

BMJ Open

BMJ Open is committed to open peer review. As part of this commitment we make the peer review history of every article we publish publicly available.

When an article is published we post the peer reviewers' comments and the authors' responses online. We also post the versions of the paper that were used during peer review. These are the versions that the peer review comments apply to.

The versions of the paper that follow are the versions that were submitted during the peer review process. They are not the versions of record or the final published versions. They should not be cited or distributed as the published version of this manuscript.

BMJ Open is an open access journal and the full, final, typeset and author-corrected version of record of the manuscript is available on our site with no access controls, subscription charges or pay-per-view fees (<http://bmjopen.bmj.com>).

If you have any questions on BMJ Open's open peer review process please email info.bmjopen@bmj.com

BMJ Open

VITALITY, RESILIENCE AND THE NEED FOR SUPPORT AMONG HOSPITAL EMPLOYEES DURING THE CONTINUATION OF THE COVID-19 PANDEMIC: A STUDY PROTOCOL

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2021-049090
Article Type:	Protocol
Date Submitted by the Author:	16-Jan-2021
Complete List of Authors:	Van Mol, Margo; Erasmus Universiteit Rotterdam, Intensive Care Adults de Veer, Mathijs; Erasmus MC, University Medical Center Rotterdam, , Department of Psychiatry, section Medical Psychology de Pagter, Anne; Erasmus Medical Center, Pediatrics Kouwenhoven-Pasmooij , T.A.; Erasmus MC, Hoogendijk, Witte; Erasmus Medical Center, Psychiatry Busschbach, Jan; Erasmus MC, Department of Psychiatry, Section of Medical Psychology & Psychotherapy Oude Hengel, Karen; Erasmus MC, ; Netherlands Organization for Applied Scientific Research TNO, Kranenburg, Leonieke; Erasmus MC, University Medical Center Rotterdam, , Department of Psychiatry, section Medical Psychology
Keywords:	COVID-19, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Human resource management < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

SCHOLARONE™
Manuscripts



I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our [licence](#).

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which [Creative Commons](#) licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

**VITALITY, RESILIENCE AND THE NEED FOR SUPPORT AMONG HOSPITAL EMPLOYEES DURING THE
CONTINUATION OF THE COVID-19 PANDEMIC: A STUDY PROTOCOL**

Margo van Mol¹, Mathijs de Veer², Anne de Pagter³, Tessa Kouwenhoven-Pasmooij⁴,
Witte Hoogendijk⁵, Jan van Busschbach⁶, Karen Ouden Hengel^{7,8}, Leonieke Kranenburg⁹

¹Dr. M.M.C. van Mol

Erasmus MC, University Medical Center Rotterdam, Department of Intensive Care Adults. the
Netherlands.

²M.R. de Veer

Erasmus MC, University Medical Center Rotterdam, Department of Psychiatry, section Medical
Psychology, the Netherlands
m.deveer@erasmusmc.nl

³Dr. A. P.J. de Pagter

Erasmus MC, University Medical Center Rotterdam, Sophia Childrens Hospital, Challenge & Support
programme, the Netherlands
p.depachter@erasmusmc.nl

⁴Dr. T. Kouwenhoven-Pasmooij

Erasmus MC, University Medical Center Rotterdam, Department of Occupational Health, The
Netherlands
t.kouwenhoven@erasmusmc.nl

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

⁵ Prof. Dr. W.J. Hoogendijk

Erasmus MC, University Medical Center Rotterdam, Department of Psychiatry, the Netherlands

w.hoogendijk@erasmusmc.nl

⁶ Prof. Dr. J.J. van Busschbach

Erasmus MC, University Medical Center Rotterdam, Department of Psychiatry, section Medical

Psychology, the Netherlands

j.vanbusschbach@erasmusmc.nl

Dr. K.M. Oude Hengel

⁷ Erasmus MC, University Medical Center Rotterdam, Department of Public Health, The Netherlands.

⁸ Department of Work, Health and Technology, Netherlands Organisation for Applied Scientific

Research TNO, Leiden, The Netherlands

k.oudehengel@erasmusmc.nl

⁹ Dr. L.W. Kranenburg

Erasmus MC, University Medical Center Rotterdam, Department of Psychiatry, section Medical

Psychology, the Netherlands

l.kranenburg@erasmusmc.nl

Correspondence author:

Margo MC van Mol

Erasmus MC University Medical Center, Department of Intensive Care, P.O. Box 2040, 3000 CA,

Rotterdam, the Netherlands. Room Ne409

E-mail address: m.vanmol@erasmusmc.nl

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Telephone: +31 6 15566554

m.vanmol@erasmusmc.nl

January 2021

Version 1

Word count, excluding title page, abstract, references, figures and tables: 3994

For peer review only

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

**VITALITY, RESILIENCE AND THE NEED FOR SUPPORT AMONG HOSPITAL EMPLOYEES DURING THE
CONTINUATION OF THE COVID-19 PANDEMIC: A STUDY PROTOCOL**

Abstract

Introduction

The Coronavirus Disease 2019 (COVID-19) pandemic has a significant impact on the physical and mental functioning of healthcare professionals, especially those working on the 'frontline', and other hospital workers. At the onset of the crisis, various interventions were introduced to promote resilience and offer mental support to these professionals. However, it is unknown whether the interventions will meet the needs of professionals as the COVID-19 pandemic continues.

The goal of the intended study is to gain insight in factors that protect the vitality and resilience of hospital employees during the so-called 'second wave' of the COVID-19 pandemic. This paper describes the study protocol.

Methods and analysis

This study applies a mixed-methods design, using both quantitative and qualitative methods of data collection and analysis. The first part of the study (sub-study I) consists of surveys among doctors and nurses in COVID-19 departments and non-COVID-19 departments, and other professionals in the hospital (i.e., managers and homeworkers) in 2020 and 2021. The second part of the study (sub-study II) consist of focus groups and interviews among professionals of the intensive care unit, COVID-19 departments and infection prevention units.

Ethics and dissemination

The research protocol for this study has been approved by the Medical Ethics Committee (MEC-2020-0705). Professionals with vitality experience less work-related stress and can therefore handle

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

more work in the new and stressful circumstance. In other words, maintaining professionals' vitality and resilience will contribute to healthcare quality. The outcomes of this study will be used to develop and implement interventions to support hospital employees in maintaining their vitality and resilience during and after the COVID-19 pandemic.

Article summary

Strengths and limitations of this study

- As the COVID-19 pandemic continues, it will be necessary for organizations to maintain professionals' vitality and resilience, as more effort is expected from the professionals and they will be confronted with new and stressful circumstances.
- Frontline workers from different departments managers and homeworkers will be compared in contrast to the majority of studies so far which focused exclusively on the needs of healthcare professionals.
- Real life data started during the beginning of 2nd COVID-19 wave, ongoing to autumn 2021.
- The COVID-19 pandemic is the motivation for this study, but may also limit the response rates or procedure of this study, given its unpredictable course.

Key words:

COVID-19, healthcare professionals, mental support, needs assessment, resilience, vitality.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Introduction

Worldwide, it has been reported that the Coronavirus Disease 2019 (COVID-19) pandemic has a significant impact on the physical and mental functioning of healthcare professionals, especially for those working on the 'frontline' (e.g., intensive care units (ICUs), COVID-19 departments and infection prevention units), and other hospital workers[1-4]. Indeed, also in the Netherlands, the COVID-19 pandemic had an impact on medical professionals. This is critical, as it has been reported that some Dutch medical professionals were already overburdened before the COVID-19 pandemic[5, 6].

The need for high-intensity medical treatment rapidly increased during the COVID-19 pandemic, during which the work circumstances became uncertain and stressful[7]. Work circumstances involved the continuous use of personal protective equipment, adapted responsibilities and tasks, moral dilemmas, and the risk of contamination for the healthcare professionals themselves[8]. Interpersonal contact with patients' family members, one of the core features of the professional practice of nurses, was considerably reduced due to visiting limitations in most hospitals[9, 10]. In addition, the work environment also changed for ICU nurses as their teams changed due to help from (former) colleagues and other healthcare professionals. This sudden shift in activities and responsibilities required ICU nurses to have additional competences to maintain high-quality healthcare. Buddies, or support staff from other departments in the hospital, were sometimes confronted with distressing or even shocking events during the first hectic weeks of the pandemic. Professionals of the infection prevention unit had to deal with an enormous workload due to the accumulation of new tasks and changing work processes under enormous time pressure, as well as the social turbulence resulting from the implemented quarantine measures. In the case of a health crisis such as the continuing COVID-19 outbreaks, the health and vitality of the frontline professionals becomes even more critical than in normal circumstances. This is because the higher workload and stress will do a higher appeal on the physical and mental resources of the

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 professionals. The COVID-19 pandemic had not only impact on the clinicians of the hospital. The
4
5 work environment also changed for non-clinical professionals who suddenly had to do all
6
7 administrative work and communication from home. In addition to this loss of the work
8
9 environment and direct contact with colleagues, homeworkers might lack a sense of purpose,
10
11 solidarity and valuable contribution to the crisis situation[11]. Last, the COVID-19 pandemic required
12
13 great effort from managers[12]. More than ever, they had to deal with logistic and administrative
14
15 processes in the upscaling of high-intensity care, improving work alliances and the integration of
16
17 staff in newly formed teams, and in managing the continuous flow of changing information.
18
19
20
21
22

Health, vitality and resilience

23
24
25 In previous virus outbreaks, such as the outbreaks of SARS, Ebola and MERS, it became clear that
26
27 increased stress levels at work in healthcare professionals were associated with fear of
28
29 contamination, shortage of materials, poor communication between healthcare professionals,
30
31 unclear work instructions and information, deficient or non-functioning equipment, and inadequate
32
33 planning among healthcare professionals[13-16]. Experiences from China during the COVID-19
34
35 pandemic showed similar results[17-19]. In a European study after COVID-19 on work-related stress
36
37 reactions among ICU healthcare professionals half of the respondents (50.4%) showed symptoms of
38
39 anxiety[1]. Early phase evidence on COVID-19 suggested that healthcare professionals experienced
40
41 mood and sleep disturbances during this outbreak, stressing the need to establish ways to minimize
42
43 mental health risks and support interventions aiming at pandemic conditions[3]. In the short-term,
44
45 this work-related stress can cause fatigue, sleep disorders, mistakes and moral distress[20]. Long-
46
47 term effects of high work pressure include burnout, depression and post-traumatic stress, resulting
48
49 in dropout due to illness and abandonment of paid employment[21, 22]. A recent study in the
50
51 Netherlands on burnout rates among intensivists were reported to be moderate (14.8%)[23].
52
53
54 Furthermore, recovery time - regaining strength after an intensive period at work- is associated with
55
56 physical and mental well-being[24]. A long recovery time is an early indicator of work-related stress
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 and exhaustion[25]. In contrast to high workload, stress and recovery time, vitality, resilience and
4
5 job satisfaction are characteristics of professionals that counterbalance work-related stress[26, 27].
6
7 These characteristics strengthen professionals' mental and physical well-being and their retention
8
9 for work[28-30]. Professionals with vitality are more resistant to work pressure.
10
11
12
13

Interventions among healthcare professionals during the COVID-19 pandemic

14
15
16 A wide variety of studies have examined interventions to reduce the work-related stress of
17
18 healthcare professionals during the COVID-19 pandemic. Providing personal protective equipment is
19
20 the top priority, followed by fulfilling the psychological needs of professionals[31]. To support
21
22 mental health and promote the vitality of healthcare professionals, various interventions, including
23
24 buddy systems, peer support, coaching and easily accessible psychological help, were proposed
25
26 during the COVID-19 period from March to May 2020[7, 32-36]. Other individual interventions, such
27
28 as telemedicine activities, e-package and self-help books, appear to be promising[37-40]. For
29
30 example, a hospital in China offered online courses to help medical professionals to deal with
31
32 psychological problems[41]. Many interventions have taken an individual approach, but system-level
33
34 changes in healthcare organizations seems to have a wider reach than individual support[42]. A
35
36 notable omission in the literature is that protective factors are given limited attention: the focus is
37
38 on the stressors. So there seems to be many possible interventions to support professionals in times
39
40 of a pandemic, however, it is not clear which intervention matches the needs of the professional
41
42 most closely. Therefore, we set out to investigate which supportive interventions, system changes
43
44 and other supportive factors could meet individual needs during and in the aftermath of the COVID-
45
46 19 pandemic in a large academic hospital in the Netherlands.
47
48
49
50
51
52
53

Objectives

54
55
56 The overall goal of the study is to gain insight into the risk and protective factors as well as the needs
57
58 and barriers in the working environment related to the promotion of the vitality and resilience of
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 employees. Our objective is to assess levels of vitality and resilience, and the need for support or
4
5 resources among professionals with a focus on professionals working in ICUs, COVID-19 departments
6
7 and infection prevention units. Furthermore, to gain more insight into the relationship of vitality and
8
9 resilience with factors such as self-perceived health, stress, burnout, posttraumatic stress, and need
10
11 for recovery. Based on the results of this study we aim to formulate recommendations for
12
13 interventions aiming at increased vitality and resilience for healthcare professionals in the
14
15 organization.
16
17
18
19
20

21 **Methods and analysis**

22 *Study design*

23
24 A mixed-methods design, using both quantitative (Sub-study-I) and qualitative methods (Sub-study-
25
26 II), is applied. Sub-study I is a cross-sectional online survey administered first in October 2020, when
27
28 the second wave of the COVID-19 pandemic was upcoming and ongoing, followed with
29
30 measurements in March and September 2021. Sub-study II includes focus group interviews among
31
32 nurses, doctors, and professionals regarding the ICU, COVID-19 departments and the infection
33
34 prevention unit during the end of 2020. The Spirit checklist was used to finalize reporting of the
35
36 study protocol in detail (Supplemental file S1).
37
38
39
40
41
42
43
44
45

46 *Setting*

47 The study setting is a large academic hospital in the Netherlands.
48
49
50

51 *Study population*

52
53 Sub-study I: The population consists of a random sample based on voluntary participation of four
54
55 target groups: professionals working at the COVID-19 department, non-COVID-19 departments,
56
57 managers and homeworkers.
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Sub-study II: The population consists of a non-random sample of professionals working in the ICU, COVID-19 department and the infection prevention unit. Participants are invited and selected in collaboration with the managers of the study population.

The inclusion criteria for the entire study are (i) a minimum age of eighteen years and (ii) sufficient Dutch language proficiency to complete the questionnaires or to discuss the relevant topic.

Patient and Public Involvement

No patient involved.

*Study procedures*Sub-study I: Online surveys

Professionals are informed about the study in several ways. The communication strategy is tailored to each target group and supported by the communication department of the organization. A link to the online survey is published on the intranet of the organization, printed QR-codes containing a link to the survey are available at the coffee corners and canteens, announcements are made in the weekly COVID-19 livestream and by team management via personal email. Participation is voluntary and can be performed during working hours.

The online questionnaire starts with information about the study, privacy statements and a consent form for participation. After providing consent to participate, participants are asked to fill out the entire questionnaire, which consists of two parts. The first part is generic for all employees and takes approximately six minutes to complete; it includes questions on demographic information and the main outcomes. The second part consists of additional modules on working conditions and health and has a completion time of approximately seven minutes. Nurses and homeworkers receive another additional module tailored to their specific work environment.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Sub-study II: Focus groups

In total, six focus groups with 6-10 participants that take approximately 60 minutes are conducted. ICU doctors, ICU nurses, microbiologists, hospital hygienists, COVID-19 unit nurses, and COVID-19 unit doctors (lung specialists and specialists internal medicine) are individually invited to participate in one of the focus groups through consultation with the team managers. These meetings are preferably in-person (to observe non-verbal attitude and facial expressions), but due to the COVID-19 measures and social distancing, it may not be possible for participants to be physically present. In those cases, the focus groups are carried out via video calling technology.

Prior to the meetings, a topic list is created by the research group based on the literature and internal reports on the experiences of professionals. This topic list is used to guide and structure the meeting. The aim of the focus group is to study protective factors that contribute to vitality and resilience during the COVID-19 pandemic. Furthermore, possible interventions to increase vitality and resilience are explored and elaborated upon. Written informed consent is given prior to the meeting, and two experienced researchers guide the meetings. The focus group interviews are recorded and transcribed verbatim.

Measurements

This paragraph lists all measurement instruments included in the questionnaire. The first part consists of measuring instruments addressing demographics, primary outcomes (i.e. vitality, resilience and needs assessment), and several secondary outcomes (i.e. self-perceived health, stress, burnout, posttraumatic stress, and need for recovery). The second part consists of separate modules for homeworkers and nurses with regard to work ability, working conditions, job satisfaction, work-private balance, exposure to COVID-19 at work, preventive measures for COVID-19 and career perspectives.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Demographics

Gender, age (divided into five categories), educational level, function at work, work location and professionals' experience (in years) are assessed. Educational level is divided into three levels: low, medium and high educational level. In total, the list of functions includes 23 positions within the academic hospital (e.g., nurse, ICT employee, pharmacist, educator, doctor).

Main outcome measures

Vitality

Vitality is measured with four items from the original 36-item Short Form Health Survey (SF-36) [43]. The total summed score of four items that refer to the past four weeks: "Did you feel full of liveliness?", "Did you have a lot of energy?", "Did you feel worn out?", and "Did you feel tired?". The answers are rated on a six-point scale from 1 (= constantly) to 6 (= never) [44]. Higher scores indicating a better subjective vitality.

Resilience

Resilience (the ability to cope with stress, setbacks or difficulties at work) is measured with six items from the Psychological Capital Questionnaire[45]. The items contain statements such as: "When I have a setback at work, I have a hard time getting back on track and moving on", "If necessary, I can work well without the help of others" and "I can handle difficult moments at work". The six items are scored from 1 (= strong disagreement) to 6 (= strong agreement). Higher values indicate a higher level of resilience.

Needs assessment

Needs are measured with a self-designed scale with four items. Examples of questions are: "In which area would you like to be supported?" and "What would this support look like?" and "What should

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

be offered or developed?”. A predefined list includes 10 individual- and 14 organizational-related answer options, e.g., support for working from home, time management, and work-private balance.

Other outcome measures

Self-perceived health

Self-rated health is assessed with one question ‘ “In general, how would you say your health is?”

Responses range from 1 (= excellent) to 5 (= poor).

Stress

Stress is measured with a numeric rating scale. The stress score, ranging from 0 (= no stress at all) to 100 (= the worst stress imaginable). This scale is used to retrospectively objectify stress before, during and after the first COVID-19 outbreaks. The three item question was “How did you experience the stress before/during/after the COVID-19 crisis on a scale from 0 to 10?”

Burnout

Burnout is measured using five items, that are based on an adapted version of the Utrecht Burnout Scale [46]. The items refer to the current situation such as “I feel emotionally drained from my job” and “I feel completely exhausted from my work”. The responses range from 1 (= never) to 7 (= daily).

Posttraumatic stress

Posttraumatic stress is assessed with the Posttraumatic stress disorder (PTSD) Checklist for the DSM-5 (PCL-5) - COVID-19 version with 20 items[47]. This scale consists of 20 items, measuring PTSD symptoms, with scoring options from 0 (= not all) to 4 (= extremely) and was adapted to the COVID-19 situation. A score of 33 or higher is perceived indicative for PTSD.

Need for recovery

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 Work fatigue and the risk of psychological symptoms are measured using the Dutch questionnaire on
4 the Experience and Evaluation of Work (Dutch abbreviation: VBBA)[48, 49]. The need for recovery
5 scale consists of eleven dichotomous items (yes/no), representing short-term effects of a working
6 day[24, 50, 51]. The score of the need for recovery scale ranges from 0 to 100 and is calculated as
7 the sum of points (1 = yes, 0 = no) divided by the number of questions answered, multiplied by 100.
8
9
10
11
12
13
14 Higher scores indicate a higher need for recovery, which is unfavourable.
15
16
17

Work ability

18
19
20
21 Work ability is measured with the Work Ability Index (WAI)[52]. This widely used index measures
22 self-assessed work ability and consists of seven items. Because the sub-items of the WAI can also be
23 used as a simple indicator for work ability[53], three of the seven items are used: current work
24 ability (one item), and work ability in relation to physical and mental job demands (two items). A
25 total WAI score (range 2–20) is obtained by adding the weight scores of these individual items[54].
26
27
28
29
30
31
32
33
34

Working conditions

35
36
37 Aspects of working conditions measured in this study are: job autonomy, emotional job demands,
38 social support and physical working conditions.
39
40
41
42

43 Job autonomy is measured with six items on a three point scale (no; yes, sometimes; yes, regularly).
44 Five items, i.e., those about making decisions, having to find solutions, and being able to take time
45 off, are based on the Job Content Questionnaire[55, 56]. One item on autonomy related to working
46 time based on the Netherlands Working Conditions Survey, is also included in the questionnaire[57].
47
48
49
50
51
52
53

54 Emotional job demands is evaluated with four items. Three items are derived from the Copenhagen
55 Psychosocial Questionnaire and assess whether the work leads to emotionally difficult situations,
56 the emotional demands of the job, and emotional involvement in work. An additional item is “Is your
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 job more emotionally demanding because of COVID-19?”. All items are measured on a four-point
4
5 scale (never to always)[58].
6
7
8
9

10 Social support is defined as whether colleagues and supervisors are willing to help and listen to
11
12 work-related problems and is assessed using four items from COPSOQ[58]. Social support is
13
14 measured on four-point Likert scales 1 (= almost never) to five (= always).
15
16
17

18
19 Physical working conditions are measured with one self-designed question and assesses whether a
20
21 worker received more or less physically demanding work due to COVID-19 measures. This scale has
22
23 three answer options (no; yes, sometimes; yes, regularly).
24
25
26

Job satisfaction

27
28
29 Job satisfaction is measured with one item: “Altogether, how satisfied are you with your work?” The
30
31 responses range from 1 (very dissatisfied) to 5 (very satisfied).
32
33
34

Work-private life balance

35
36
37 Work-private life balance is measured with two questions on the mutual interference between work
38
39 and home life. The questions are adopted from the Netherlands Working Conditions Survey [57], but
40
41 were originally constructed by Fox and Dwyer (1999) [59]. Both questions have four answer options
42
43 ranging from 1 (= no, never) to 4 (= very often).
44
45
46
47
48
49

Exposure to COVID-19 at work

50
51
52 Professionals are asked to what extent they might have been exposed to COVID-19 at the worksite.
53
54 These questions are derived from the Netherlands Working Conditions Survey COVID-19 [60], based
55
56 on questionnaires developed within the OMEGANetwork[61]. Participants are asked if they work with
57
58 patients, the average number of patients they worked with during a typical working day in the last
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 week, and if these patients were suspected to have or had been diagnosed with COVID-19.

4
5 Additionally, participants evaluate their work on a regular basis with colleagues, the number of
6
7 colleagues they work with and if they share tools or surfaces with them.
8
9

Preventive measures for COVID-19

10
11
12 The questions on preventive measures in the workplace are from the Netherlands Working
13
14 Conditions Survey COVID-19 [60] and consist of one general question and five more specific
15
16 questions. The general question assesses the general measures at the department level with regard
17
18 to the COVID-19 pandemic, with answer options such as homeworking, adjustment of working
19
20 hours, general preventive measures in the workplace, mandatory inclusion or withdrawal of leave.
21
22 The specific questions are about the possibility of keeping a 1.5 metre distance between colleagues
23
24 and/or patients, the availability of personal protective equipment, the usage of personal protective
25
26 equipment and the application of general hygiene measures. The responses to these five questions
27
28 are never, sometimes, often and always. This module will not be applied to professionals working
29
30 from home.
31
32
33
34
35
36
37
38

Career perspective

39
40
41 Three items on career perspective are derived from the Netherlands Working Conditions Survey
42
43 COVID-19[60] and adjusted to fit the study population working in the hospital. These items include
44
45 the motivation to work in the healthcare sector in the future (responses: less, equal, and more), the
46
47 intention to change jobs within the health care sector and the intention to change jobs outside the
48
49 healthcare sector with responses ranging from 1 (= certainly not) to 5 (=certainly yes).
50
51
52
53

Outcome measures for pre-defined groups or professions

Nurse questionnaire

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 The Practice Environment Scale of the Nursing Work Index is the most widely used measure to gauge
4 the state of nursing practice environments[62, 63]. It is the only measure recommended by several
5 organizations promoting quality healthcare. The 15-item questionnaire uses responses ranging from
6 1 (= strongly disagree) to 4 (= totally agree). This module will be applied to nurses only.
7
8
9

Homeworkers

10
11
12
13
14
15
16 A total of eight items are specifically tailored to homeworkers. Two items refer to the number of
17 hours in a week people work from home and how many hours a day they work on a screen (e.g.,
18 laptop and tablet). One item is focused on the availability of ergonomic work equipment at home (a
19 desk or table with a comfortable working height, a chair that can be adjusted to one's body
20 measurements, a separate display, and a separate computer mouse). The need for other furniture is
21 assessed with one item "Do you need additional materials for a good home workplace?". The answer
22 options are yes or no. Moreover, regarding rest breaks – outside the lunch break – are asked "Do you
23 take (short) breaks on a working day, except for a lunch break?". This question includes the following
24 response options: 1 (= yes, regularly), 2 (= yes, sometimes) and 3 (= no). The last three items are
25 about concentration while at home and include the following statements: "Do you have trouble
26 concentrating while working?", "Do you struggle to keep your attention while you work?" and "Do
27 you have difficulty with the reduced social contact with colleagues?" Answers range from 1 (= never)
28 to 4 (= always).
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47

Data handling and statistical analyses

48
49
50 Sub study I: survey data are anonymously collected using Limesurvey (Version 2.06 lts Build 160524)
51 and exported to a secure SPSS database (©IBM SPSS Statistics for Windows, Version 25.0. Armonk,
52 NY: IBM Corp) for analysis. All principal investigators have access to the final study dataset. Data will
53 be stored for fifteen years.
54
55
56
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 First, the data are cleaned and checked for missing data. The descriptive statistics are presented as
4 numbers and percentages with a normal distribution around the mean (with standard deviation) for
5 dichotomous variables and a non-normal distribution around the median (with interquartile range)
6 for continuous variables. Data for different subgroups (professionals in COVID-19 departments, non-
7 COVID-19 departments, executives and homeworkers) are analyzed with the Mann-Whitney test or
8 t-tests. Linear and logistics regression analyses are performed to investigate the associations
9 between risk factors and the main outcomes (vitality and resilience). Statistical significance will be
10 defined as $p < .05$.

11
12
13
14
15
16
17
18
19
20
21
22
23 Sub study II: Focus group interview data are audiotaped and transcribed verbatim. Thematic analysis
24 is conducted the principles of thematic content analysis [64]. Two researchers read the transcripts.
25 Each of them develops a structured analysis framework that consists of preliminary themes and
26 codes. After that, they compare their frameworks to reach consensus. Next, one researcher codes
27 the transcripts line by line according to this framework in the software programme NVivo12®. The
28 coder uses memos for comments during coding. When coding is finished and the code 'other' is
29 used, the two researchers discuss these codes and rename them into a new or existing codename
30 best reflecting the contents of the otherwise uncategorised text fragment. After coding is finished,
31 the cohesion and inter-relations between codes are analysed by the two researchers. The principal
32 investigators have access to these data, and data will be stored for fifteen years.

Ethics and dissemination

33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51 The study is approved by the Medical Ethics Committee of the Erasmus MC (MEC-2020-0705) and
52 conducted according to the principles of the Declaration of Helsinki (64th WMA General Assembly,
53 Fortaleza, Brazil, October 2013) and in accordance with the Medical Research Involving Human
54 Subjects Act. The study complies with the Netherlands Code of Conduct for Scientific Practice from
55 the Association of Universities in the Netherlands. Protocol modifications will be communicated and

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 to the Medical Ethics Committee by protocol amendment. Participants will be informed about the
4
5 study both orally and by letter. Consent for participation will be given by written informed consent.
6
7
8 Participants can leave the study at any time for any reason if they wish to do so without any
9
10 consequences. The withdrawal will be registered for informative purpose.
11
12
13

14 The consequences of the COVID-19 crisis on the mental health and working conditions of healthcare
15
16 professionals have been recognized worldwide[65]. By using a mixed-methods approach, we aim to
17
18 gain an overview of vitality, resilience and health (e.g. stress and burnout) among healthcare
19
20 professionals, as well as the risk factors associated with these outcomes. This is an urgent and
21
22 rushed study because we want to use the results against the same health crisis that we are
23
24 investigating. Based on this study, directions for future interventions during the COVID-19 pandemic
25
26 and thereafter can be provided to improve the vitality and resilience of professionals in the hospital,
27
28 and therewith support their employability.
29
30
31
32
33

Strengths and limitations

34
35
36 The first strength is the mixed-methods design, consisting of qualitative and quantitative methods .
37
38
39 Second, we compare different departments and distinguish executives and homeworkers. The
40
41 majority of studies so far focused exclusively on the needs of healthcare professionals without
42
43 considering other hospital employees such as supportive staff, researchers and managers. Third, real
44
45 life data gathering during start of 2nd wave.
46
47
48
49

50 The COVID-19 pandemic was the motivation for this research, but may also have limited the
51
52 procedure of this study, given its unpredictable course. During the writing of this protocol paper, the
53
54 second wave of COVID-19 had already started in The Netherlands. Therefore, a lower response rate
55
56 is not unexpected. The second limitation is the cross-sectional design of the study, which makes it
57
58 impossible to draw causal conclusions from this report.
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Data dissemination

Public access to the study protocol, study details, participant-level dataset, and statistical code can be acquired from the corresponding author. The results will be disseminated to healthcare professionals, health services authorities and the public via presentations at national and international meetings and published in peer-reviewed journals. A lay summary of the results will be written and shared with all professionals of the organization.

Study status

The study is currently ongoing with data recruitment.

For peer review only

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

References

1. Azoulay E, De Waele J, Ferrer R, et al. Symptoms of burnout in intensive care unit specialists facing the COVID-19 outbreak. *Ann Intensive Care* 2020;10(1):1-8.
2. Kok N, Hoedemaekers A, van der Hoeven H, et al. Recognizing and supporting morally injured ICU professionals during the COVID-19 pandemic. *Int Care Med*, 2020;46:1653–1654
doi.org/10.1007/s00134-020-06121-3
3. Pappa S, Ntella V, Giannakas T, et al. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Imm*, 2020;doi.org/10.1016/j.bbi.2020.05.026
4. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA network open* 2020;3(3):e203976-e203976.
5. Solms L, van Vianen AEM, Theeboom T, et al. Keep the fire burning: a survey study on the role of personal resources for work engagement and burnout in medical residents and specialists in the Netherlands. *BMJ open* 2019;9(11).
6. Prins JT, Hoekstra-Weebers J, Van De Wiel HBM, et al. Burnout among Dutch medical residents. *Int J Behav Med* 2007;14(3):119-125.
7. Rieckert A, Schuit E, Bleijenberg N, et al. How can we build and maintain the resilience of our health care professionals during COVID-19? Recommendations based on a scoping review. *BMJ Open* 2021;11:e043718. doi:10.1136/bmjopen-2020-04371
8. Gold, J.A., Covid-19: adverse mental health outcomes for healthcare workers. *Brit Med J Publish Group*. 2020;369:m1815 doi: 10.1136/bmj.m1815
9. Bagnasco A, Zanini M, Hayter M, et al. COVID 19—A message from Italy to the global nursing community. *JAN* 2020; DOI: 10.1111/jan.14407
10. Murthy S, Gomersall CD, Fowler RA. Care for critically ill patients with COVID-19. *JAMA* 2020;323(15):1499-1500.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

11. Joly, H. Lead your team into a post-pandemic world. *Harvard Business Review* 2020;8.
12. Kniffin KM, Narayanan J, Anseel F, et al. COVID-19 and the Workplace: Implications, Issues, and Insights for Future. *Research and Action* 2020;DOI: 10.1037/amp0000716
13. Maunder R, Hunter J, Vincent L, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ* 2003;168(10):1245-1251.
14. Ulrich CM. Ebola is causing moral distress among African healthcare workers. *BMJ*, 2014;349:g6672.
15. Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry* 2009;54(5):302-311.
16. Bukhari EE, Temsah MH, Aleyadhy AA, et al. Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak perceptions of risk and stress evaluation in nurses. *J Infect Dev Ctries* 2016;10(08):845-850.
17. Zhu Z, Xu S, Wang H, et al. COVID-19 in Wuhan: Immediate Psychological Impact on 5062 Health Workers. *MedRxiv* 2020; doi.org/10.1101/2020.02.20.2002533
18. Xiao H, Zhang Y, Kong D, et al. The effects of social support on sleep quality of medical staff treating patients with coronavirus disease 2019 (COVID-19) in January and February 2020 in China. *Medical science monitor: international medical journal of experimental and clinical research*, 2020;26:923549-1.
19. Zhang Y, Wang C, Pan W, Zheng J, Gao J, Huang X, et al. Stress, burnout, and coping strategies of frontline nurses during the COVID-19 epidemic in Wuhan and Shanghai, China. *Front Psychiatry*, 2020;11:1154.
20. De Villers MJ, DeVon HA. Moral distress and avoidance behavior in nurses working in critical care and noncritical care units. *Nursing Ethics*, 2013. 20(5): p. 589-603.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 21 Moss M, Good VS, Gozal D, et al. An official critical care societies collaborative statement:
4
5 burnout syndrome in critical care health care professionals: a call for action. *Am J Crit Care*
6
7 2016;25(4):368-376
8
9
- 10 22. Van Mol MMC, Kompanje EJO, Benoit DD, et al.. The prevalence of compassion fatigue and
11
12 burnout among healthcare professionals in intensive care units: a systematic review. *PLoS*
13
14 *ONE*, 2015;10(8):e0136955.
15
- 16 23. Meynaar IA, Ottens T, Zegers M, et al.. Burnout, resilience and work engagement among Dutch
17
18 intensivists in the aftermath of the COVID-19 crisis: A nationwide survey. *J Crit Care* 2020;
19
20 doi.org/10.1016/j.jcrc.2020.11.01
21
22
- 23 24. Graham B, Cottey L, Smith JE, et al. Measuring 'Need for Recovery' as an indicator of staff well-
24
25 being in the emergency department: a survey study. *Emergency Medicine* 2020;37(9):555-
26
27 561.
28
29
- 30 25. Nieuwenhuijsen K, Sluiter JK, Dewa CS. Need for recovery as an early sign of depression risk in a
31
32 working population. *Int J Occup Environ Med*, 2016;58(11):e350-e354.
33
34
- 35 26. van Mol MMC, Nijkamp MD, Bakker J, et al.. Counterbalancing work-related stress? Work
36
37 engagement among intensive care professionals. *Australian Crit Care* 2018;31(4):234-241.
38
- 39 27. Schaufeli WB, Salanova M, González-Romá V, et al. The measurement of engagement and
40
41 burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness studies*
42
43 2002;3(1):71-92.
44
45
- 46 28. Schaufeli WB. Engaging leadership in the job demands-resources model. *Career Development*
47
48 *International* 2015;20:5.
49
- 50 29. Bakker AB, Demerouti E, Sanz-Vergel AI. Burnout and work engagement: The JD-R approach.
51
52 *Ann Rev Organ Psychol Organ Behav*. 2014.1:389-411.
53
54
- 55 30. Yu F, Raphael D, Mackay L, Smith M, King A. Personal and work-related factors associated with
56
57 nurse resilience: a systematic review. *Int J Nurs Stud* 2019;93:129-140.
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 31.Santarone K, McKenney M, Elkbuli A. Preserving mental health and resilience in frontline
4
5 healthcare workers during COVID-19. *Am J Emergency Med* 2020;38(7):1530–1531.
6
7
8 32. Ministerie van Defensie. Tips & adviezen voor de mentale gezondheid van zorgprofessionals.
9
10 Retrieved from [https://www.waardigheidentrots.nl/wp-content/uploads/2020/03/Flyer-](https://www.waardigheidentrots.nl/wp-content/uploads/2020/03/Flyer-Mentale-Gezondheid-zorgprofessionals-tijdens-corona.pdf)
11
12 [Mentale-Gezondheid-zorgprofessionals-tijdens-corona.pdf](https://www.waardigheidentrots.nl/wp-content/uploads/2020/03/Flyer-Mentale-Gezondheid-zorgprofessionals-tijdens-corona.pdf).
13
14 33. Hu Y-Y, Fix ML, Hevelone ND, et al. Physicians' needs in coping with emotional stressors: the case
15
16 for peer support. *Archiv Surgery* 2012;147(3):212-217.
17
18 34. Albott CS, Wozniak JR, McGlinch BP, et al. Battle Buddies: Rapid Deployment of a Psychological
19
20 Resilience Intervention for Health Care Workers During the Coronavirus Disease 2019
21
22 Pandemic. *Anesth Anal* 2020; doi:10.1213/ANE.0000000000004912
23
24 35. Leszcz M, Maunder R, Hunter J. Psychological support for health care workers during the COVID-
25
26 19 pandemic. *CMAJ* 2020;192(24):E660-E660.
27
28 36.Kisely S, Warren N, McMahon L, et al. Occurrence, prevention, and management of the
29
30 psychological effects of emerging virus outbreaks on healthcare workers: rapid review and
31
32 meta-analysis. *BMJ* 2020;369.
33
34 37.Jing H, Fangkun L, Ziwei T, et al. Care for the psychological status of frontline medical staff
35
36 fighting against COVID-19. *Clinical infectious diseases: an official publication of the Infectious*
37
38 *Diseases Society of America* 2020 retrieved from [https://academic.oup.com/cid/advance-](https://academic.oup.com/cid/advance-article-pdf/doi/10.1093/cid/ciaa385/33004970/ciaa385)
39
40 [article-pdf/doi/10.1093/cid/ciaa385/33004970/ciaa385](https://academic.oup.com/cid/advance-article-pdf/doi/10.1093/cid/ciaa385/33004970/ciaa385).
41
42
43 38.Percudani M, Corradin M, Moreno M, et al. Mental health services in Lombardy during COVID-19
44
45 outbreak. *Psychiatry Res* 2020;112980.
46
47 39.Kang L, Ma S, Chen M, et al. Impact on mental health and perceptions of psychological care
48
49 among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease
50
51 outbreak: A cross-sectional study. *Brain Behav Imm* 2020;87:11-17
52
53
54
55
56
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 40.Blake H, Bermingham F, Johnson G, Tabner A. Mitigating the psychological impact of COVID-19 on
4
5 healthcare workers: a digital learning package. *Int J Environmental Res Public Health*
6
7 2020 ;17(9):2997.
8
9
- 10 41.Chen Q, Liang M, Li Y, et al.. Mental health care for medical staff in China during the COVID-19
11
12 outbreak. *The Lancet Psychiatry*, 2020;7(4):e15-e16.
13
- 14 42.Wu PE, Styra R, Gold WL. Mitigating the psychological effects of COVID-19 on health care
15
16 workers. *CMAJ* 2020;192(17):E459-E460.
17
- 18 43. Ware Jr JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36): I. Conceptual
19
20 framework and item selection. *Med Care*, 1992:473-483.
21
22
- 23 44. van der Zee KI, Sanderman R. Measuring health status with the RAND-36. A manual. [Het meten
24
25 van de gezondheidstoestand met de RAND-36. Een handleiding], Groningen, 1993.
26
27
- 28 45.Luthans F, Avolio BJ, Avey JB, Norman SM. Positive psychological capital: Measurement and
29
30 relationship with performance and satisfaction. *Personnel psychology* 2007;60(3):541-572.
31
32
- 33 46.Schaufeli WB, Dierendonck DV. Utrecht Burnout Scale [Utrechtse Burnout Schaal] (UBOS). De
34
35 psycholoog, 2001;6(1):9-12.
36
- 37 47.Weathers FW, Litz BT, Keane TM, et al. The ptsd checklist for dsm-5 (pcl-5). Scale available from
38
39 the National Center for PTSD. Retrieved from
40
41 <https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp>. Nederlandse
42
43 vertaling: Boeschoten, M.A., Bakker, A., Jongedijk, R.A. & Olff, M. (2014) (Stichting Centrum
44
45 '45)
46
47
- 48 48.Broersen JPJ, Fortuin RJ, Dijkstra L, et al. Health and Safety Covenants Monitor: key figures and
49
50 limit values [Monitor Arboconvenanten: kengetallen en grenswaarden]. *TBV–Tijdschrift voor*
51
52 *Bedrijfs-en Verzekeringsgeneeskunde*, 2004;12(4):104-108.
53
54
- 55 49. Veldhoven Mv, Meijman T. Meijman, Measuring psychosocial workload with a questionnaire: the
56
57 questionnaire perception and assessment of work [Het meten van psychosociale
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 arbeidsbelasting met een vragenlijst: de vragenlijst beleving en beoordeling van de arbeid].
4
5 1994: Nederlands Instituut voor Arbeidsomstandigheden.
6
7
8 50. Jansen NWH, Kant I, van den Brandt PA. Need for recovery in the working population:
9
10 description and associations with fatigue and psychological distress. *Int J Behav Med*, 2002;
11
12 9(4):322.
13
14 51. Moriguchi CS, Trevizani T, de Fátima Carreira Moreira R, et al. Need for recovery assessment
15
16 among nursing professionals and call center operators. *Work* 2012;41(Supplement 1):4838-
17
18 4842.
19
20
21 52. Ilmarinen J. Ageing workers in the European Union: status and promotion of work ability,
22
23 employability, and employment. The Geneva Papers on Risk and Insurance. *Issues and*
24
25 *Practice* 1999;26(4), 623-641.
26
27
28 53. Ahlstrom L, Grimby-Ekman A, Hagberg M, Dellve L. The work ability index and single-item
29
30 question: associations with sick leave, symptoms, and health—a prospective study of women
31
32 on long-term sick leave. *Scand J Work, Environment & Health* 2010:404-412.
33
34 54. Tuomi K, Ilmarinen J, Jahkola A, Katajarinne L, Tulkki A, Oja G. Work ability index. Helsinki: Finnish
35
36 Institute of Occupational Health; 1998. *Occup Health Care*, 1998. 19.
37
38
39 55. Karasek R. Job Content Questionnaire user's guide. *Department of Work Environment*, 1985.
40
41 56. Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The Job Content
42
43 Questionnaire (JCQ): an instrument for internationally comparative assessments of
44
45 psychosocial job characteristics. *J Occup Health Psychol* 1998;3(4):322.
46
47
48 57. Hooftman WE, Mars GMJ, Knops JCM, et al. National Working Conditions Survey 2019.
49
50 Methodology and global results [Nationale Enquête Arbeidsomstandigheden 2019.
51
52 Methodologie en globale resultaten]. 2020: TNO; CBS.
53
54 58. Kristensen TS, Borg V. Copenhagen psychosocial questionnaire (COPSOQ). *Mental Health*
55
56 2003;5(5):5.
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 59.Fox ML, Dwyer DJ. An investigation of the effects of time and involvement in the relationship
4
5 between stressors and work–family conflict. *J Occup Health Psychol* 1999;4(2):164.
6
7
8 60.Bouwens L, Zoomer T, Hooftman W, Oude Hengel K. Reading guide National Working Conditions
9
10 Survey - COVID-19 [Leeswijzer Nationale Enquête Arbeidsomstandigheden – COVID-19]
11
12 2020, TNO: Leiden, The Netherlands.
13
14 61.OMEGA-NET. COVID-19 And OMEGA-NET. 2020 [cited 2020; Available from:
15
16 <https://omeganetcohorts.eu/resources/covid19-and-omega/>.
17
18
19 62.Lake ET. Development of the practice environment scale of the nursing work index. *Res Nurs &*
20
21 *Health* 2002;25(3):176-188.
22
23 63.Zangaro GA, Jones K. Practice Environment Scale of the Nursing Work Index: A Reliability
24
25 Generalization Meta-Analysis. *Western J Nurs Res* 2019;41(11):1658-1684.
26
27
28 64.Braun V, Clarke V., Using thematic analysis in psychology. *Qualitative Res Psychol* 2006 ;3(2):77-
29
30 101.
31
32 65.Morgantini LA, Naha U, Wang H, et al. Factors Contributing to Healthcare Professional Burnout
33
34 During the COVID-19 Pandemic: A Rapid Turnaround Global Survey. *MedRxiv*
35
36 2020;doi:10.1101/2020.05.17.20101915
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Declarations

Authors contributions

MvM, TK, JB and LK jointly designed the study, raised funding and established the development of the study protocol. MvM, MV, TK, KOH and LK prepared the study materials. MvM, MV and LK gathered the data of both sub-studies and produced the first draft of the article outline together with KOH and TK. All authors (MvM, MV, AP, TK, JB, WH, KOH, LK) contributed substantially to the concept of the study, the analyses of literature, critically revised the content of the manuscript, have read and approved the final version.

Funding

This work was internally supported by the board of Erasmus MC (no grant number applicable), which had no role in the design of this study and has no role in its execution, analysis and interpretation of data.

Competing interest statement

The authors declare no conflicts of interest.

Wordcount:

3994

Acknowledgements

The authors would like to thank all participating respondents for their involvement in the study.

Availability of data and materials

Anonymized data gathered and analysed during the current study are not publicly available due to legal and ethical restriction. These can be requested from the corresponding author as well as text

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 and photo material of the developed intervention. Materials described in the manuscript, including
4
5 all relevant raw data, will be freely available at a reasonable request to any scientist wishing to use
6
7 them for non-commercial purposes.
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For peer review only



SPIRIT 2013 Checklist: Recommended items to address in a clinical trial protocol and related documents*

Section/item	Item No	Description	Addressed on page number
Administrative information			
Title	1	Descriptive title identifying the study design, population, interventions, and, if applicable, trial acronym	1
Trial registration	2a	Trial identifier and registry name. If not yet registered, name of intended registry	NA
	2b	All items from the World Health Organization Trial Registration Data Set	NA
Protocol version	3	Date and version identifier	3
Funding	4	Sources and types of financial, material, and other support	2
Roles and responsibilities	5a	Names, affiliations, and roles of protocol contributors	1,2 and 28
	5b	Name and contact information for the trial sponsor	2, corresponding author
	5c	Role of study sponsor and funders, if any, in study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication, including whether they will have ultimate authority over any of these activities	28
	5d	Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee)	NA

1 Introduction

2				
3	Background and	6a	Description of research question and justification for undertaking the trial, including summary of relevant	6-8
4	rationale		studies (published and unpublished) examining benefits and harms for each intervention	
5				
6		6b	Explanation for choice of comparators	NA
7				
8	Objectives	7	Specific objectives or hypotheses	8
9				
10	Trial design	8	Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group),	
11			allocation ratio, and framework (eg, superiority, equivalence, noninferiority, exploratory)	NA
12				
13				
14	Methods: Participants, interventions, and outcomes			
15				
16	Study setting	9	Description of study settings (eg, community clinic, academic hospital) and list of countries where data will	9
17			be collected. Reference to where list of study sites can be obtained	
18				
19	Eligibility criteria	10	Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and	9
20			individuals who will perform the interventions (eg, surgeons, psychotherapists)	
21				
22	Interventions	11a	Interventions for each group with sufficient detail to allow replication, including how and when they will be	NA
23			administered	
24				
25		11b	Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose	NA
26			change in response to harms, participant request, or improving/worsening disease)	
27				
28		11c	Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence	NA
29			(eg, drug tablet return, laboratory tests)	
30				
31		11d	Relevant concomitant care and interventions that are permitted or prohibited during the trial	NA
32				
33	Outcomes	12	Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood	11-17
34			pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg,	
35			median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen	
36			efficacy and harm outcomes is strongly recommended	
37				
38	Participant timeline	13	Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for	9, NA
39			participants. A schematic diagram is highly recommended (see Figure)	
40				
41				
42				
43				
44				
45				
46				

1	Sample size	14	Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations	9, 10 NA
2				
3				
4	Recruitment	15	Strategies for achieving adequate participant enrolment to reach target sample size	9, 10
5				

6 **Methods: Assignment of interventions (for controlled trials)**

7 Allocation:

10	Sequence generation	16a	Method of generating the allocation sequence (eg, computer-generated random numbers), and list of any factors for stratification. To reduce predictability of a random sequence, details of any planned restriction (eg, blocking) should be provided in a separate document that is unavailable to those who enrol participants or assign interventions	NA
11				
12				
13				
14				
15				
16	Allocation concealment mechanism	16b	Mechanism of implementing the allocation sequence (eg, central telephone; sequentially numbered, opaque, sealed envelopes), describing any steps to conceal the sequence until interventions are assigned	NA
17				
18				
19				
20	Implementation	16c	Who will generate the allocation sequence, who will enrol participants, and who will assign participants to interventions	NA
21				
22				
23				
24	Blinding (masking)	17a	Who will be blinded after assignment to interventions (eg, trial participants, care providers, outcome assessors, data analysts), and how	NA
25				
26				
27		17b	If blinded, circumstances under which unblinding is permissible, and procedure for revealing a participant's allocated intervention during the trial	NA
28				
29				
30				

31 **Methods: Data collection, management, and analysis**

33	Data collection methods	18a	Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (eg, duplicate measurements, training of assessors) and a description of study instruments (eg, questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol	17-18
34				
35				
36				
37				
38				
39		18b	Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols	NA
40				
41				
42				

1	Data management	19	Plans for data entry, coding, security, and storage, including any related processes to promote data quality (eg, double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol	17-18
2				
3				
4				
5	Statistical methods	20a	Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol	17-18
6				
7				
8		20b	Methods for any additional analyses (eg, subgroup and adjusted analyses)	17-18
9				
10		20c	Definition of analysis population relating to protocol non-adherence (eg, as randomised analysis), and any statistical methods to handle missing data (eg, multiple imputation)	17-18
11				
12				
13				
14	Methods: Monitoring			
15				
16	Data monitoring	21a	Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the protocol. Alternatively, an explanation of why a DMC is not needed	NA
17				
18				
19				
20				
21				
22		21b	Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial	NA
23				
24				
25	Harms	22	Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct	NA
26				
27				
28	Auditing	23	Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor	NA
29				
30				
31				
32	Ethics and dissemination			
33				
34	Research ethics approval	24	Plans for seeking research ethics committee/institutional review board (REC/IRB) approval	4 and 18
35				
36				
37	Protocol amendments	25	Plans for communicating important protocol modifications (eg, changes to eligibility criteria, outcomes, analyses) to relevant parties (eg, investigators, REC/IRBs, trial participants, trial registries, journals, regulators)	18
38				
39				
40				
41				
42				
43				
44				
45				
46				

Downloaded from <http://bmjopen.bmj.com/> on April 23, 2024 by guest. Protected by copyright.

1	Consent or assent	26a	Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32)	18
2				
3				
4		26b	Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable	NA
5				
6				
7	Confidentiality	27	How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial	18
8				
9				
10	Declaration of interests	28	Financial and other competing interests for principal investigators for the overall trial and each study site	28
11				
12				
13	Access to data	29	Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators	18
14				
15				
16	Ancillary and post-trial care	30	Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation	NA
17				
18				
19				
20	Dissemination policy	31a	Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (eg, via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions	19
21				
22				
23				
24		31b	Authorship eligibility guidelines and any intended use of professional writers	28
25				
26		31c	Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code	28
27				
28				
29	Appendices			
30				
31	Informed consent materials	32	Model consent form and other related documentation given to participants and authorised surrogates	Correspondent author (in Dutch)
32				
33				
34	Biological specimens	33	Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable	NA
35				
36				

37 *It is strongly recommended that this checklist be read in conjunction with the SPIRIT 2013 Explanation & Elaboration for important clarification on the items.
 38 Amendments to the protocol should be tracked and dated. The SPIRIT checklist is copyrighted by the SPIRIT Group under the Creative Commons
 39 "[Attribution-NonCommercial-NoDerivs 3.0 Unported](https://creativecommons.org/licenses/by/4.0/)" license.
 40
 41
 42
 43
 44
 45
 46

BMJ Open

VITALITY, RESILIENCE AND THE NEED FOR SUPPORT AMONG HOSPITAL EMPLOYEES DURING THE COVID-19 PANDEMIC: STUDY PROTOCOL OF A MIXED METHODS STUDY

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2021-049090.R1
Article Type:	Protocol
Date Submitted by the Author:	14-Jul-2021
Complete List of Authors:	Van Mol, Margo; Erasmus Medical Center, Intensive Care Adults de Veer, Mathijs; Erasmus Medical Center, Department of Psychiatry, section Medical Psychology de Pagter, Anne; Erasmus Medical Center, Pediatrics Kouwenhoven-Pasmooij, T.A.; Erasmus Medical Center Hoogendijk, Witte; Erasmus Medical Center, Psychiatry Busschbach, Jan; Erasmus Medical Center, Department of Psychiatry, Section of Medical Psychology & Psychotherapy Oude Hengel, Karen; Erasmus Medical Center; Netherlands Organization for Applied Scientific Research TNO, Kranenburg, Leonieke; Erasmus Medical Center, Department of Psychiatry, section Medical Psychology
Primary Subject Heading:	Public health
Secondary Subject Heading:	Mental health, Health policy, Nursing, Occupational and environmental medicine
Keywords:	COVID-19, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Human resource management < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

SCHOLARONE™
Manuscripts



I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our [licence](#).

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which [Creative Commons](#) licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

**VITALITY, RESILIENCE AND THE NEED FOR SUPPORT AMONG HOSPITAL EMPLOYEES DURING THE
COVID-19 PANDEMIC: STUDY PROTOCOL OF A MIXED METHODS STUDY**

Margo van Mol¹, Mathijs de Veer², Anne de Pagter³, Tessa Kouwenhoven-Pasmooij⁴,
Witte Hoogendijk⁵, Jan van Busschbach⁶, Karen Ouden Hengel^{7,8}, Leonieke Kranenburg⁹

¹ Dr. M.M.C. van Mol

Erasmus MC, University Medical Center Rotterdam, Department of Intensive Care Adults. the
Netherlands.

² M.R. de Veer

Erasmus MC, University Medical Center Rotterdam, Department of Psychiatry, section Medical
Psychology, the Netherlands

m.deveer@erasmusmc.nl

³ Dr. A. P.J. de Pagter

Erasmus MC, University Medical Center Rotterdam, Sophia Childrens Hospital, Challenge & Support
programme, the Netherlands

p.depachter@erasmusmc.nl

⁴ Dr. T. Kouwenhoven-Pasmooij

Erasmus MC, University Medical Center Rotterdam, Department of Occupational Health, The
Netherlands

t.kouwenhoven@erasmusmc.nl

⁵ Prof. Dr. W.J. Hoogendijk

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Erasmus MC, University Medical Center Rotterdam, Department of Psychiatry, the Netherlands

w.hoogendijk@erasmusmc.nl

⁶ Prof. Dr. J.J. van Busschbach

Erasmus MC, University Medical Center Rotterdam, Department of Psychiatry, section Medical
Psychology, the Netherlands

j.vanbusschbach@erasmusmc.nl

Dr. K.M. Oude Hengel

⁷ Erasmus MC, University Medical Center Rotterdam, Department of Public Health, The Netherlands.

⁸ Department of Work, Health and Technology, Netherlands Organisation for Applied Scientific
Research TNO, Leiden, The Netherlands

k.oudehengel@erasmusmc.nl

⁹ Dr. L.W. Kranenburg

Erasmus MC, University Medical Center Rotterdam, Department of Psychiatry, section Medical
Psychology, the Netherlands

l.kranenburg@erasmusmc.nl

Correspondence author:

Margo MC van Mol

Erasmus MC University Medical Center, Department of Intensive Care, P.O. Box 2040, 3000 CA,
Rotterdam, the Netherlands. Room Ne409

E-mail address: m.vanmol@erasmusmc.nl

Telephone: +31 6 15566554

m.vanmol@erasmusmc.nl

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Abstract*Introduction*

The Coronavirus Disease 2019 (Covid-19) pandemic has had a significant impact on the physical and mental functioning of healthcare professionals, especially those working on the 'frontline', and other hospital workers. At the onset of the crisis, various interventions were introduced to promote resilience and offer mental support to these professionals. However, it is unknown whether the interventions will meet the needs of professionals as the Covid-19 pandemic continues.

The goal of this exploratory study is to gain insight in factors that protect the vitality and resilience of Dutch hospital employees during the so-called 'second wave' of the Covid-19 pandemic. This paper describes the study protocol.

Methods and analysis

This exploratory study applies a mixed-methods design, using both quantitative and qualitative methods of data collection and analysis. The first part of the study (sub-study I) consists of surveys among doctors and nurses in Covid-19 departments and non-Covid-19 departments, and other professionals in the hospital (i.e., managers and homeworkers) in 2020 and 2021. The second part of the study (sub-study II) consists of focus groups and interviews among professionals of the intensive care unit, Covid-19 departments and infection prevention units.

Ethics and dissemination

The research protocol for this study has been approved by the Medical Ethics Committee (MEC-2020-0705). The outcomes of this study will be used to develop and implement interventions to support hospital employees maintaining their vitality and resilience during and after the Covid-19 pandemic. Employees with vitality experience less work-related stress and make a positive contribution to healthcare quality.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Article summary***Strengths and limitations of this study***

- A mixed-methods design will be applied which strengthens the insights on vitality, resilience and the need for support among hospital employees.
- Insight in vitality, resilience and need for support of frontline workers from different departments will be investigated, as well as managers and homeworkers who will be compared in contrast to the majority of studies so far, which focused mainly on the needs of healthcare professionals such as nurses and doctors.
- Real life data gathering started during the beginning of 2nd Covid-19 wave, ongoing to autumn 2021.
- The Covid-19 pandemic is the motivation for this study, but may also limit the response rates or generalizability of this study, given its unpredictable course.

Key words:

Covid-19, healthcare professionals, mental health, needs assessment, need for support, resilience, vitality.

Introduction

Worldwide, it has been reported that the Coronavirus Disease 2019 (Covid-19) pandemic had a significant impact on the physical and mental functioning of healthcare professionals, especially for those working on the 'frontline' (e.g., intensive care units (ICUs), Covid-19 departments and infection prevention units)[1-4]. Indeed, also in the Netherlands, the Covid-19 pandemic had an impact on healthcare workers. This is critical, as it has been reported that some Dutch medical professionals were already overburdened before the pandemic[5, 6].

The need for high-intensity medical treatment of patients rapidly increased during the Covid-19 pandemic, during which the work circumstances became uncertain and stressful[7]. These work circumstances included the continuous use of personal protective equipment, adapted responsibilities and tasks, moral dilemmas, and the risk of contamination for the healthcare professionals themselves[8]. Interpersonal contact with patients' family members, one of the core features of the professional practice of nurses, was considerably reduced due to visiting limitations in most hospitals[9, 10]. In addition, the work environment also changed for ICU nurses as their teams changed due to the practical help from (former) colleagues and other healthcare professionals. This sudden shift in activities and responsibilities required ICU nurses to have additional competences maintaining high-quality healthcare. Buddies, or support staff from other departments in the hospital, were sometimes confronted with distressing or even shocking events during the first hectic weeks of the pandemic. Professionals of the infection prevention unit had to deal with an enormous workload due to the accumulation of new tasks and changing work processes, as well as the social turbulence resulting from the implemented quarantine measures. In the case of a health crisis such as the Covid-19 pandemic, the health and vitality of the frontline professionals became even more critical. Because a higher workload and stress could have a higher appeal on the physical and mental resources of the professionals. However, the Covid-19 pandemic not only had impact on the clinicians of the hospital. The work environment also changed for non-

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 clinical professionals who suddenly had to work and communicate from home. In addition to this,
4
5 homeworkers might lack a sense of purpose, solidarity and valuable contribution to the crisis
6
7 situation[11]. Last, the Covid-19 pandemic required great effort from managers[12]. More than ever,
8
9 they had to deal with logistic and administrative processes in the upscaling of high-intensity care,
10
11 improving work alliances and the integration of staff in newly formed teams, and in managing the
12
13 continuous flow of changing information.
14
15

Health, vitality and resilience

16
17
18
19
20 In previous virus outbreaks, such as the outbreaks of SARS, Ebola and MERS, it became clear that
21
22 increased stress levels at work in healthcare professionals were associated with fear of
23
24 contamination; shortages of materials; poor communication between healthcare professionals;
25
26 unclear work instructions and information; deficient or non-functioning equipment; and inadequate
27
28 planning among healthcare professionals[13-16]. Experiences from China during the Covid-19
29
30 pandemic showed similar results[17-19]. In a European study on work-related stress reactions
31
32 among ICU healthcare professionals, half of the respondents (50.4%) showed symptoms of anxiety
33
34 after the first wave of Covid-19[1]. Early phase evidence on Covid-19 suggested that healthcare
35
36 professionals experienced mood and sleep disturbances during the outbreaks, stressing the need to
37
38 establish ways to minimize mental health risks and support interventions aiming at pandemic
39
40 conditions[3]. In the short-term, this work-related stress can cause fatigue, sleep disorders, mistakes
41
42 and moral distress[20]. Long-term effects of high work pressure include burnout, depression and
43
44 post-traumatic stress, resulting in dropout due to illness and abandonment of paid employment[21,
45
46 22]. A recent Dutch study among intensivists reported a moderate risk for burnout (14.8%)[23].
47
48 Furthermore, recovery time - regaining strength after an intensive period at work- has been
49
50 associated with physical and mental well-being[24], as a long recovery time is an early indicator of
51
52 work-related stress and exhaustion[25]. In contrast to high workload, stress and less recovery time,
53
54 vitality, resilience and job satisfaction were describes as characteristics of professionals that
55
56
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 counterbalance work-related stress[26, 27]. These characteristics could strengthen professionals'
4 mental and physical well-being and their retention for work[28-30]. Therefore, professionals with a
5 high level of vitality and resilience seemed more resistant to work pressure.
6
7
8
9

Interventions among healthcare professionals during the Covid-19 pandemic

10
11
12 A wide variety of studies have examined interventions to reduce the work-related stress of
13 healthcare professionals during the Covid-19 pandemic. Providing personal protective equipment is
14 the top priority, followed by fulfilling the psychological needs of professionals[31]. To support
15 mental health and promote the vitality of healthcare professionals, various interventions, including
16 buddy systems, peer support, coaching and easily accessible psychological help, were proposed
17 during the first months of Covid-19 wave [7, 32-36]. Other individual interventions, such as
18 telemedicine activities, e-package and self-help books, appeared promising[37-40]. For example, a
19 hospital in China offered online courses to help medical professionals to deal with psychological
20 problems[41]. Many interventions have taken an individual approach, but system-level changes in
21 healthcare organizations seemed to have a wider reach than individual support[42]. A notable
22 omission in the literature is that protective factors were given limited attention: the focus is on the
23 stressors. Many possible interventions were likely to support professionals in times of a pandemic,
24 however, it is not clear which intervention matches the needs of the professional most closely.
25 Therefore, a study was set up to investigate which supportive interventions, system changes and
26 other supportive factors could meet individual needs during and in the aftermath of the Covid-19
27 pandemic in a large academic hospital in the Netherlands.
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51

Objectives

52 The overall goal of the explorative study is to gain insight into the risk and protective factors as well
53 as the needs and barriers in the working environment related to the promotion of the vitality and
54 resilience of employees. Our objective is to assess levels of vitality and resilience, and the need for
55
56
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 support or resources among professionals with a focus on professionals working in ICUs, Covid-19
4 departments, homeworkers and infection prevention units. Furthermore, to gain more insight into
5 the relationship of vitality and resilience with factors such as self-perceived health, stress, burnout,
6 posttraumatic stress, and need for recovery. The aim of the current paper is to describe the protocol
7 of this explanatory mixed-methods study.
8
9
10
11
12
13
14
15
16

17 **Methods and analysis**

18 *Study design*

19
20 A mixed-methods design, using both quantitative (Sub-study-I) and qualitative methods (Sub-study-
21 II), is applied. Sub-study I is a cross-sectional online survey administered first in October 2020, when
22 the second wave of the Covid-19 pandemic was upcoming and ongoing, followed with
23 measurements in March and September 2021. Sub-study II includes focus group interviews among
24 nurses, doctors, and professionals regarding the ICU, Covid-19 departments and the infection
25 prevention unit during the end of 2020.
26
27
28
29
30
31
32
33
34
35
36

37 *Setting*

38 The study setting is a large academic hospital in the Netherlands.
39
40
41
42
43

44 *Study population*

45
46 Sub-study I: The population consists of a random sample drawn based on voluntary participation of
47 four target groups: professionals working at the Covid-19 department, non-Covid-19 departments,
48 managers and homeworkers. A convenience sample has been used to monitor the health of the
49 hospital workers, as was also done in comparable studies performed during the COVID-19 pandemic
50 [43, 44]. We estimated the sample size of the consecutive quantitative measurements as 25% of the
51 healthcare workers in the four target groups. Several organisational strategies will be followed to
52 stimulate participation and reach the threshold of the aimed response rates.
53
54
55
56
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Sub-study II: The population for the focus groups are the frontline workers. Maximum variation sampling is used, with respect to the type of frontline departments (ICU, COVID-19 departments, infection prevention unit) and occupational groups (physicians, nurses and infection prevention experts), resulting in six focus groups.

The inclusion criteria for the entire study are (i) a minimum age of eighteen years and (ii) sufficient Dutch language proficiency to complete the questionnaires or to discuss the relevant topic.

Patient and Public Involvement

No patient involved.

*Study procedures*Sub-study I: Online survey

Hospital employees are informed about the study in several ways. The communication strategy is tailored to each target group and supported by the communication department of the organization. A link to the online survey is published on the intranet of the organization, printed QR-codes containing a link to the survey are available at the coffee corners and canteens, announcements are made in the weekly Covid-19 livestream and by team management via personal email. Participation is voluntary and can be performed during working hours.

The online questionnaire starts with information about the study, privacy statements and an informed consent form for participation. After providing consent, participants are asked to fill out the entire questionnaire, which consists of two parts. The first part is generic for all employees and takes approximately six minutes to complete; it includes questions on demographic information and the main outcomes. The second part consists of additional modules on working conditions and health and takes approximately seven minutes. Nurses and homeworkers receive an additional module tailored to their specific work environment.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Sub-study II: Focus groups

In total, six focus groups with 6-10 participants that take approximately 60 minutes are conducted. ICU doctors, ICU nurses, microbiologists, hospital hygienists, Covid-19 unit nurses, and Covid19-unit doctors (lung specialists and specialists internal medicine) are individually invited to participate in one of the focus groups through consultation with the team managers. These meetings are preferably in-person (to observe non-verbal attitude and facial expressions), but due to the Covid-19 measures and social distancing, it may not be possible for participants to be physically present. In those cases, the focus groups are carried out via video calling technology.

Prior to the meetings, a topic list is created by the research group based on the literature and internal reports on the experiences of professionals. This topic list is used to guide and structure the meeting. The aim of the focus group is to study protective factors that contribute to vitality and resilience during the Covid-19 pandemic. Furthermore, possible interventions to increase vitality and resilience are explored and elaborated upon. Written informed consent is given prior to the meeting, and two experienced researchers guide the meetings. The focus group interviews are recorded and transcribed verbatim.

Measurements

This paragraph lists all measurement instruments included in the questionnaire. The first part consists of measuring instruments addressing demographics, primary outcomes (i.e. vitality, resilience and needs assessment), and several secondary outcomes (i.e. self-perceived health, stress, burnout, posttraumatic stress, and need for recovery). The second part consists of separate modules for homeworkers and nurses with regard to work ability, working conditions, job satisfaction, work-private balance, exposure to Covid-19 at work, preventive measures for Covid-19 and career perspectives.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Demographics

Gender, age, educational level, job titles, work location and professionals' experience (in years) are assessed. Educational level is divided into three levels: low, medium and high educational level. In total, the list of job titles includes 23 positions within the academic hospital (e.g., nurse, ICT employee, pharmacist, educator, researcher).

Main outcome measures

Vitality

Vitality is measured with four items from the original 36-item Short Form Health Survey (SF-36) [45]. The total summed score of four items that refer to the past four weeks: "Did you feel full of liveliness?", "Did you have a lot of energy?", "Did you feel worn out?", and "Did you feel tired?". The answers are rated on a six-point scale from 1 (= constantly) to 6 (= never) [46]. Higher scores indicating a better subjective vitality.

Resilience

Resilience (the ability to cope with stress, setbacks or difficulties at work) is measured with six items from the Psychological Capital Questionnaire[47]. The items contain statements such as: "When I have a setback at work, I have a hard time getting back on track and moving on", "If necessary, I can work well without the help of others" and "I can handle difficult moments at work". The six items are scored from 1 (= strong disagreement) to 6 (= strong agreement). Higher values indicate a higher level of resilience.

Needs assessment

Needs are measured with a self-designed scale with four items. Examples of questions are: "In which area would you like to be supported?" and "What would this support look like?" and "What should

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

be offered or developed?”. A predefined list includes 10 individual- and 14 organizational-related answer options, e.g., support for working from home, time management, and work-private balance.

Other outcome measures

Self-perceived health

Self-rated health is assessed with one question: “In general, how would you say your health is?”

Answer options from 1 (= excellent) to 5 (= poor).

Stress

Stress is measured with a numeric rating scale. The stress score, ranging from 0 (= no stress at all) to 100 (= the worst stress imaginable). This scale is used to retrospectively objectify stress before, during and after the first COVID-19 outbreaks. The three item question was “How did you experience the stress before/during/after the COVID-19 crisis on a scale from 0 to 10?”

Burnout

Burnout is measured using five items, that are based on an adapted version of the Utrecht Burnout Scale [48]. The items refer to the current situation such as “I feel emotionally drained from my job” and “I feel completely exhausted from my work”. The answer options from 1 (= never) to 7 (= daily).

Posttraumatic stress

Posttraumatic stress is assessed with the Posttraumatic stress disorder (PTSD) Checklist for the DSM-5 (PCL-5) - Covid-19 version with 20 items[49]. This scale consists of 20 items, measuring PTSD symptoms, with scoring options from 0 (= not all) to 4 (= extremely) and was adapted to the Covid-19 situation. A score of 33 or higher is perceived indicative for PTSD.

Need for recovery

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 Work fatigue and the risk of psychological symptoms are measured using the Dutch questionnaire on
4 the Experience and Evaluation of Work (Dutch abbreviation: VBBA)[50, 51]. The need for recovery
5 scale consists of eleven dichotomous items (yes/no), representing short-term effects of a working
6 day[24, 52, 53]. The score of the need for recovery scale ranges from 0 to 100 and is calculated as
7 the sum of points (1 = yes, 0 = no) divided by the number of questions answered, multiplied by 100.
8
9
10
11
12
13
14 Higher scores indicate a higher need for recovery, which is unfavourable.
15
16
17

Work ability

18
19
20 Work ability is measured with the Work Ability Index (WAI)[54]. This widely used index measures
21 self-assessed work ability and consists of seven items. Because the sub-items of the WAI can also be
22 used as a simple indicator for work ability[55], three of the seven items are used: current work
23 ability (one item), and work ability in relation to physical and mental job demands (two items). A
24 total WAI score (range 2–20) is obtained by adding the weight scores of these individual items[56].
25
26
27
28
29
30
31
32
33
34

Working conditions

35
36 Aspects of work load in the current study are: job autonomy, emotional job demands, social support
37 and physical working conditions.
38
39
40
41
42

43 Job autonomy is measured with six items on a three point scale (no; yes, sometimes; yes, regularly).

44 Five items, i.e., those about making decisions, having to find solutions, and being able to take time
45 off, are based on the Job Content Questionnaire[57, 58]. One item on autonomy related to working
46 time based on the Netherlands Working Conditions Survey, is also included in the questionnaire[59].
47
48
49
50
51
52

53 Emotional job demands is evaluated with four items. Three items are derived from the Copenhagen
54 Psychosocial Questionnaire and assess whether the work leads to emotionally difficult situations,
55 the emotional demands of the job, and emotional involvement in work. An additional item is “Is your
56
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 job more emotionally demanding because of Covid-19?". All items are measured on a four-point
4
5 scale (never to always)[60].
6
7
8
9

10 Social support is defined as whether colleagues and supervisors are willing to help and listen to
11
12 work-related problems and is assessed using four items from COPSOQ[60]. Social support is
13
14 measured on four-point Likert scales 1 (= almost never) to five (= always).
15
16
17

18
19 Physical work load are measured with one self-designed question and assesses whether a worker
20
21 received more or less physically demanding work due to Covid-19 measures. This scale has three
22
23 answer options (no; yes, sometimes; yes, regularly).
24
25
26
27

Job satisfaction

28
29 Job satisfaction is measured with one item: "Altogether, how satisfied are you with your work?" The
30
31 answer options range from 1 (very dissatisfied) to 5 (very satisfied).
32
33
34
35
36

Work-private life balance

37
38
39 Work-private life balance is measured with two questions on the mutual interference between work
40
41 and home life. The questions are adopted from the Netherlands Working Conditions Survey [59], but
42
43 were originally constructed by Fox and Dwyer (1999) [61]. Both questions have four answer options
44
45 ranging from 1 (= no, never) to 4 (= very often).
46
47
48
49

Exposure to COVID-19 at work

50
51
52 Professionals are asked to what extent they might have been exposed to Covid-19 at the worksite.
53
54 These questions are derived from the Netherlands Working Conditions Survey Covid-19 [62], based
55
56 on questionnaires developed within the OMEGANetwork[63]. Participants are asked if they work
57
58 with patients, the average number of patients they work with during a typical working day in the last
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

week, and if these patients are suspected to have or had been diagnosed with Covid-19.

Additionally, participants are asked if and with how many workers they work on a regular basis with colleagues, and if they share tools or surfaces with their colleagues.

Preventive measures for Covid-19

The five questions on preventive measures with regard to Covid-19 are derived from the Netherlands Working Conditions Survey Covid-19 [62]. One general question assesses the general measures taken at the department level with regard to the Covid-19 pandemic, with answer options such as homeworking, adjustment of working hours, general preventive measures in the workplace, mandatory inclusion or withdrawal of leave. The specific questions on preventive measures include the possibility of keeping a 1.5 metre distance between colleagues and/or patients, the availability of personal protective equipment, the usage of personal protective equipment and the application of general hygiene measures. The responses to these five questions are never, sometimes, often and always. This module will not be applied to homeworkers.

Career perspective

Three items on career perspective are derived from the Netherlands Working Conditions Survey Covid-19[62] and adjusted to fit the study population working in the hospital. These items include the motivation to work in the healthcare sector in the future (responses: less, equal, and more), the intention to change jobs within the health care sector and the intention to change jobs outside the healthcare sector with responses ranging from 1 (= certainly not) to 5 (=certainly yes).

Outcome measures for pre-defined groups or professions

Nurse questionnaire

The Practice Environment Scale of the Nursing Work Index is the most widely used measure to gauge the state of nursing practice environments[64, 65]. It is the only measure recommended by several

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 organizations promoting quality healthcare. The 15-item questionnaire uses responses ranging from
4
5 1 (= strongly disagree) to 4 (= totally agree). This module will be applied to nurses only.
6
7

Homeworkers

8
9
10
11 A total of eight items are specifically tailored to homeworkers. Two items refer to the number of
12
13 hours in a week people work from home and how many hours a day they work on a screen (e.g.,
14
15 laptop and tablet). One item is focused on the availability of ergonomic work equipment at home (a
16
17 desk or table with a comfortable working height, a chair that can be adjusted to one's body
18
19 measurements, a separate display, and a separate computer mouse). The need for other furniture is
20
21 assessed with one item "Do you need additional materials for a good home workplace?". Moreover,
22
23 participants are asked if they take (short) breaks on a working day, except for a lunch break?". This
24
25 question includes the following answer options: 1 (= yes, regularly), 2 (= yes, sometimes) and 3 (=
26
27 no). The last three items are about concentration while at home and include the following
28
29 statements: "Do you have trouble concentrating while working?", "Do you struggle to keep your
30
31 attention while you work?" and "Do you have difficulty with the reduced social contact with
32
33 colleagues?" Answer options range from 1 (= never) to 4 (= always).
34
35
36
37
38
39
40

Data handling and statistical analyses

41
42
43 Sub study I: survey data are anonymously collected using Limesurvey (Version 2.06 Its Build 160524)
44
45 and exported to a secure SPSS database (©IBM SPSS Statistics for Windows, Version 25.0. Armonk,
46
47 NY: IBM Corp) for analysis. All principal investigators have access to the final study dataset. Data will
48
49 be stored for fifteen years.
50

51
52 First, the data are cleaned and checked for missing data. The descriptive statistics are presented as
53
54 numbers and percentages for dichotomous variables and mean and standard deviation for for
55
56 continuous variables. Data for different subgroups (professionals in Covid-19 departments, non-
57
58 Covid-19 departments, managers and homeworkers) are analyzed with the Mann-Whitney test or t-
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 tests. Linear and logistics regression analyses are preformed to investigate the associations between
4
5 risk factors and the main outcomes (vitality and resilience). Statistical significance will be defined as
6
7
8 $p < .05$.

9
10
11
12 Sub study II: Focus groups data will be analyzed by means of thematic content analysis [66]. This
13
14 method organizes and describes the data set in rich detail and investigates patterns of response or
15
16 meaning within the data set. We take an inductive approach to identify possible themes. Once a
17
18 satisfactory thematic map is established, the themes are examined to identify the 'essence' of what
19
20 each individual theme is about and to understand how they are interrelated in relation to our
21
22 research question. To achieve this, the following steps will be taken:
23
24

25
26
27 Focus group interview data are audiotaped and transcribed verbatim. [66] Two researchers will read
28
29 the transcripts in detail. Each of them starts with developing a structured analysis framework that
30
31 consists of preliminary codes and themes. They make use of mind-maps and tables to organize the
32
33 data. After that, they compare their frameworks to reach consensus. Next, one researcher codes the
34
35 transcripts line by line according to this framework in the software programme NVivo12[®]. The coder
36
37 uses memos for comments during coding. When coding is finished and the code 'other' is used, the
38
39 two researchers discuss these codes and rename them into a new or existing codename best
40
41 reflecting the contents of the otherwise uncategorised text fragment. During and after coding, the
42
43 two researchers review and check the themes for internal homogeneity and external heterogeneity.
44
45 Finally, the two researchers analyse the cohesion and inter-relations between themes to come to a
46
47 coherent account and accompanying narrative of the data. The principal investigators have access to
48
49 these data, which will be stored for fifteen years.
50
51
52
53
54
55
56

57 **Ethics and dissemination**

58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

1
2
3 The study is approved by the Medical Ethics Committee of the Erasmus MC (MEC-2020-0705). It will
4
5 beconducted according to the principles of the Declaration of Helsinki (64th WMA General
6
7 Assembly, Fortaleza, Brazil, October 2013) and in accordance with the Medical Research Involving
8
9 Human Subjects Act. The study complies with the Netherlands Code of Conduct for Scientific Practice
10
11 from the Association of Universities in the Netherlands. Protocol modifications will be
12
13 communicated and to the Medical Ethics Committee by protocol amendment. Participants will be
14
15 informed about the study both orally and by letter. Consent for participation will be given by written
16
17 informed consent. Participants can leave the study at any time for any reason if they wish to do so
18
19 without any consequences. The withdrawal will be registered for informative purpose.
20
21
22
23
24
25

26 Discussion

27
28
29 The consequences of the Covid-19 crisis on the mental health and working conditions of healthcare
30
31 professionals have been recognized worldwide[67]. Hospital employees with vitality experience less
32
33 work-related stress and can therefore handle more work in the new and stressful circumstance. In
34
35 other words, maintaining professionals' vitality and resilience will contribution to healthcare quality.
36
37 By using a mixed-methods approach, we aim to gain an overview of vitality, resilience and health
38
39 (e.g., stress and burnout) among healthcare professionals, as well as the risk factors associated with
40
41 these outcomes. The covid-19 pandemic has put an extra focus on the impact of work-related stress
42
43 and how to deal with its causes and consequences. Even though the pandemic entails a specific
44
45 surge of specific patients, and as such may hamper generalizability, we believe that the outcomes of
46
47 this study will add to the body of knowledge on how best to deal with the work related stress
48
49 experienced by healthcare workers worldwide.
50
51
52
53
54
55

56 This is an urgent and rushed study because we wanted to use the results against the same health
57
58 crisis that we are investigating. Based on this study, directions for future interventions during the
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

Covid-19 pandemic and thereafter could provide raised levels of vitality and resilience of professionals in the hospital, and therewith support their employability in the long run.

Strengths and limitations

The first strength is the mixed-methods design, consisting of qualitative and quantitative methods which provide a more in-depth insight in the need for support in the exploratory study and therewith details information to develop interventions. . Second, we compare different departments and distinguish healthcare workers, managers, and homeworkers. The majority of studies so far focused exclusively on the needs of healthcare professionals without considering other hospital employees such as supportive staff, researchers and managers.

The Covid-19 pandemic was the motivation for this research, but may also have limited the procedure of this study, given its unpredictable course. During the writing of this protocol paper, the second wave of Covid-19 had already started in The Netherlands. Therefore, a lower response rate is not unexpected from the frontline healthcare workers. The second limitation is the cross-sectional design of the study, which makes it impossible to draw causal conclusions from this report and to investigate the long-term effects.

Data dissemination

Public access to the study protocol, study details, participant-level dataset, and statistical code can be acquired from the corresponding author. The results will be disseminated to healthcare professionals, health services authorities and the public via presentations at national and international meetings and published in peer-reviewed journals. A lay summary of the results will be written and shared with all professionals of the organization.

Study status

The study is currently ongoing with data recruitment.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

References

1. Azoulay E, De Waele J, Ferrer R, et al. Symptoms of burnout in intensive care unit specialists facing the COVID-19 outbreak. *Ann Intensive Care* 2020;10(1):1-8.
2. Kok N, Hoedemaekers A, van der Hoeven H, et al. Recognizing and supporting morally injured ICU professionals during the COVID-19 pandemic. *Int Care Med*, 2020;46:1653–1654
doi.org/10.1007/s00134-020-06121-3
3. Pappa S, Ntella V, Giannakas T, et al. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Imm*, 2020;doi.org/10.1016/j.bbi.2020.05.026
4. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA network open* 2020;3(3):e203976-e203976.
5. Solms L, van Vianen AEM, Theeboom T, et al. Keep the fire burning: a survey study on the role of personal resources for work engagement and burnout in medical residents and specialists in the Netherlands. *BMJ open* 2019;9(11).
6. Prins JT, Hoekstra-Weebers J, Van De Wiel HBM, et al. Burnout among Dutch medical residents. *Int J Behav Med* 2007;14(3):119-125.
7. Rieckert A, Schuit E, Bleijenberg N, et al. How can we build and maintain the resilience of our health care professionals during COVID-19? Recommendations based on a scoping review. *BMJ Open* 2021;11:e043718. doi:10.1136/bmjopen-2020-04371
8. Gold, J.A., Covid-19: adverse mental health outcomes for healthcare workers. *Brit Med J Publish Group*. 2020;369:m1815 doi: 10.1136/bmj.m1815
9. Bagnasco A, Zanini M, Hayter M, et al. COVID 19—A message from Italy to the global nursing community. *JAN* 2020; DOI: 10.1111/jan.14407
10. Murthy S, Gomersall CD, Fowler RA. Care for critically ill patients with COVID-19. *JAMA* 2020;323(15):1499-1500.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

11. Joly, H. Lead your team into a post-pandemic world. *Harvard Business Review* 2020;8.
12. Kniffin KM, Narayanan J, Anseel F, et al. COVID-19 and the Workplace: Implications, Issues, and Insights for Future. *Research and Action* 2020;DOI: 10.1037/amp0000716
13. Maunder R, Hunter J, Vincent L, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. *CMAJ* 2003;168(10):1245-1251.
14. Ulrich CM. Ebola is causing moral distress among African healthcare workers. *BMJ*, 2014;349:g6672.
15. Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry* 2009;54(5):302-311.
16. Bukhari EE, Temsah MH, Aleyadhy AA, et al. Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak perceptions of risk and stress evaluation in nurses. *J Infect Dev Ctries* 2016;10(08):845-850.
17. Zhu Z, Xu S, Wang H, et al. COVID-19 in Wuhan: Immediate Psychological Impact on 5062 Health Workers. *MedRxiv* 2020; doi.org/10.1101/2020.02.20.2002533
18. Xiao H, Zhang Y, Kong D, et al. The effects of social support on sleep quality of medical staff treating patients with coronavirus disease 2019 (COVID-19) in January and February 2020 in China. *Medical science monitor: international medical journal of experimental and clinical research*, 2020;26:923549-1.
19. Zhang Y, Wang C, Pan W, Zheng J, Gao J, Huang X, et al. Stress, burnout, and coping strategies of frontline nurses during the COVID-19 epidemic in Wuhan and Shanghai, China. *Front Psychiatry*, 2020;11:1154.
20. De Villers MJ, DeVon HA. Moral distress and avoidance behavior in nurses working in critical care and noncritical care units. *Nursing Ethics*, 2013. 20(5): p. 589-603.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 21 Moss M, Good VS, Gozal D, et al. An official critical care societies collaborative statement:
4
5 burnout syndrome in critical care health care professionals: a call for action. *Am J Crit Care*
6
7 2016;25(4):368-376
8
9
10 22. Van Mol MMC, Kompanje EJO, Benoit DD, et al.. The prevalence of compassion fatigue and
11
12 burnout among healthcare professionals in intensive care units: a systematic review. *PLoS*
13
14 *ONE*, 2015;10(8):e0136955.
15
16 23. Meynaar IA, Ottens T, Zegers M, et al.. Burnout, resilience and work engagement among Dutch
17
18 intensivists in the aftermath of the COVID-19 crisis: A nationwide survey. *J Crit Care* 2020;
19
20 doi.org/10.1016/j.jcrc.2020.11.01
21
22
23 24. Graham B, Cottey L, Smith JE, et al. Measuring 'Need for Recovery' as an indicator of staff well-
24
25 being in the emergency department: a survey study. *Emergency Medicine* 2020;37(9):555-
26
27 561.
28
29
30 25. Nieuwenhuijsen K, Sluiter JK, Dewa CS. Need for recovery as an early sign of depression risk in a
31
32 working population. *Int J Occup Environ Med*, 2016;58(11):e350-e354.
33
34 26. van Mol MMC, Nijkamp MD, Bakker J, et al.. Counterbalancing work-related stress? Work
35
36 engagement among intensive care professionals. *Australian Crit Care* 2018;31(4):234-241.
37
38
39 27. Schaufeli WB, Salanova M, González-Romá V, et al. The measurement of engagement and
40
41 burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness studies*
42
43 2002;3(1):71-92.
44
45
46 28. Schaufeli WB. Engaging leadership in the job demands-resources model. *Career Development*
47
48 *International* 2015;20:5.
49
50 29. Bakker AB, Demerouti E, Sanz-Vergel AI. Burnout and work engagement: The JD-R approach.
51
52 *Ann Rev Organ Psychol Organ Behav*. 2014.1:389-411.
53
54
55 30. Yu F, Raphael D, Mackay L, Smith M, King A. Personal and work-related factors associated with
56
57 nurse resilience: a systematic review. *Int J Nurs Stud* 2019;93:129-140.
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 31.Santarone K, McKenney M, Elkbuli A. Preserving mental health and resilience in frontline
4
5 healthcare workers during COVID-19. *Am J Emergency Med* 2020;38(7):1530–1531.
6
7
8 32. Ministerie van Defensie. Tips & adviezen voor de mentale gezondheid van zorgprofessionals.
9
10 Retrieved from [https://www.waardigheidentrots.nl/wp-content/uploads/2020/03/Flyer-](https://www.waardigheidentrots.nl/wp-content/uploads/2020/03/Flyer-Mentale-Gezondheid-zorgprofessionals-tijdens-corona.pdf)
11
12 [Mentale-Gezondheid-zorgprofessionals-tijdens-corona.pdf](https://www.waardigheidentrots.nl/wp-content/uploads/2020/03/Flyer-Mentale-Gezondheid-zorgprofessionals-tijdens-corona.pdf).
13
14 33. Hu Y-Y, Fix ML, Hevelone ND, et al. Physicians' needs in coping with emotional stressors: the case
15
16 for peer support. *Archiv Surgery* 2012;147(3):212-217.
17
18 34. Albott CS, Wozniak JR, McGlinch BP, et al. Battle Buddies: Rapid Deployment of a Psychological
19
20 Resilience Intervention for Health Care Workers During the Coronavirus Disease 2019
21
22 Pandemic. *Anesth Anal* 2020; doi:10.1213/ANE.0000000000004912
23
24 35. Leszcz M, Maunder R, Hunter J. Psychological support for health care workers during the COVID-
25
26 19 pandemic. *CMAJ* 2020;192(24):E660-E660.
27
28 36.Kisely S, Warren N, McMahon L, et al. Occurrence, prevention, and management of the
29
30 psychological effects of emerging virus outbreaks on healthcare workers: rapid review and
31
32 meta-analysis. *BMJ* 2020;369.
33
34 37.Jing H, Fangkun L, Ziwei T, et al. Care for the psychological status of frontline medical staff
35
36 fighting against COVID-19. *Clinical infectious diseases: an official publication of the Infectious*
37
38 *Diseases Society of America* 2020 retrieved from [https://academic.oup.com/cid/advance-](https://academic.oup.com/cid/advance-article-pdf/doi/10.1093/cid/ciaa385/33004970/ciaa385)
39
40 [article-pdf/doi/10.1093/cid/ciaa385/33004970/ciaa385](https://academic.oup.com/cid/advance-article-pdf/doi/10.1093/cid/ciaa385/33004970/ciaa385).
41
42
43 38.Percudani M, Corradin M, Moreno M, et al. Mental health services in Lombardy during COVID-19
44
45 outbreak. *Psychiatry Res* 2020;112980.
46
47 39.Kang L, Ma S, Chen M, et al. Impact on mental health and perceptions of psychological care
48
49 among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease
50
51 outbreak: A cross-sectional study. *Brain Behav Imm* 2020;87:11-17
52
53
54
55
56
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 40.Blake H, Bermingham F, Johnson G, Tabner A. Mitigating the psychological impact of COVID-19 on
4
5 healthcare workers: a digital learning package. *Int J Environmental Res Public Health*
6
7 2020 ;17(9):2997.
8
9
- 10 41.Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the COVID-19
11
12 outbreak. *The Lancet Psychiatry*, 2020;7(4):e15-e16.
13
- 14 42.Wu PE, Styra R, Gold WL. Mitigating the psychological effects of COVID-19 on health care
15
16 workers. *CMAJ* 2020;192(17):E459-E460.
17
- 18 43.Heesakkers H., Zeegers M, van Mol MMC, et al. The impact of the first COVID-19 surge on the
19
20 mental well-being of ICU nurses: A nationwide survey study. *Intensive and Critical Care*
21
22 *Nursing*, 2021:103034.
23
- 24 44.Cag Y., Erdem H, Gormez A, et al. Anxiety among front-line health-care workers supporting
25
26 patients with COVID-19: A global survey. *General hospital psychiatry*, 2021. 68:90-96.
27
- 28 45. Ware Jr JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36): I. Conceptual
29
30 framework and item selection. *Med Care*, 1992:473-483.
31
32
- 33 46. van der Zee KI, Sanderma R. Measuring health status with the RAND-36. A manual. [Het meten
34
35 van de gezondheidstoestand met de RAND-36. Een handleiding], Groningen, 1993.
36
37
- 38 47.Luthans F, Avolio BJ, Avey JB, Norman SM. Positive psychological capital: Measurement and
39
40 relationship with performance and satisfaction. *Personnel psychology* 2007;60(3):541-572.
41
42
- 43 48.Schaufeli WB, Dierendonck DV. Utrecht Burnout Scale [Utrechtse Burnout Schaal] (UBOS). De
44
45 psycholoog, 2001;6(1):9-12.
46
47
- 48 49.Weathers FW, Litz BT, Keane TM, et al. The ptsd checklist for dsm-5 (pcl-5). Scale available from
49
50 the National Center for PTSD. Retrieved from
51
52 <https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp>. Nederlandse
53
54 vertaling: Boeschoten, M.A., Bakker, A., Jongedijk, R.A. & Olff, M. (2014) (Stichting Centrum
55
56 '45)
57
58
59
60

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
50. Broersen JPJ, Fortuin RJ, Dijkstra L, et al. Health and Safety Covenants Monitor: key figures and limit values [Monitor Arboconvenanten: kengetallen en grenswaarden]. *TBV-Tijdschrift voor Bedrijfs-en Verzekeringsgeneeskunde*, 2004;12(4):104-108.
51. Veldhoven Mv, Meijman T. Meijman, Measuring psychosocial workload with a questionnaire: the questionnaire perception and assessment of work [Het meten van psychosociale arbeidsbelasting met een vragenlijst: de vragenlijst beleving en beoordeling van de arbeid]. 1994: Nederlands Instituut voor Arbeidsomstandigheden.
52. Jansen NWH, Kant I, van den Brandt PA. Need for recovery in the working population: description and associations with fatigue and psychological distress. *Int J Behav Med*, 2002; 9(4):322.
53. Moriguchi CS, Trevizani T, de Fátima Carreira Moreira R, et al. Need for recovery assessment among nursing professionals and call center operators. *Work* 2012;41(Supplement 1):4838-4842.
54. Ilmarinen J. Ageing workers in the European Union: status and promotion of work ability, employability, and employment. The Geneva Papers on Risk and Insurance. *Issues and Practice* 1999;26(4), 623-641.
55. Ahlstrom L, Grimby-Ekman A, Hagberg M, Dellve L. The work ability index and single-item question: associations with sick leave, symptoms, and health—a prospective study of women on long-term sick leave. *Scand J Work, Environment & Health* 2010;404-412.
56. Tuomi K, Ilmarinen J, Jahkola A, Katajarinne L, Tulkki A, Oja G. Work ability index. Helsinki: Finnish Institute of Occupational Health; 1998. *Occup Health Care*, 1998. 19.
57. Karasek R. Job Content Questionnaire user's guide. *Department of Work Environemnt*, 1985.
58. Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The Job Content Questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol* 1998;3(4):322.

VITALITY, RESILIENCE AND NEEDS; PROTOCOL PAPER

- 1
2
3 59. Hooftman WE, Mars GMJ, Knops JCM, et al. National Working Conditions Survey 2019.
4
5 Methodology and global results [Nationale Enquête Arbeidsomstandigheden 2019.
6
7 Methodologie en globale resultaten]. 2020: TNO; CBS.
8
9
10 60. Kristensen TS, Borg V. Copenhagen psychosocial questionnaire (COPSOQ). *Mental Health*
11
12 2003;5(5):5.
13
14 61. Fox ML, Dwyer DJ. An investigation of the effects of time and involvement in the relationship
15
16 between stressors and work–family conflict. *J Occup Health Psychol* 1999;4(2):164.
17
18 62. Bouwens L, Zoomer T, Hooftman W, Oude Hengel K. Reading guide National Working Conditions
19
20 Survey - COVID-19 [Leeswijzer Nationale Enquête Arbeidsomstandigheden – COVID-19]
21
22 2020, TNO: Leiden, The Netherlands.
23
24
25 63. OMEGA-NET. COVID-19 And OMEGA-NET. 2020 [cited 2020; Available from:
26
27 <https://omeganetcohorts.eu/resources/covid19-and-omega/>.
28
29
30 64. Lake ET. Development of the practice environment scale of the nursing work index. *Res Nurs &*
31
32 *Health* 2002;25(3):176-188.
33
34 65. Zangaro GA, Jones K. Practice Environment Scale of the Nursing Work Index: A Reliability
35
36 Generalization Meta-Analysis. *Western J Nurs Res* 2019;41(11):1658-1684.
37
38 66. Braun V, Clarke V., Using thematic analysis in psychology. *Qualitative Res Psychol* 2006 ;3(2):77-
39
40 101.
41
42
43 67. Morgantini LA, Naha U, Wang H, et al. Factors Contributing to Healthcare Professional Burnout
44
45 During the COVID-19 Pandemic: A Rapid Turnaround Global Survey. *MedRxiv*
46
47 2020;doi:10.1101/2020.05.17.20101915
48
49
50
51
52
53
54
55
56
57
58
59
60

Declarations

Authors contributions

MvM, TK, JB and LK jointly designed the study, raised funding and established the development of the study protocol. MvM, MV, TK, KOH and LK prepared the study materials. MvM, MV and LK gathered the data of both sub-studies and produced the first draft of the article outline together with KOH and TK. All authors (MvM, MV, AP, TK, JB, WH, KOH, LK) contributed substantially to the concept of the study, the analyses of literature, critically revised the content of the manuscript, have read and approved the final version.

Funding

This work was internally supported by the board of Erasmus MC (no grant number applicable), which had no role in the design of this study and has no role in its execution, analysis and interpretation of data.

Competing interests

The authors declare no conflicts of interest.

Acknowledgements

The authors would like to thank all participating respondents for their involvement in the study.

Availability of data and materials

Anonymized data gathered and analysed during the current study are not publicly available due to legal and ethical restriction. These can be requested from the corresponding author as well as text and photo material of the developed intervention. Materials described in the manuscript, including all relevant raw data, will be freely available at a reasonable request to any scientist wishing to use them for non-commercial purposes.