risk factors. Finally, the comparison to other studies is difficult, given the use of different psychological scales, reporting patterns and sampling times.

Conclusion:

High rates of young doctors working clinically in the COVID-19 pandemic showed persistently high levels of psychological distress 6 months after the COVID-19 outbreak. The main determinants of psychological well-being of young doctors are work hours, salaries, teamwork, COVID-19 specific training and protective measures. These findings reflect lack of support and loss of control in areas of their personal and professional lives.

Healthcare leaders should be aware of a potential mental health crisis amongst young doctors as a direct result of their involvement in clinical care during the pandemic. Changes in workforce planning which ensure protected salaries, safe work hours and conditions as well as psychological support should to be implemented in the hope of preventing further psychological suffering and protecting the wellbeing of the healthcare workforce for many years to come.

Abbreviations:

COVID-19 – Coronavirus Disease 2019

HADS – Hospital Anxiety and Depression Scale

PPE – personal protective equipment

PSS-10 – Perceived Stress Scale 10

SARS-CoV-2 – the severe acute respiratory syndrome coronavirus 2

Declarations:

Ethics approval and consent to participate:

The study was approved by the National Healthcare Service Health Research Authority (NHS HRA) and Care Research Wales (HCRW) (IRAS ID 287542, REC reference:20/HRA/3845). The study was performed in accordance with the recommendations of the Declaration of Helsinki for research with humans. The written informed consent was obtained from each participant of the study. The first question of the survey asked about informed consent. Access to subsequent questions was only granted if informed consent was completed.

Patient consent:

Not applicable

Consent for publication:

Not applicable

Availability of data and materials:

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interest:

The authors declare that they have no competing interests.

Funding:

The project is investigator-initiated study with no funding received.

Authors' contributions:

KCJ, JB and PK had full access to all the data in the study and take responsibility for the integrity of data and the accuracy of the data analysis.

Concept and design: KCJ and JB

Acquisition, analysis, and data interpretation: KCJ, AB, JB, PK, PV, NI, MT, CF, CV, MS, HNT, DAG, MV, SM, AW, MA, VJ, SR, MP, AS, AR.

Drafting of the manuscript: KCJ, AB, PK

Critical revision of the manuscript for important intellectual content: KCJ, AB, JB, PK, PV, NI, MT, CF, CV, MS, HNT, DAG, MV, SM, AW, MA, VJ, SR, MP, AS, AR.

Statistical analysis: PK

Supervision: AR

Acknowledgements:

Group Information:

The COVID-19 – Young Doctors Working Group Members:

Katarzyna Czerwińska-Jelonkiewicz, Anna Baneria, Jordi Bañeras, Przemysław Kwasiborski, Poonam Velagapudi, Nkechinyere Ijioma, Maria Trêpa, Chala Fekadu, Christophe Vandenbrielle, Maria Stratinaki, Han Naung Tun, Diego Araiza Garaygordobil, Monica Verdoia, Sara Moscatelli, Alice Wood, Victoria Johnson, Sebastian Reinstadler, Milica Aleksic, Michał Pazdernik, Anastazia Shchendrygina, Alex Rosenberg, Hana Mamoun, Awad Zeid, Miłosz Jaguszewski, Otilia Tica, Salvatore de Rosa, Daniel Lovric.

Additional Contributions:

We are grateful to all doctors working clinically during the COVID-19 pandemic, who participated in the study. We are grateful to Professor Adam Witkowski – Chair of the Polish Society of Cardiology, Doctor Jo Szram – the Royal College of Physicians Linacre Fellow and Elected Councillor, Kristin West – Team Lead, Member Strategy – Career Sections of the American College of Cardiology, Doctor John Jones, Membership, Research and Fundraising Manager of the Intensive Care Society and Doctor Jeremy Bewley Council Member of the Intensive Care Society for their support and contribution to the survey spreading.

The study was endorsed by the Polish Cardiac Society, the Club 30 of the Polish Cardiac Society, the International Young Academy of Cardiology and the Pink International Young Academy of Cardiology Group, The Panhellenic Medical Society, the German Cardiac Society and Young Section of the German Cardiac Society, the Romanian Society of Cardiology and the Young Group of the Romanian Society of Cardiology, the Austrian Society of Cardiology and Young Group of the Austrian Society of Cardiology, the Portuguese Society of Cardiology and Portuguese Medical Board Association, the Spanish Society of Cardiology and Young Group of the Spanish Society of Cardiology, the Mexican Society of Cardiology.

References:

1. Adalja AA, Toner E, Inglesby TV. Priorities for the US Health Community Responding to COVID-19. *2020;323(14):1343-4. doi.org/10.1001/jama.2020.3413*
2. Chew NWS, Lee GKH, Tan BYQ, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. *Brain Behav Immun. 2020;88:559-65. doi:10.1016/j.bbi.2020.04.049*
3. Neto MLR, Almeida HG, Esmeraldo JD, et al. When health professionals look death in the eye: the mental health of professionals who deal daily with the 2019 coronavirus outbreak. *Psychiatry Res.*

- 2020;288:112972. doi:10.1016/j.psychres.2020.112972
4. Liang Y, Wu K, Zhou Y, et al. Mental Health in Frontline Medical Workers during the 2019 Novel Coronavirus Disease Epidemic in China: A Comparison with the General Population. *Int. J. Environ. Res. Public Health*. 2020;17: doi:10.3390/ijerph17186550.
 5. Preti E, Di Mattei V, Perego G, et al. The Psychological Impact of Epidemic and Pandemic Outbreaks on Healthcare Workers: Rapid Review of the Evidence. *Curr Psychiatry Rep*. 2020;22(8):43. doi:10.1007/s11920-020-01166-z
 6. Erquicia J, Valls L, Barja A, et al. Emotional impact of the Covid-19 pandemic on healthcare workers in one of the most important infection outbreaks in Europe [published online October 31, 2020]. *Med Clin (Engl Ed)*. 2020;155(10):434-40. doi:10.1016/j.medcle.2020.07.010.
 7. Manh Than H, Minh Nong V, Nguyen CT, et al. Mental Health and Health-Related Quality-of-Life Outcomes Among Frontline Health Workers During the Peak of COVID-19 Outbreak in Vietnam: A Cross-Sectional Study. *Risk Management and Healthcare Policy*. 2020;13:2927-36. doi:10.2147/RMHP.S280749.
 8. Alshekaili M, Hassan W, Al Said N, et al. Factors associated with mental health outcomes across healthcare settings in Oman during COVID-19: frontline versus non-frontline healthcare workers [published online October 10, 2020]. *BMJ Open*. 2020;10:e042030. doi:10.1136/bmjopen-2020-042030.
 9. Lai J, Ma S, Wang Y, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019 [published online March 2, 2020]. *JAMA Netw Open*. 2020;3(3):e203976. doi:10.1001/jamanetworkopen.2020.3976
 10. Epidemiology Working Group for NCIP Epidemic Response, Chinese Center for Disease Control and Prevention. [The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China]. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2020 Feb 10;41(2):145-151. Chinese. doi:10.3760/cma.j.issn.0254-6450.2020.02.003.
 11. World Health Organization. Coronavirus disease 2019 (COVID-19): situation reports. February 28, 2020. [Internet]. Available from: [https://www.who.int/publications/i/item/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-\(covid-19\)](https://www.who.int/publications/i/item/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-(covid-19))
 12. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*. 2020;395:1054-62. doi:10.1016/S0140-6736(20)30566-3.
 13. CDC COVID-19 Response Team. Severe Outcomes Among Patients with Coronavirus Disease 2019 (COVID-19) - United States, February 12-March 16, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(12):34-6. doi:10.15585/mmwr.mm6912e2.
 14. Guan, Ni, Yu Hu, W. Liang, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med*. 2020; 382:1708-20. doi:10.1056/NEJMoa2002032
 15. Wang C, Pan R, Wan X, et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain Behav Immun*. 2020;87:40-8. doi:10.1016/j.bbi.2020.04.028

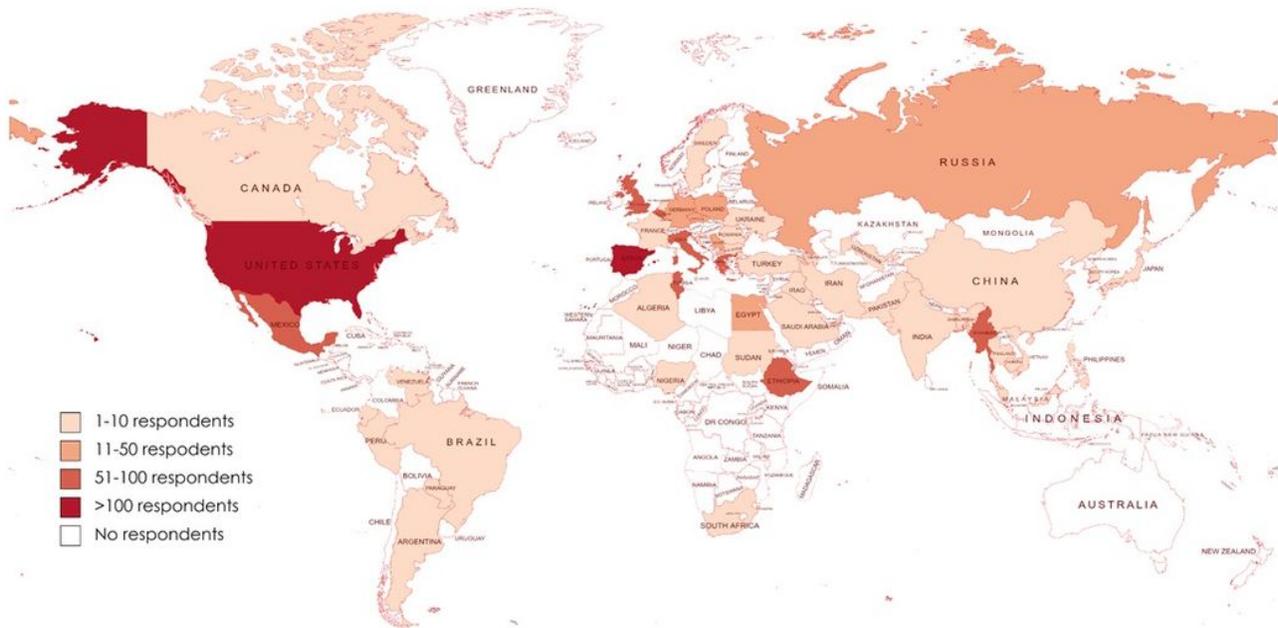
16. Li W, Frank E, Zhao Z, et al. Mental Health of Young Physicians in China During the Novel Coronavirus Disease 2019 Outbreak [published online June 1, 2020]. *JAMA Netw Open*. 2020;3(6):e2010705. doi:10.1001/jamanetworkopen.2020.10705
17. Vallée M, Kutchukian S, Pradère B, et al. Prospective and observational study of COVID-19's impact on mental health and training of young surgeons in France. [published online August 13, 2020]. *Br J Surg*. 2020;107(11):e486-e488. doi:10.1002/bjs.11947.
18. Ungureanu BS, Vladut C, Bende F, et al. Impact of the COVID-19 Pandemic on Health-Related Quality of Life, Anxiety, and Training Among Young Gastroenterologists in Romania [published online December 23, 2020]. *Front Psychol*. 2020;11:579177. doi:10.3389/fpsyg.2020.579177.
19. Choi, B., Jegatheeswaran, L., Minocha, A. et al. The impact of the COVID-19 pandemic on final year medical students in the United Kingdom: a national survey. *BMC Med Educ*. 2020;20:206. doi.org/10.1186/s12909-020-02117-1
20. Rao P, Diamond J, Korjian S, et al. The Impact of the COVID-19 Pandemic on Cardiovascular Fellows-in-Training: A National Survey. *J Am Coll Cardiol*. 2020;76(7):871-5. doi:10.1016/j.jacc.2020.06.027.
21. Bjelland I, Dahl AA, Haug TT et al. The validity of the Hospital Anxiety and Depression Scale. An updated literature review. *Journal of Psychosomatic Research*. 2002;52(2):69-77. doi:10.1016/s0022-3999(01)00296-3.
22. Zigmond A, Snalth R. The Hospital Anxiety and Depression Scale. *Acta psychiatr. scand*. 1983;67(6):361-70. doi:10.1111/j.1600-0447.1983.tb09716.x.
23. Paiva CE, Martins BP, Paiva BSR. Doctor, are you healthy? A cross-sectional investigation of oncologist burnout, depression, and anxiety and an investigation of their associated factors 11 *Medical and Health Sciences 1117 Public Health and Health Services 17 Psychology and Cognitive Scie*. *BMC Cancer*. 2018;18(1):1-11. doi:10.1186/s12885-018-4964-7.
24. Bobes Garcia J, Paz G.-Portilla M, Bascaran-Fernandez M, et al. Banco de instrumentos basicos para la practica de la psiquiatria clinica. *Ars Medica*. 2004. ISBN 84-9706-072-5.
25. Beneria A, Arnedo M, Contreras S, et al. Impact of simulation-based teamwork training on COVID-19 distress in heathcare professionals. *BMC Med Educ*. 2020;20(1):515
26. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385-96. doi:10.2307/2136404
27. Trujillo HM, González-Cabrera JM. Psychometric properties of the Spanish version of the Perceived Stress Scale (PSS). *Psicol Conductual*. 2007;15(3):457-77.
28. Crawford JR, Henry JD, Crombie C, Taylor EP. Brief report Normative data for the HADS from a large non-clinical sample. *Br J Clin Psychol*. 2001;40(4):429-34. doi:10.1348/014466501163904
29. Homood A, Abdualrahman A. Perceived stress and coping strategies among ICU nurses in government tertiary hospitals in Saudi Arabia: a cross-sectional study. *Ann Saudi Med*. 2019;39:48-55. doi:10.5144/0256-4947.2019.48
30. Hinz A, Brähler E. Normative values for the hospital anxiety and depression scale (HADS) in the general German population. *J Psychosom Res*. 2011;71(2):74-8.

doi:10.1016/j.jpsychores.2011.01.005

31. Terol-Cantero M, Cabrera-Perona V, Martín-Aragón M. Hospital anxiety and depression scale (HADS) review in Spanish samples. *An Psicol.* 2015;31(2):494-503. doi:10.6018/analesps.31.2.172701
32. White RG, Van Der Boor C. Impact of the COVID-19 pandemic and initial period of lockdown on the mental health and well-being of adults in the UK [published online August 17, 2020]. *BJ Psych Open.* 2020;6(5):e90. doi:10.1192/bjo.2020.79
33. Salari N, Hosseini-Far A, Jalali R *et al.* Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis [published online July 6, 2020]. *Global Health.* 2020;16(1):57. doi:10.1186/s12992-020-00589-w.
34. Hummel S, Oetjen N, Du J, *et al.* Mental Health Among Medical Professionals During the COVID-19 Pandemic in Eight European Countries: Cross-sectional Survey Study [published online January 18, 2020]. *J Med Internet Res.* 2021;23(1):e24983. doi:10.2196/24983
35. Liu S, Yang L, Zhang C, *et al.* Online mental health services in China during the COVID-19 outbreak. *Lancet Psychiatry.* 2020;7:17-8. [org/10.1016/S2215-0366\(20\)30077-8](https://doi.org/10.1016/S2215-0366(20)30077-8)
36. McAlonan GM, Lee AM, Cheung V, *et al.* Immediate and sustained psychological impact of an emerging infectious disease outbreak on health care workers. *Can J Psychiatry.* 2007;52(4):241-7. doi:10.1177/070674370705200406
37. Chatzittofis A, Karanikola M, Michailidou K, Constantinidou A. Impact of the COVID-19 Pandemic on the Mental Health of Healthcare Workers. *Int J Environ Res Public Health.* 2021;18(4):1435. doi:10.3390/ijerph18041435
38. Lancee WJ, Maunder RG, Goldbloom DS. Prevalence of psychiatric disorders among Toronto hospital workers one to two years after the SARS outbreak. *Psychiatr Serv.* 2008;59(1):91-5. [org/10.1176/ps.2008.59.1.91](https://doi.org/10.1176/ps.2008.59.1.91)
39. Maunder RG, Lancee WJ, Balderson KE, Bennett JP, Borgundvaag B, Evans S, *et al.* Long-term psychological and occupational effects of providing hospital healthcare during SARS outbreak. *Emerg Infect Dis.* 2006;12(12):1924-32. doi:10.3201/eid1212.060584
40. Beneria A, Arnedo M, Contreras S, Pérez-Carrasco M, Garcia-Ruiz I, Rodríguez-Carballeira M, Raduà J, Rius JB. Impact of simulation-based teamwork training on COVID-19 distress in healthcare professionals. *BMC Med Educ.* 2020;20(1):515. doi: 10.1186/s12909-020-02427-4
41. Junfeng Du J, Gwendolyn Mayer G, Svenja Hummel S, *et al.* Mental Health Burden in Different Professions During the Final Stage of the COVID-19 Lockdown in China: Cross-sectional Survey Study. *J Med Internet Res.* 2020;22(12):e24240. doi:2196/24240
42. Elbay RY, Kurtulmuş A, Arpacioğlu S, Karadere E. Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. *Psychiatry Res.* 2020;290:113130. doi:10.1016/j.psychres.2020.113130
43. Petrie K, Crawford J, LaMontagne AD, *et al.* Working hours, common mental disorder and suicidal ideation among junior doctors in Australia: a cross-sectional survey. *BMJ Open.* 2020;10:doi:10.1136/bmjopen-2019-033525

44. Costigliola V. Mobility of medical doctors in cross-border healthcare. *EPMA J.* 2011;2(4):333-9. doi:10.1007/s13167-011-0133-7
45. Jing D, Jin Y, Liu J. The Impact of Monetary Incentives on Physician Prosocial Behavior in Online Medical Consulting Platforms: Evidence From China [published online July 26, 2019]. *J Med Internet Res.* 2019;21(7):e14685. doi:2196/14685
46. Chua SE, Cheung V, Cheung C, McAlonan GM, Wong JWS, Cheung EPT, et al. Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers. *Can J Psychiatry.* 2004;49(6):391-3. [org/10.1177/070674370404900609](https://doi.org/10.1177/070674370404900609)
47. Kim SW, Su KP. Using psychoneuroimmunity against COVID-19. *Brain Behav, Immun.* 2020;87:4-5. doi:10.1016/j.bbi.2020.03.025.
48. Shanafelt T, Ripp J, Trockel M. Understanding and Addressing Sources of Anxiety Among Health Care Professionals During the COVID-19 Pandemic. 2020;323(21):2133-4. doi:10.1001/jama.2020.5893.
49. Urooj U, Ansari A, Siraj A, Khan S, Tariq H. Expectations, Fears and Perceptions of doctors during Covid-19 Pandemic. *Pak J Med Sci.* 2020;36(COVID19-S4):S37-S42. doi:10.12669/pjms.36.COVID19-S4.2643
50. Millennials at work. Reshaping the workplace. [Internet]. Available from: <https://www.pwc.com/co/es/publicaciones/assets/millennials-at-work.pdf>

Figures



Country	Number of respondents	Country	Number of respondents	Country	Number of respondents	Country	Number of respondents
Algeria/ Maldives/ China/ Uzbekistan/ Armenia/Bulgaria/Bangladesh/Venezuela/Japan/Iran/Irak /Paraguay	1	Czech Republic	18	Myanmar	51	Spain	115
Sweden/ Brazil/ Croatia/ Cambodia/ Philippines/ Thailand/ South Africa/ South Korea	2	Poland	18	United Kingdom	66	Portugal	174
Ukraine/ Argentina/ Cyprus/ Azerbaijan/ Sudan	3	Egypt	22	Tunisia	73	United States of America	192
Ecuador/ Peru/ Canada/ Netherlands/ Nigeria/ Saudi Arabia	4	Austria	23	Mexico	76		
Romania/France/ Malaysia/ United Arab Emirates	6	Germany	30	Italy	76		
Vietnam/ North Macedonia/ India	7	Serbia	31	Greece	77		
Turkey	8	Russia	34	Belgium	88		
Pakistan	10			Ethiopia	96		

Figure 1

Participants numbers and countries distribution.

HADS score distribution among young doctors (n=792).

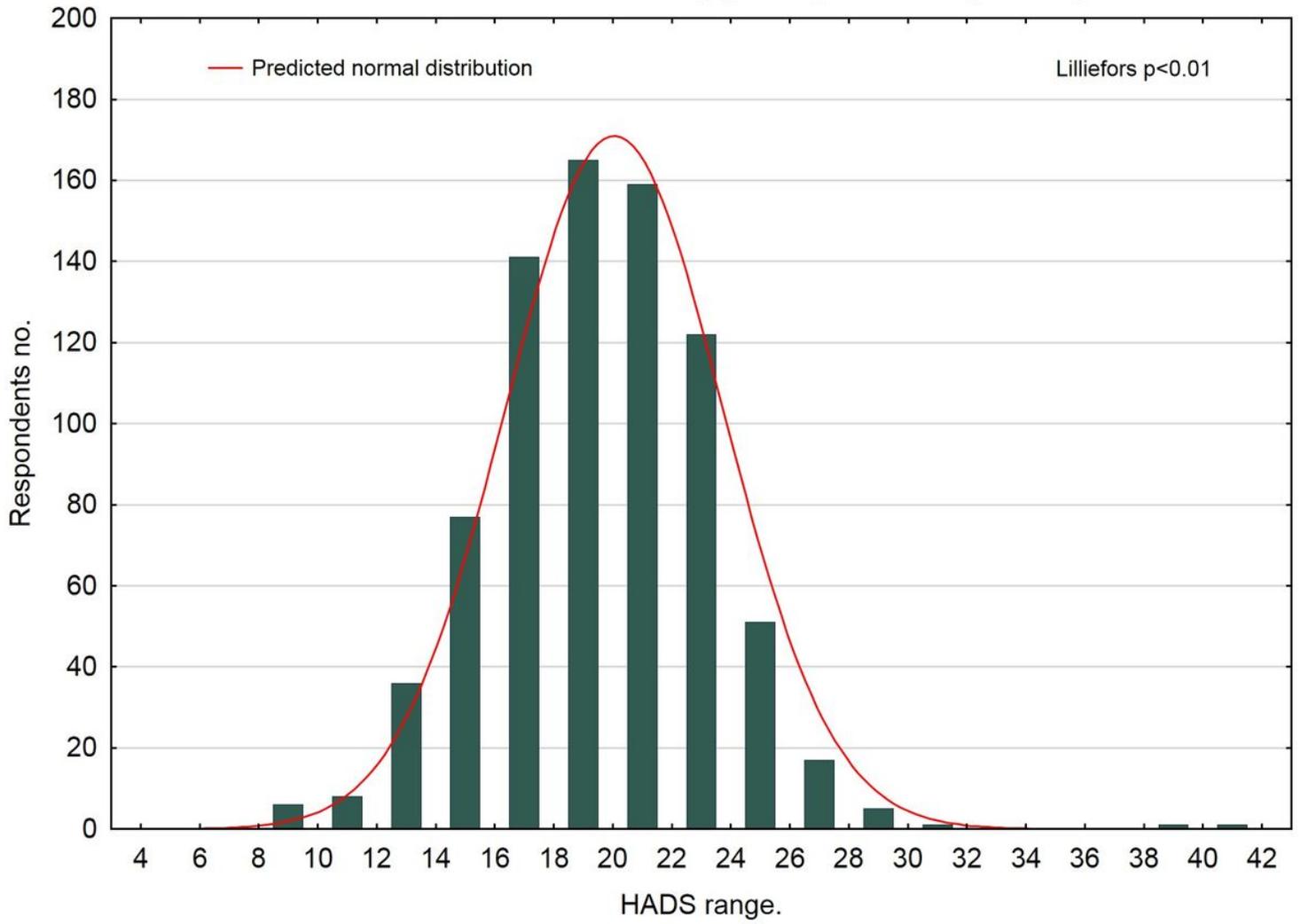


Figure 2

HADS score distribution among the respondents.

PSS-10 score distribution among doctors (n=792).

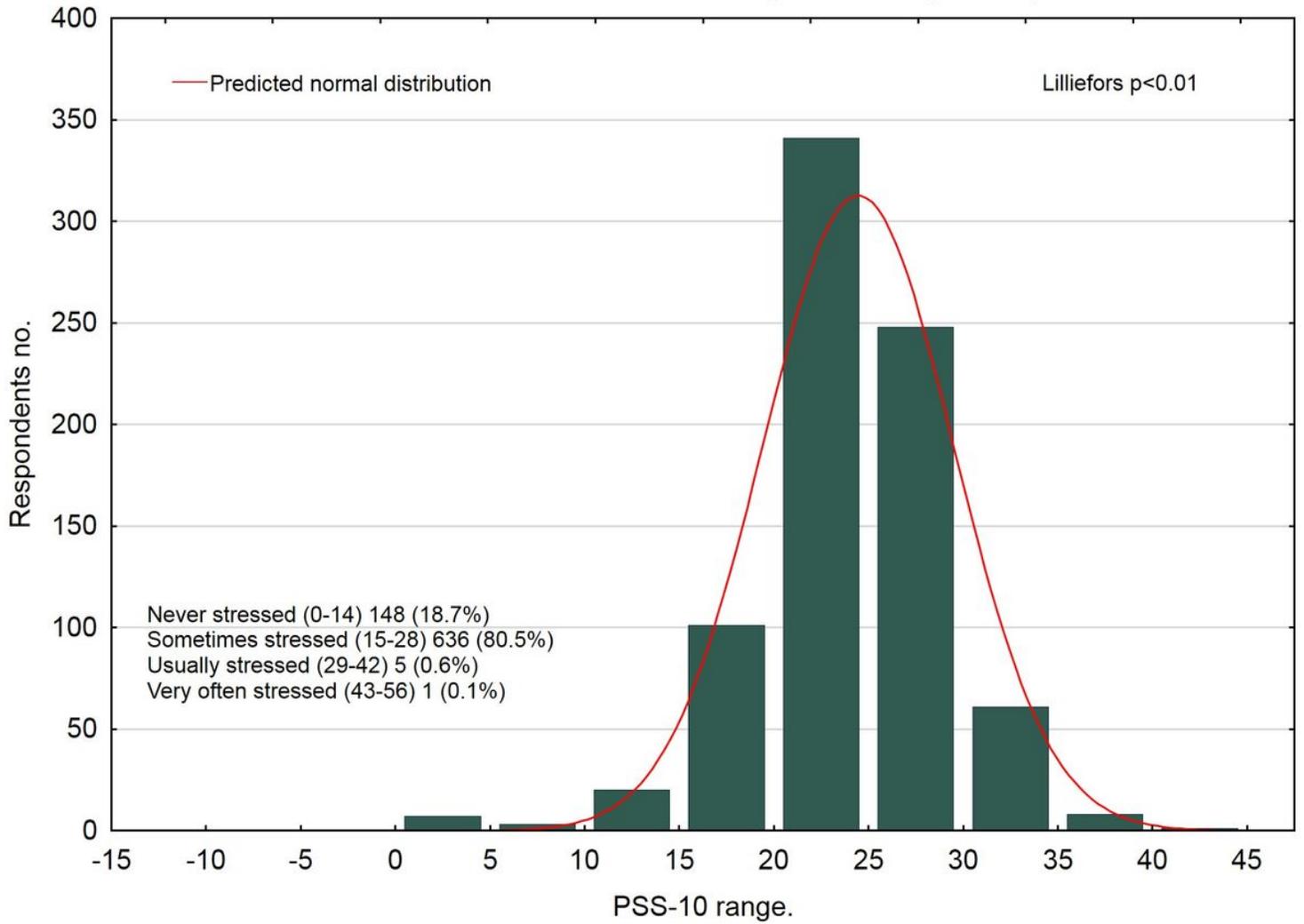


Figure 3

PSS-10 score distribution among the respondents.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Suppl.Figure1.jpg](#)
- [SupplFigure2.jpg](#)
- [SupplementaryTable1.doc](#)
- [SupplementaryTable2.docx](#)
- [SupplementaryTable3.docx](#)