Operationalization of One Health Burnout prevention and recovery: Participatory Action Research-design of nature-based health promotion interventions for employees

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ABSTRACT

50 Burnout is, besides a global, complex phenomenon, a public health issue with negative
51 consequences on personal, organizational, social, and economic levels. This paper outlines
52 the co-design of a novel Nature-based Burnout Coaching intervention, called NABUCO. Due
53 to the complexity of burnout, we propose a One Health approach in healthcare, educational
54 and governmental pilot organizations, to deliver guidelines and protocols for prevention and
55 recovery of burnout. We advocate the inclusion of the salutogenic and mutual healing capacity
56 of nature connectedness, facilitating a positive impact on mental and environmental health. A
57 transdisciplinary Participative Action Research-design resulted in an iterative adaptive cycle of
58 co-design, implementation, and evaluation of NABUCO.

59

1. INTRODUCTION

61 Burnout is a silent crisis imposing significant costs on individual's health and the wider global
62 economy. Urgent action is required to identify effective complementary interventions for
63 prevention and recovery of burnout. In this paper, we demonstrate how to operationalize a
64 One Health approach (OH-approach) to burnout interventions. To start, we discuss the
65 complexity of burnout and the relevance of a OH-approach. Next, we describe why the
66 inclusion of the mutual healing capacity of nature connectedness should be included in the
67 burnout intervention.

68 The World Health Organization defined burnout in the 11th Revision of the International
69 Classification of Diseases (ICD-11) as an occupational phenomenon (1). Burnout is, besides
70 a global complex phenomenon (2-4), also a public health crisis (5) with negative consequences
71 on individual, organizational, societal and economic factors, appearing in sectors such as
72 healthcare (6-8), education (9), and government (10). Due to international differences in the
73 use of the term burnout (11), for this research burnout is defined as "a work-related syndrome
74 involving emotional exhaustion, depersonalization, and a sense of reduced personal
75 accomplishment" (12-13-14).
76
77 Burnout interventions should be considered within a model of health promotion interventions
78 (HPI), considering the structural, social, and cognitive complexity (15). Each kind of complexity
79 and its mutual interactions present challenges for the prevention and recovery of burnout. For
80 instance, structural complexity arises as several players are involved at different steps in the
81 process of HPI, ranging from the outset of the employee's burnout to the re-integration phase
82 at work. Next, cognitive complexity is found in the emergence of complex decision processes
83 due to the high number of interrelationships and interdependent decisions between these
84 players. Consequently, accurate outcomes of the HPI are hard to predict. Finally, the variety
85 of the relationships involved within and between the individual, organizational and societal
86 contexts, can give rise to disagreement or social conflict, also called social complexity.
87 Furthermore, assuming burnout is not solely job-related (e.g. parental burnout (16)), Bianchi
88 (17) proposes to perceive burnout as a '*multi-domain syndrome*'. Nonetheless, organizations
89 often apply person-directed HPI (18) (e.g. counselling, mindfulness exercises), suggesting
90 burnout is an isolated problem to be solved by the individual (19) and is limited to the context
91 of work. Consequently, attention to the whole system and larger settings, in which employees
92 suffering from burnout reside, is often lacking (21). Therefore, choosing a OH-approach in
93 tackling the problem of burnout could be more appropriate. A OH-approach consists of 'a
94 collaborative, multisectoral, and transdisciplinary approach—working at local, regional,
95 national, and global levels—with the goal of achieving optimal health outcomes, recognizing
96 the interconnection between people, animals, plants, and their shared environment' (20, 29).
97 The OH-approach promotes a holistic, integrative and transdisciplinary perspective to address
98 complex health threats (20). In short, a holistic health approach assimilates the relationship

99   between mind, body, and emotion within the person (22), situated within a broader context, in
100 which human, social, and environmental health determinants are intertwined (23). For
101 instance, a person's health and quality of life is not merely influenced by their work environment
102 but also by lifestyle changes, and the social, economic, and natural environments (24-26) in
103 which the person is situated. Furthermore, an integrative perspective on burnout should be
104 incorporated in the HPI. For instance, a combination of person- and organizational-directed
105 interventions offers the potential for more effective rehabilitation (18). Finally, applying a
106 transdisciplinary perspective, which is well-known in HPI, sustainability science (22, 27, 28)
107 and the OH-approach (20, 29), may 'produce highly novel and generative scientific outcomes'
108 (27). While integrating voices of all the stakeholders in the design and deployment of the HPI,
109 a transdisciplinary approach entails bridging science, professional expertise and other sectors.
110
111 Alongside this, the salutogenic and mutual healing capacity of nature connectedness (NC)
112 could be a promising mediator in the prevention and recovery of burnout, while at the same
113 time contributing to environmental health. There is a growing body of evidence of the
114 salutogenic effects of contact with nature, with positive psychological (30-34), cognitive (35-
115 37), physiological (31,38-41), and social benefits (42-43). Although the translation of this
116 knowledge into health practice is not common (44), 'ecotherapy' is becoming a germinating
117 field in healthcare (45, 46). Ecotherapists are mainly mental health professionals, additionally
118 trained in guiding clients with Nature-based Interventions (NBI). For this study, NBI is defined
119 as 'planned, intentional activities to promote individuals' optimal functioning, health and well-
120 being or to enable restoration and recovery through exposure to or interaction with e.g. either
121 immersive or authentic nature'(47). NBIs encourage employees to engage with nature, to
122 receive multiple health benefits on several levels (e.g. behavioral and lifestyle change and
123 changes in the work environment) (47). Although there is heterogeneity in scientific evidence,
124 positive effects on mental health, cognitive ability, recovery and restoration, and on life and
125 work satisfaction, have been reported (48,49).
126
127 Besides offering nature exposure for health purposes (e.g. general well-being, attention
128 restoration, stress reduction), some ecotherapists focus on improving NC with their clients. NC
129 is defined here as '…a stable state of consciousness comprising symbiotic cognitive, affective
130 and experiential traits that reflect, through consistent attitudes and behaviors, a sustained
131 awareness of the interrelatedness between one's self and the rest of nature.' (51) As such, NC
132 is considered a mediator for developing a mutual relationship between the client's wellbeing
133 and better self-care, as well as care for the natural environment (45,50,51). For example, as a
134 result a person might adopt a more ecological lifestyle contributing to one's health and
135 environmental health (e.g. organic food, ecological way of transportation, introducing
136 biodiversity in the garden). This 'active two-way nurturing of human and nature' (50), evoked
137 by NC, supports the mutual healing for the person and the natural environment. Recent
138 research shows that NC, besides being a psychological need (52), positively influences the
139 quality of life, brings meaningfulness, happiness, and vitality (35,51,54-55). Furthermore, NC
140 fosters pro-environmental behavior (56) and stimulates a holistic reciprocal relationship with
141 nature (57). Besides including NC within a personal context, incorporating natural elements
142 into the workplace can also be beneficial (58-61). A notable example is biophilic design (62),
143 which aims to create restorative environments and improve people's NC (62-64) contributing
144 on an organizational level to employee wellbeing, productivity, and mitigating stress (65,66).
145 Despite these promising mutual health benefits, organizations and general practitioners
146 appear to be cautious in adopting and prescribing NBIs. Besides the lack of resources and
147 time (42), the absence of a proven professional and evidence-based framework, and of natural
148 spaces nearby the organization or the employee's home, could be behind this hesitation.
149
150 In conclusion, the NBI operationalizing an OH-approach, while integrating the focus on
151 improving NC, may lead to several mental health benefits, a sustainable individual behavioral
152 lifestyle change, and changes on organizational level. These may affect employee's,

153 organizational and environmental health. Developing a professional and evidence-based
154 framework in close collaboration with the stakeholders, while using local health and
155 environmental knowledge (29,50,67), can lead to NBI protocols and guidelines for healthcare
156 professionals and organizations. As a result, confidence and leverage might increase in
157 choosing NBIs as a complementary approach to the prevention and recovery of burnout.

158

159 2. AIM AND OBJECTIVES

160 This paper reports the formative co-design process of NABUCO, using the principles of the
161 Participative Action Research (PAR) design (Fig. 1), and how we are operationalizing a OH-
162 approach to burnout. Piloting, implementation and evaluation of NABUCO will be the subject
163 of a sequential project following this formative co-design stage. A systematic review of NBIs
164 will be conducted as well.

165 Based upon conversations with key stakeholders of NABUCO, this paper will explore the
166 following research questions:

167 1.   How to co-design NABUCO in an organizational context within an evaluative
168 framework.

169 2.   How an OH-approach can tackle the complexity of burnout and work towards
170 sustainable results on a personal, organizational, societal and environmental level.

171 3.   How NABUCO can facilitate a positive impact on prevention and recovery from burnout
172 within an organizational context.

173 4.   How and what we can learn from the transdisciplinary co-design process of this
174 complex HPI.

175

176 3. METHODS

177 In this section we discuss the research design, its setting, the participants and the co-design
178 process.

179 3.1. The research design: Participative Action Research (PAR)

180 We chose a Participatory Action Research (PAR) methodology. PAR is a research approach
181 in which knowledge is constructed collectively through iterative cycling between phases and
182 actions, while inducing a change in a certain context (68). It is also used to develop complex
183 interventions (69-70), where 'participation of stakeholders from definition to resolution' (29) is
184 crucial. For ethical reasons and to create leverage for NABUCO, involving those impacted the
185 most by the problem (70-71) and using local knowledge and experience (50,67,68) is
186 significant, whilst building bridges between stakeholders and different disciplines. The PAR-
187 design (Fig 1.) is supported by an adaptive non-linear PAR-cycle, characterized by planned
188 and spontaneous interplay between the phases of co-design, implementation and evaluation.
189 A collaborative process refined the aim, objectives and the study design. We also discussed
190 how to assess the PAR quality. Criteria such as the level of participation and collaboration
191 between the PAR-team members, critical reflexivity, how actions are locally situated, and

192 different kinds of validity to evaluate within PAR (68), will be discussed in depth at next PAR-
193 rounds.

194 3.2. Setting and participants

195 We initially explored the topic with experts in burnout and nature-based practices. Next, we
196 assembled a transdisciplinary group of key stakeholders, later referred to as the PAR-team,
197 from different domains and different countries (Table 1). The stakeholders have been selected
198 based on their interest in the project, relevant experiences and expertise.

199 3.3. The co-design process

200 The co-design process consists of four subprocesses: data collection, exploration and capacity
201 building, the intervention and its evaluation.

202 *3.3.1. Data collection*

203 Data collection, exploring several topics suggested by all the PAR-team members, was
204 achieved through questionnaires, storytelling, digital and physical group conversations,
205 observations and content notes of the facilitator. They were further supported by grey and
206 scientific literature. The data analysis adopted different approaches according to the methods
207 of data collection. For instance, data from conversations and group discussions lead to
208 collective interpretation and negotiation with the PAR-team members (71). In another
209 approach, one researcher analyzed data gathered by questionnaires (for example, regarding
210 the design of the evaluation process of NABUCO). As a result, the PAR-team verified all
211 reported results.

212 *3.3.2. Exploration and capacity building*

213 First, the PAR-team reflected on shared motivations, values, expectations and collaboration.
214 We also gathered local knowledge, embodying the stakeholders' perceived problems and
215 opportunities regarding burnout prevention and recovery, the different contexts and countries
216 in which they operate, and the capacity building to support a new intervention. Next, we
217 explored the preferred NABUCO outcomes, which fed into subsequent NABUCO-protocols.

218 *3.3.3. The NABUCO intervention*

219 The PAR-team co-designed the framework, content and protocols for NABUCO. An iterative
220 process allowed for moving back and forward between data collection and interpretation.
221 Reports and presentations of the collected data informed the PAR-team on how to elaborate
222 on the steps, actions, and practices being considered in NABUCO. This led to the core
223 elements of NABUCO (see 4).

224 *3.3.4. The evaluation of the NABUCO intervention*

225 Academic PAR-team members designed an online questionnaire about which factors to
226 evaluate during the future implementation of NABUCO. Discussions concerning the results,
227 led to consensus on four points. Firstly, NABUCO-participants, HR-managers, and the
228 NABUCO-coaches should participate in interim evaluations at different stages of the
229 implementation of NABUCO. Some argued for evaluation input from general practitioners or
230 psychologists. However, this could result in ethical issues (due to clients then becoming
231 patients) and delay the intervention. Secondly, we should evaluate across all stakeholders

232 through a range of methodologies, concretized by a mixed methods design, generating
233 quantitative and qualitative data. The use of questionnaires, interviews, discussion- and focus
234 groups, collecting qualitative data of the communities of practice (see 4.4), would support this
235 design. Thirdly, we ranked the evaluation topics. Burnout was ranked first, closely followed by
236 perceived stress, well-being, NC, mental health, resilience, physical health and social
237 connectedness. Less highly ranked were productivity and individual development. Capturing
238 challenges, barriers, opportunities in the workplace as well as side effects of NABUCO were
239 noted as being essential to understand the implementation processes and how a NBI might
240 function in the workplace. An additional request was to conduct a cost/benefit analysis of
241 NABUCO and a Health Impact Assessment, measuring the psychological, physiological, and
242 organizational effects of NABUCO in depth. This HIA enforces the mixed methods design,
243 which mainly focuses on measuring the quality of NABUCO.

244 Concerning the validation on the generalizability and feasibility of NABUCO, the PAR-team
245 suggested, besides conducting a systematic review, to involve external focus groups with
246 stakeholders of other organizations, within the same sectors (healthcare, educational,
247 governmental). At a further stage, we may widen the validation to other sectors.

248

249 4. RESULTS

250 The above co-design process resulted in the conception of NABUCO (Fig. 2), integrating the
251 mutual healing capacity of NC and operationalizing the OH-approach. Below we outline briefly
252 five key elements underpinning NABUCO.

253 4.1. Protocols

254 The PAR-team developed two NBI-protocols (P1, P2). P1 is a preventive approach for
255 employees at risk for stress and burnout, while P2 is meant for employees at high risk of severe
256 stress or recovery from burnout. Demonstrating the main steps to undertake in organizing the
257 NBI, the protocols consist mainly of 1) scoping and selection of the participants in the NBI, 2)
258 the actual participation, 3) the evaluation of the NBI and 4) the follow-up after the participation
259 in the NBI. In P2, the re-integration phase of the employee is an additional step in the
260 intervention.

261 4.2. NABUCO-care team

262 A transdisciplinary NABUCO-care team will be assembled at the start of NABUCO within an
263 organization. Consisting of the psychologist (responsible for expert judgment), the NABUCO-
264 coach, and the organization's representative (e.g. HR-Department), this team will support any
265 participant in the NABUCO-modules (see 4.3.) when needed (e.g. problems between a
266 participant and the NABUCO-coach, non-acceptance by a leader, personal issues regarding
267 the intervention). Each team-member will be trained in NABUCO, to fully understand their role
268 and responsibilities. Moreover, collaboration with the NABUCO-care team allows the PAR-
269 team to adjust the research intervention when required.

270

271 4.3. NABUCO-modules

272 Some PAR-team members mentioned that NBIs would offer a complementary health
273 approach, reaching a group of employees not attracted to the current burnout practices offered
274 by their organization (e.g. mindfulness, CBT-therapy, indoor coaching). The PAR-team came
275 up with a set of nature-based modules, aimed at developing sustainable individual and
276 collective self-care capacity. They were called NABUCO-modules, consisting of nature-based
277 burnout coaching (NBC), nature-based leadership training (NBT) and implementing biophilic
278 design teams (BDT) within the participating organization. All modules focus on stimulating NC
279 by offering ecotherapy exercises and profound experiences for inducing individual,
280 organizational and environmental change. Firstly, the NBC consists of a group (in P1) or an
281 individual (in P2) trajectory, focusing on stress-recovery and developing NC. Secondly, some
282 mentioned the development of managers' authentic leadership as a potential mediator in the
283 burnout prevention of employees. Considering the feasibility in the organization and
284 acknowledging the positive role of NC in developing authentic leadership (72), an open
285 program NBT for leaders of different participating organizations will be offered. The open
286 program, consisting of nature-based leadership-related and NC exercises, will promote
287 processes such as shared learning, crosspollination and mutual support between the leaders
288 of the participating organizations. It will also foster their psychological resilience, evoking a
289 positive effect on the employees' wellbeing and the overall organization's health. Thirdly, one
290 of the PAR-team members mentioned the use of the natural environment in and around the
291 workplace (e.g. walking meetings in nature, lunch break in the park, decorating the building
292 with plants, nature wallpapers). Consequently, BDT is suggested to be implemented in the
293 participating organizations. NBC and NBT-participants are invited to join as NABUCO-
294 ambassadors to maintain their NC experiences and share these with their colleagues. Other
295 interested employees are welcome to participate. As such, BDTs might be a gateway for those
296 that suffer the most but are hard to reach. In conclusion, all NABUCO-modules will incorporate
297 a holistic OH-approach, focusing on improving NC, mediating the reciprocal link between
298 human, organizational and environmental health. Moreover, the layered developmental
299 approach of the employee, the management, and the organization and the collaboration with
300 several stakeholders in these modules brings the integrative perspective of OH into practice.

301 4.4. Communities of practice

302 Striving for sustainable results with NABUCO, the PAR-team proposed communities of
303 practice aiming at 1) promoting cross-pollination of NABUCO-knowledge, experiences and
304 best practices 2), stimulating transdisciplinary and reflexive capacity, 3) feeding the
305 implementation of NABUCO, 4) and guaranteeing the continuation after NABUCO. Besides
306 meeting on a regular basis physically, a virtual incubator, by means of a digital platform,
307 gathers NABUCO-information and experiences shared by participants. These communities of
308 practice also promote coaching and mutual support.

309 4.5. Evaluation framework and expert judgment

310 During the intervention, we will introduce expert judgment, in collaboration with an external
311 general practitioner or psychologist, within this evaluative framework. At the start of the
312 intervention, it will serve to categorize employee participants, in particular for those at high risk
313 of stress and diagnosed with burnout. During the scoping phase the expert judgment examines
314 whether these individuals are suitable for participation in the NABUCO-modules. At the end of
315 the guidance and the re-integration, the expert evaluates the employee's progress. This
316 evaluation framework will be developed further.

317

5. DISCUSSION

This paper outlines the co-design process of a complementary NBI for burnout. In the NABUCO project we consider the OH-approach, while integrating the salutogenic and mutual healing capacity of NC to be relevant and innovative. As a result, we came to a thoughtful combination of a holistic, integrative and transdisciplinary person- and organization-directed intervention, adding value to actual burnout interventions. The co-design setting creates leverage as the innovation happens from within, while staying close to the stakeholders' realities. Moreover, the data collection and collaborative interpretation created the foundation for further development of the NABUCO-implementation. However, some critical reflections and important learning points should be considered for the further development of NABUCO.

5.1. Critical reflections on and lessons learned from the co-design process of NABUCO.

The co-design process raised six critical points.

Firstly, the co-design process has built connections between stakeholders, resulting in a strong partnership, as all PAR-team members participated fully during the co-design process. They will be invited again for the continuation of this research and the further development of NABUCO. Additionally, new insights arose by sharing each other's difficulties and practices regarding tackling burnout within an organizational context. For instance, the HR-managers realized that setting up a collaboration between organizations would help facilitate mutual learning.

Secondly, in taking a transdisciplinary OH-approach in this study, the PAR-team felt the need for creating common ground by attuning each other's professional language. Deep conversations, supported by schematic visualizations and presentations avoiding the use of jargon, were vital for mutual understanding and overcoming silos.

Thirdly, a concern arose that sustaining stakeholder engagement can be challenging due to the length of the project. Literature about PAR-methodology discusses this well-known issue. Keeping the transdisciplinary aspect of the PAR-team in mind, we might need to re-confirm the members in the next co-design phase and to clarify our mutual expectations, resources, communication strategies and roles during the research (68). Nevertheless, new dynamics within the PAR-team, new content and new opportunities regarding NABUCO might arise.

Fourthly, given the ambition of full participation of all stakeholders at all phases of the PAR, involving employees considered at high risk for or even suffering from burnout in the co-design process is highly advisable. However, a PAR-member, who is also a burnout expert, mentioned that based on her experience, it would be challenging to reach those employees. For instance, stress patterns (e.g. feeling of lack of time, being overly responsible) may counter their motivation for participation. If we do not want to miss out on the purpose of this intervention, discussing the most suitable way to involve these individuals in the co-design process with them would be essential. For now, only the spokeswoman of VZW Burn-out Vlaanderen, a Flemish association of burnout victims, participated in this formative co-design phase. However, it will be imperative to integrate the voices of those who suffer the most for ethical reasons. Consequently, finding the right language and the most effective communication channels to reach these individuals (68), while ensuring a safe and ethical

359 research setting (50, 68, 71), will be crucial in further developing NABUCO.

360 Fifthly, the evaluation of our collaboration and participation level is based on the facilitator's
361 observations and comments, and on spontaneous reflective communication between the PAR-
362 team members. Consequently, since the PAR-team has agreed on the need for a more in-
363 depth evaluation, this will be further developed in the following co-design meeting.

364 Finally, we enjoyed a genuine collaborative process of reflection, learning, and action.
365 Nevertheless, barriers concerning the co-designed protocols or our further collaboration might
366 arise with the re-confirmed PAR-team. Time, contexts, PAR-members and resources might
367 have changed since the formative co-design process of NABUCO. Therefore, a skilled
368 facilitator will be important, to lead the PAR-team through these barriers, by building trust and
369 encouraging stakeholder engagement while promoting emergent processes and quality
370 dialogue.

371 5.2. Critical reflections on and lessons learned from the content design of the NABUCO-
372 intervention.

373 This part will discuss the challenges and opportunities for the further implementation and
374 evaluation of NABUCO put forward by the PAR-team.

375 With visuals and textual overviews, we thoroughly checked each NABUCO-element, regarding
376 its content and specific contribution to the intervention, with the PAR-team. Next, feedback
377 was gathered on the logical flow of the NABUCO-intervention as a whole, the stakeholders'
378 role, the clarity of the steps in the process and the evaluation processes of the NBI so far.

379 Firstly, some PAR-members reported that implementing specific steps or actions could differ
380 in intensity or kind due to their contexts, organizational culture, economic feasibility and human
381 resources. As a result, continuously adjusting the protocols and implementation processes
382 during the PAR piloting and evaluation stages is necessary.
383
384 Second, more profound reflection is required regarding the distinct responsibilities of expert
385 judgment. Until now, we had discussions within the PAR-team whether expert judgment should
386 also be involved in Protocol 1 (P1). Expert judgment could be very time-consuming and cost-
387 intensive, as the NBC in P1 targets mainly groups. As such, expert judgment should only be
388 applied in Protocol 2, and thus be limited to individuals at high risk or diagnosed with burnout.
389 On the other hand, a generalized expert judgment would offer objective advice on the suitability
390 for participation in the NABUCO-modules and on the employees' progress in their self-care
391 capacity. Both are prerequisite in developing a professional and evaluative framework.
392 Accordingly, the topic of expert judgment will be discussed in-depth in the consecutive co-
393 design meetings.
394
395 Third, a systematic review of NBI is essential to develop a deep theoretical understanding of
396 'the changes and the causal chain the NBI can provoke at personal and organizational levels'
397 (48). Moreover, concepts such as burnout and NC should be studied further in-depth to decide
398 how to measure the impact of the NBI on all levels.
399
400 Fourth, it is difficult to distinguish between mental health issues and burnout as they may
401 interact. NABUCO might also have a positive impact on, for example, other mental health
402 issues or on other domains of burnout. Consequently, NABUCO could also be considered as
403 'inclusive' and as a complementary approach, reaching those who still are at work. It will be
404 imperative to execute a rigorous evaluation program, to gain a better insight into this issue,
405 which will be done at a subsequent stage in our research.

406

407 Finally, the Health Impact Assessment results will support the development of a professional
408 evaluative framework, thereby increasing the confidence of healthcare practitioners in
409 prescribing NBI as a complementary HPI. The same is true for evaluating economic feasibility
410 and assessing the socio-economic impact of NABUCO, which could help shape Ministry of
411 Health policies and promote NBI prescriptions for the prevention and recovery of burnout.

412

413 **6. CONCLUSION**

414 Despite the shortcomings and the challenges mentioned above, the co-design process has led
415 to an innovative NBI for burnout prevention and recovery in organizations. Co-design and
416 transdisciplinarity, operationalizing a OH-approach in the NABUCO-intervention, are vital
417 when dealing with the complex challenges of burnout. Furthermore, mediating the reciprocal
418 relationship with nature by improving nature connectedness for better self-care and care for
419 the natural environment may lead to a sustainable impact at an individual, organizational and
420 environmental level. Consequently, NABUCO could be seen as a potential complementary
421 approach to tackle burnout in the workspace.

422

423 **ABBREVIATIONS**

424 HPI=Health promotion intervention

425 OH= One Health

426 PAR=Participative Action Research

427 NABUCO= Nature-based burnout coaching intervention

428 NBI=Nature-based intervention

429 NBC=Nature-based coaching

430 NBT=Nature-based training

431 NC=Nature connectedness

432 BDT=Biophilic Design team

433

434 **AUTHOR CONTRIBUTIONS**
435 All authors contributed equally to the co-design of NABUCO. HK and AS had the lead in the
436 co-design of NABUCO. AS was responsible for the different drafts of this paper. All authors
437 have read and approved the final version of the manuscript.

438

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CONFLICT OF INTEREST STATEMENT

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

ETHICAL STATEMENT

The publication of this study involving human participants was reviewed and approved by the Ethical Committee Universal Hospital Antwerp EC/PM/AL/2020.060. The participants provided their written informed consent to participate in and publish this study.

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652 **TABLE**

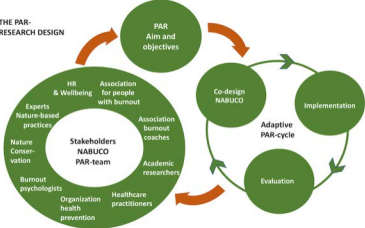653 Table 1. Composition of the PAR-team members by profession and country.

Professional PAR-Team member	Country Belgium (BE), The Netherlands (NL), United Kingdom (UK), France (FR)
Personnel manager	BE, NL
Wellbeing manager	BE
Academic researchers	BE, UK, FR
Representative of the Association of professional burnout coaches	BE
Health psychologist	BE
Burnout coach	BE
Spokesperson of the Association of burnout victims	BE
Representative of a nature conservation organization	BE
Training coordinator of coaching in nature	BE
Representative of an association for healthcare organizations	NL, UK
Nature-based health practitioners	BE, UK, NL

654 **FIGURES CAPTIONS**

655 Figure 1. The PAR Research design. The adaptive PAR-cycle encompasses cyclical
656 information exchange. In a collaborative process, the aim, the objectives and the NABUCO
657 study were refined.

658 Figure 2. NABUCO, a nature-based One Health burnout intervention, with Protocol 1
659 (Prevention) and Protocol 2 (Recovery and re-integration).

660

THE PAR-
RESEARCH DESIGN

PAR
Aim and objectives

Co-design
NABUCO

Implementation

Adaptive
PAR-cycle

Evaluation

HR
& Wellbeing

Association
for people
with burnout

Experts
Nature-based
practices

Association
burnout
coaches

Nature
Conser-
vation

Stakeholders
NABUCO
PAR-team

Academic
researchers

Burnout
psychologists

Organization
health
prevention

Healthcare
practitioners

THE ONE HEALTH BURNOUT INTERVENTION:
NABUCO