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Systematic RADaR analysis of responses to the open-ended question in the Culture of Care Barometer survey of a Dutch hospital

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ABSTRACT

Objectives Systematically measuring the work environment of healthcare employees is key to continuously improving the quality of care and addressing staff shortages. In this study, we systematically analyse the responses to the one open-ended question posed in the Dutch version of the Culture of Care Barometer (CoCB-NL) to examine (1) if the responses offered new insights into healthcare employees' perceptions of their work environment and (2) if the original CoCB had any themes missing.

Design Retrospective text analysis using Rigorous and Accelerated Data Reduction technique.

Setting University hospital in the Netherlands using the CoCB-NL as part of the annual employee survey.

Participants All hospital employees were invited to participate in the study (N=14 671). In total, 2287 employees responded to the open-ended question.

Results 2287 comments were analysed. Comments that contained more than one topic were split according to topic, adding to the total (n=2915). Of this total, 372 comments were excluded because they lacked content or respondents indicated they had nothing to add. Subsequently, 2543 comments were allocated to 33 themes. Most comments (n=2113) addressed the 24 themes related to the close-ended questions in the CoCB-NL. The themes most commented on concerned questions on 'organisational support'. The remaining 430 comments covered nine additional themes that addressed concerns about work environment factors (team connectedness, team effectiveness, corporate vision, administrative burden and performance pressure) and themes (diversity and inclusion, legal frameworks and collective bargaining, resilience and work–life balance, and personal matters).

Conclusions Analysing responses to the open-ended question in the CoCB-NL led to new insights into relevant elements of the work environment and missing themes in the COCB-NL. Moreover, the analysis revealed important themes that not only require attention from healthcare organisations to ensure adequate improvements in their employees' work environment but should also be considered to further develop the CoCB-NL.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The first study to rigorously assess responses to the open-ended question in the Culture of Care Barometer.

⇒ Using Rigorous and Accelerated Data Reduction on a large set of written qualitative data (2915 comments) proved effective for systematic analysis and concise presentation.

⇒ Surveying all (clinical, non-clinical and research) employees of a university hospital ensured the diversity that provides a representative perspective on all healthcare organisations' employees' experiences.

⇒ Study limitations include potential response bias, because employees who chose to respond may hold different views than those who chose not to participate.

⇒ This study took place in the last phase of the COVID-19 pandemic in the Netherlands; some results could be influenced by the dire circumstances and the need to work from home.

INTRODUCTION

Worldwide, healthcare organisations face severe workforce shortages that pose a threat to the quality of care.[1] According to the WHO the global deficit of nurses, constituting half of the healthcare workforce, reached 5.9 million in 2018.[2] In an article in the Nursing Times, the US Bureau of Labor Statistics projects that 'more than 275 000 additional nurses are needed from 2020 to 2030,[3] and employment opportunities for nurses are projected to grow at a faster rate (9%) than all other occupations from 2016 to 2026'.[3] Hence, a major challenge for healthcare organisations is to attract and retain sufficient numbers of healthcare employees. Improving the work environment can help organisations attract and retain healthcare employees.[4 5] Reasons for quitting the profession include

high workload, forced overtime, lack of influence on practices and insufficient use of employees' professional competencies.[4–7] In contrast, a positive work environment reduces the intention to leave,[4 8] enhances employee outcomes (eg, job satisfaction[5 9]) and patient outcomes (eg, lower hospital-acquired infection rates[6 10] and fewer readmissions[11]). Work environment (WE) is defined as 'the internal setting of the organisation where employees work'. It consists of the physical environment, culture, social climate and context of functions, tasks and roles in organisations in general.[12] In healthcare, a positive WE is characterised by respect and trust between employees at all levels, effective cooperation and communication, recognition and appreciation, management support and a work environment that is both physically as well as psychologically safe.[13] For healthcare organisations, creating and sustaining a positive WE begins with understanding employees' current perceptions of their WE.

A common strategy for healthcare organisations to gain insight into employees' perceptions of their WE is to conduct a (satisfaction) survey.[14] Multiple validated questionnaires are available to assess WE, each with a slightly different area of focus, target audience or length.[15 16] These questionnaires are commonly composed of statements linked to Likert-type scales that ask how much a respondent agrees with the specific statement.[16] Although Likert-type scales are often used to examine self-reported perceptions as they allow standardised and/or numerical information collection,[17] the results presented can be difficult to interpret and translate into daily practice, especially when seeking to improve the measured construct.[18] Furthermore, scale items are usually generated from the underlying latent construct the scale developer aimed to measure.[17 19] If certain topics are not captured during the survey development, relevant items based on the latent construct may not be addressed and could thus remain out of scope or be interpreted differently.

To tackle the potential loss of information when studying perceptions with closed-ended questions, it is common to finish with an open-ended question at the end of the survey.[20] Hence, the questionnaires frequently used by healthcare organisations contain such a question, for WE (eg, Practice Environment Scale of the Nursing Work Index[21]; Essentials of Magnetism Tool[22]; Safety Attitudes Questionnaire[23]; Hospital Survey on Patient Safety Culture (HSOPSC)[24]). Responses to open-ended questions could offer valuable contextual information and provide indications and directions for improvements. For example, Boussat et al[24] found that responses to the open-ended question of the HSOPSC included necessary contextual information complementary to the HSOPSC scores. Therefore, responses to open-ended questions could offer insights beyond numerical results.[23] Although many questionnaires often allow respondents to comment on issues in the open-ended question,[20] their answers are rarely reported in scientific publications. Researchers and practitioners often face dilemmas in valuing and analysing the open answers.[20] Due to the lack of reports on these responses, the content of the questionnaire might not match the current opinions of the respondents. Although it is common to establish survey validity and reliability, most validation strategies occur within the framework of the statements and Likert-scale answers developed by the researchers.[20] Hence, it is conceivable that shifts in perceptions over time are not captured, particularly for constructs like WE that are multifaceted and subjective.[18]

We examined the content of answers given to the open-ended question in the Dutch Culture of Care Barometer (CoCB-NL),[25 26] a measurement tool to explore healthcare employees' perspectives on their WE. The CoCB-NL found its origin in the CoCB, developed by Rafferty et al[25] and both showed good validity and reliability in the previous studies.[25 26] Therefore, the instrument has become part of the annual employee survey of a university hospital. The CoCB-NL assesses healthcare organisational WE with 30 positively formulated items on five factors: 'organisational support', 'leadership', 'collegiality and teamwork', 'relation with manager' and 'employee influence and development'.[26] It concludes with one open-ended question: 'What, if any, action needs to be taken to improve the culture of care of your work environment?'[25] By systematically analysing the responses to this open-ended question we aimed to examine (1) if the responses led to new insights or additional information on healthcare employees' perceptions of their WE and (2) if any themes are missing in the CoCB-NL questionnaire. The knowledge gained would be valuable for ongoing improvements to measuring and enhancing WE, a prerequisite for attracting and retaining healthcare employees.

METHODS

Design

We conducted a qualitative analysis of comments responding to the open-ended question of the validated CoCB-NL[26] using the RADaR (Rigorous and Accelerated Data Reduction) technique.[27] RADaR is a systematic way of transforming raw textual data into manageable data tables fit for rigorous analysis and concise presentation and therefore suitable for thematic analysis of large amounts of qualitative data, as was available in this study.[27] The reporting in this study complies with the Standards of Reporting Qualitative Research.[28]

Sample and setting

The setting was a Dutch university hospital (14 671 employees, 1100 beds with 30 288 admissions and 628 904 outpatient visits in 2022) that annually conducts employee surveys, including the CoCB-NL.[26] For this study, all hospital employees were invited to participate by email, after they were informed by their management and through the organisation's communication channels. The survey took place in February 2022 and was available in both Dutch and English to be accessible to both national and international employees.

Data collection

Data were collected via the digital tool LimeSurvey, compliant with the hospital's data security principles. The annual employee survey comprised several validated questionnaires measuring the employee's experience of 'work environment' (CoCB-NL[25][26]), 'safety climate' (Safety Attitudes Questionnaire, (subscale Safety Climate[23][29]), 'work engagement' (Utrecht Work Engagement Scale[30]), 'work–life balance'[31] and 'workability' (Work Ability Index item 1[32]). The survey concluded with a demographics section (respondent's department, profession or function) applying categorical response options to guarantee anonymity. This study only concerned responses to the CoCB-NL, which was in the first part of the survey. It posed a total of 30 closed-ended questions followed by one open-ended question: 'What, if any, action needs to be taken to improve the culture of care in your work environment.' The response field for this open-ended question had no word or character limit. We included all the completed questionnaires containing a response to this open-ended question (2287 comments/6144 respondents, 37 %).

Patient and public involvement

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

Study participation was anonymous and voluntary. Participants were informed about the study in the announcement email and on the first page of the questionnaire. Participants gave implicit consent by proceeding to the substantive questions on the second page. Researchers only had access to the output file of responses to the open-ended question. This file contained no information retrievable to individuals such as email addresses or personnel identification numbers.

Data analysis

Data analysis involved five steps taken in three phases. In the first phase, we built the database (table format) and filled in all the data relevant to answering the research questions. Subsequently, comments were given initial codes. The second phase reduced the collection by excluding, sorting and clustering data, and refined the coding. Finally, themes were formulated in the third phase.

Phase 1: building the database: steps 1 and 2

We began with a table containing all 2287 individual comments and codes labelling the five CoCB-NL factors ('organisational support', 'leadership', 'collegiality and teamwork', 'relation with manager' and 'employee influence and development') as well as the topics related to the 30 closed-ended questions, which we refer to as 'themes'. In the first step, two junior researchers (SMM and LS) independently labelled an initial group of 280 comments (12%) according to one or more factors and themes. A comment that did not match any factor or theme was labelled 'other' and given a keyword that fitted

the comment. SMM and LS discussed their results and wrote a draft description of each theme, which the whole research team then discussed. In the second step, SMM and LS independently coded the next 25% of comments according to one or more themes. They compared the results (75% agreement) and discussed differences up to consensus with a third—senior- researcher experienced in qualitative research and an expert on healthcare employees' work environment (CJvO). This resulted in the next version of the code list which SM used to label the remaining 63% of the comments.

Phase 2: data reduction and identification of themes and subthemes: steps 3 and 4

We began step 3 in the second phase by ordering the data table. If a comment referred to two or more themes, it was split into multiple comments and assigned to the corresponding themes. Of 2915 comments in total, 501 comments referred to multiple issues, 391 comments addressed 2 themes, 97 addressed 3 themes, 9 addressed 4 themes and 4 comments addressed 5 themes. In total, 128 comments were excluded either because the respondents indicated that they had nothing to add, found the questionnaire inappropriate or had recently started their job and thought that they did not know enough to be able to answer the questions. The final dataset contained 2787 comments given by 2159 individual respondents.

SMM reread the comments labelled to 1 of 5 CoCB-NL factors and subcategorised them into 24 themes. Two researchers (LS and CJvO) crosschecked 70% of the labelling (82% agreement) and suggested alternatives in the case of disagreement. The alternatives were discussed up to consensus by CJvO and JWMW-J, two senior researchers in qualitative research. Then we wrote a first draft of theme descriptions. The whole research team checked the descriptions of each theme several times for consistency and comprehensibility. Several descriptions were altered and some themes were merged.

Subsequently, in the fourth step, SMM reread, sorted and labelled the 'other' comments, which resulted in the identification of nine additional themes. LS crosschecked all these comments (97% agreement) and the whole research team discussed the results. This led to the exclusion of another 244 comments (total excluded n=372) because they did not contain enough information for the researchers to assess what exactly the respondent meant (eg, 'internal alignment' (r1662) and 'more communication' (r431)).

Phase 3: formulating the final themes: step 5

In the final stage, one researcher not involved in the coding/labelling process (JWMW-J) reviewed the final themes and descriptions for clarity and distinctiveness. Keeping the research questions in mind, then the whole research team critically discussed the identified themes and further clustered the overlapping themes. The final code list contained 33 themes, of which 24 were based on

Table 1 Respondent characteristics

N=2283		N	%
Department type	Diagnostic and laboratory	166	7
	Functional departments	285	12
	Medical department	536	23
	Outpatient clinic and day treatment	154	7
	Support and service department	455	20
	Nursing ward	410	18
	Science and research department	200	9
	Other	77	3
Professional group	Administrative staff	274	12
	Care assistants	96	4
	Consultants	219	10
	Information and Communication Technology	40	2
	Laboratory staff	154	7
	Management	132	6
	Medical supportive staff	94	4
	Nursing	450	20
	Pharmacy staff	42	2
	Physicians	258	11
	Radiology staff	54	2
	Researcher	294	13
	Teachers	42	2
	Other	53	2

the closed-ended questions of the CoCB-NL and 9 were additional to the CoCB-NL.

RESULTS

The diverse group of respondents (table 1) came from all parts of the university hospital.

We analysed 2915 comments, excluding 372 comments in total, based on the criteria 'lack of content' (n=244), 'nothing to add' (n=104), question not appropriate' (n=13) and 'new in job' (n=11). After exclusion, the 2543 remaining comments are allocated to 33 themes. In total, 2113 comments are labelled with 24 themes related to the 5 CoCB-NL factors and associated close-ended questions, and 430 comments addressed additional themes (n=9). Figure 1 gives an overview of the themes related to the CoCB-NL factors and the additional themes. Online supplemental file 1 defines the themes.

Themes aligning with the CoCB-NL closed-ended questions

We identified 24 themes that align with the closed-ended questions in the CoCB-NL (figure 1). These themes represent almost all of the 30 closed-ended questions, except for two items, 'a good place to work' and 'proud to work', which both belong to the factor 'organisational support'. Respondents did not differentiate between organisational level and team level for the items 'informed about what's going on in team/organisation' and 'influence in team/organisation' of the factors 'leadership' and 'influence and development of employees'. Based on respondents' comments on the lack of kind or collegial behaviour, we distinguished the theme 'demeanour', which matches the factor 'collegiality and teamwork'. Although formulated positively, current the CoCB-NL items 'friendly colleagues', 'rely on colleagues' and 'being treated with respect by colleagues' are commensurate with this theme.

The CoCB-NL factor most frequently commented on was 'organisational support' (n=556), while the factor with the least number of comments was 'relation with manager' (n=291). The 'resources' theme belonging to the factor 'organisational support' was most frequently commented on (n=286) and was most diverse. We were able to identify six types of resources: 'suitable physical worksite', 'sufficient equipment and material', 'enough staff to do the job well', 'functioning service facilities', 'Information and Communication Technology (ICT) systems' and 'enough financial resources available'.

For the factor 'collegiality and teamwork', we found 56 positive comments on WE in which respondents said they had no suggestions for improvement (theme 'team climate'). In contrast, 16 respondents reported unacceptable behaviour from colleagues (theme 'demeanour') and 113 respondents called for action on undesirable or dysfunctional behaviour by leaders (theme 'tackling unacceptable behaviour'; factor 'leadership').

Emerging themes

In total, we identified nine additional themes (green spheres in figure 1). Five themes relate to the CoCB-NL factors 'collegiality and teamwork', 'organisational support' 'and 'leadership', but address subjects not covered by the associated closed-ended questions. The themes 'team connectedness' (n=108) and 'team effectiveness' (n=67), relate to teamwork and are therefore assigned to 'collegiality and teamwork'. However, 'team connectedness' and 'team effectiveness' refer to belonging to a team, something that many team members lacked as they were not allowed to meet physically during the COVID-19 pandemic. Respondents mentioned a need for a clear vision and goals to provide direction for their department (factor 'leadership', theme 'corporate vision'; n=34). Furthermore, respondents called for action by the organisation and (higher) management on the persistent 'administrative burden' (n=9) and 'performance pressure' (n=7).

We identified four distinct themes that cannot be allocated to the factor structure of the CoCB-NL: 'diversity and inclusion', 'resilience and work–life balance', 'personal matter' and 'legal frameworks and collective
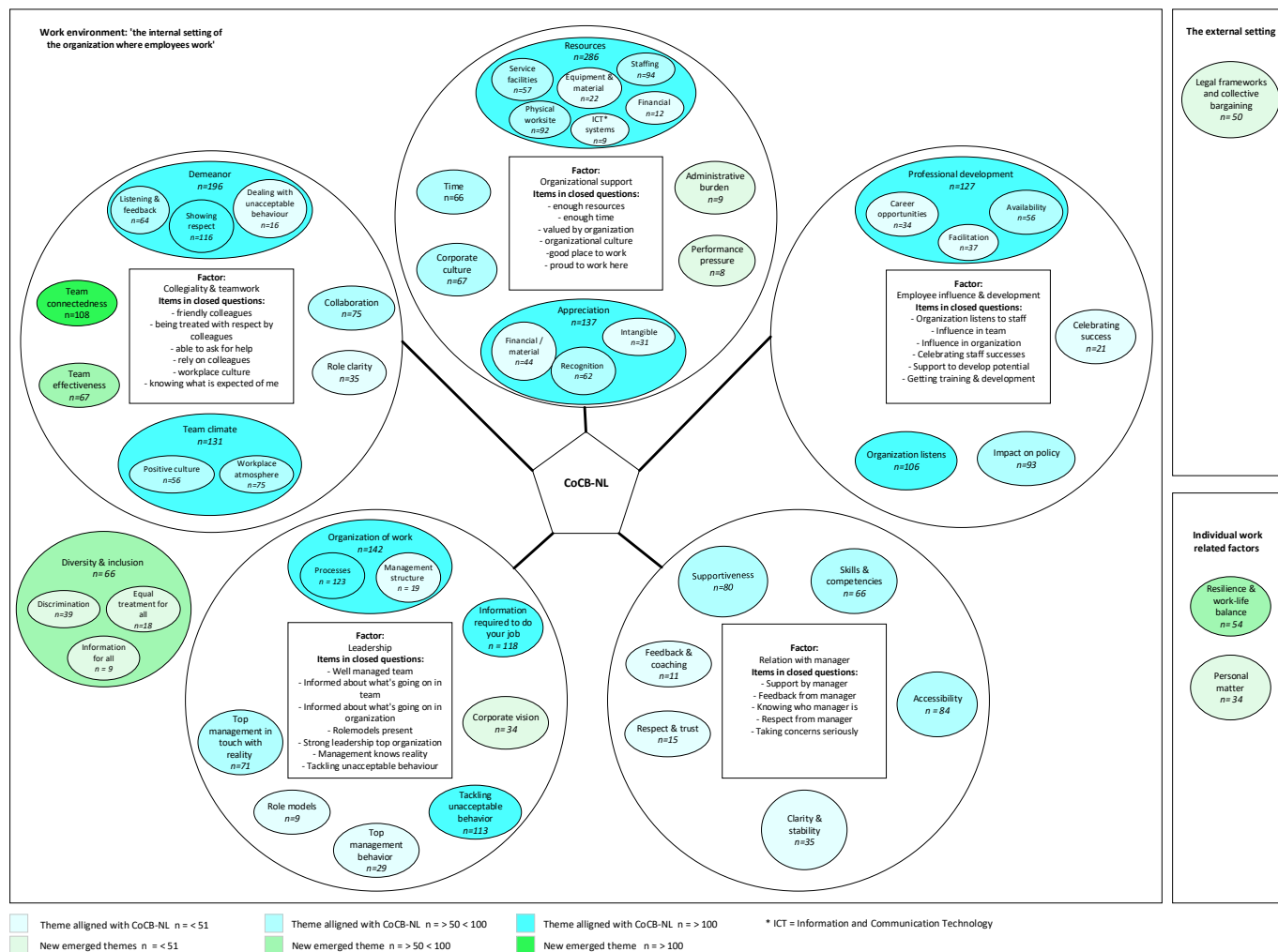
Figure 1 Factors and (sub)themes. CoCB-NL, Dutch version of the Culture of Care Barometer; ICT, Information and Communicationtechnology.

bargaining' (figure 1). The theme 'diversity and inclusion' (n=66) is based on respondents' comments on gender, ethnicity, language and ability differences and encompasses three subthemes: 'discrimination' (n=39), 'equal treatment of all' (n=18) and 'information for all' (n=9). The theme 'resilience and work–life balance' (n=54) includes comments on the requested resilience of employees, mental health issues' and constraints due to a disturbed work–life balance. The comments labelled 'personal matter' (n=34) include comments on positive or negative experiences with the workplace. The theme 'legal frameworks and collective bargaining' (n=50) concerns external conditions and includes comments on how respondents feel about conditions imposed by legislation or the collective bargaining agreement, such as salary, working hours or ageing policy.

DISCUSSION

Our study had two aims. First, to determine if the responses to the open-ended question in the CoCB-NL survey of a Dutch university hospital would lead to new insights into healthcare employees' perceptions of their

WE. Second, to evaluate if any identified themes differed from those addressed by the CoCB-NL.

We identified 33 themes, of which 24 correspond directly with the close-ended questions of the CoCB-NL and nine themes that the CoCB-NL does not address. The 24 corresponding themes include almost all the elements of the Dutch CoCB-NL and the original CoCB,[25 26] which shows the relevance of using this tool to measure the WE.

Of the nine additional themes we distinguished, five relate to factors of the COCB-NL: 'team connectedness', 'team effectiveness', 'corporate vision', 'administrative burden' and 'performance pressure'. The remaining four themes are: 'diversity and inclusion', 'resilience and work–life balance', 'personal matter' and 'legal frameworks and collective bargaining'. Except for 'resilience and work–life balance', 'personal matter', and 'legal frameworks and collective bargaining', all concern the employees' experience of their work environment. They are known elements of the healthcare employees' WE that have an effect on patient or personnel outcomes.[5 13 33] Hence, adding these six themes to the CoCB-NL or the original CoCB[25] and other translations[34] should be considered.

The themes 'team connectedness' and 'team effectiveness' emerged from comments on the employee's experiences during the COVID-19 pandemic. While working at home and meeting only online, employees found it hard to connect with team members and be effective as a team. However, after the pandemic, working remotely (from home) has become the 'new normal' for employees not providing direct patient care.[35 36] Therefore, our findings show the importance for healthcare organisations to understand the influence of WE on remote working. More research in this direction is needed. Also, the theme 'legal frameworks and collective bargaining' was mentioned quite often. The comments referred especially to the collective bargaining agreements, which were under debate at the time the survey was conducted.[37] Although these results can be attributed to a specific event or point in time, it is important to consider measuring 'team connectedness', 'team effectiveness' and 'legal frameworks and collective bargaining' as part of the WE as both patient and personnel outcomes benefit from team connectedness and effectiveness.[38 39] Also, external conditions or structures, such as a law regulating working hours, influence the employee roster, which in turn affects the work–life balance of the individual professional and fosters employees' concerns.[40 41] Healthcare organisations should take these concerns seriously.

The distinct theme 'diversity and inclusion' was not related to any factor of the CoCB-NL. Diversity and inclusion in organisations is associated with corporate performance in terms of innovation, profit and personnel engagement and retention.[42] An inclusive WE is diverse in composition and originates in a climate where employees are willing to speak out and participate, and unacceptable behaviour is less prevalent.[43] Recent government-indicated research concluded that the Dutch healthcare sector does not have a diverse workforce that reflects society.[44] Healthcare organisations are urged to continue working towards a more diverse and inclusive WE.[42 44] Although the importance of a diverse and inclusive WE is evident, we are not aware of any instrument measuring the diversity and inclusivity of healthcare employees' WE.[15 16]

Respondents did not address two CoCB-NL items in the open-ended question: 'a good place to work' and 'proud to work'. These two are addressed by the closed-ended questions, so it cannot be said that they do not contribute to a positive WE and could, therefore, be considered as positive outcomes.[13] It is important to remain critical of questionnaire items. New themes require adaptation of the CoCB-NL, but it is known that long questionnaires are detrimental to low response rates.[45]

The fact that our study found nine new themes important to healthcare employees' WE confirms the value of analysing open comments in questionnaires.[20 46] These new themes provide context to the WE measured and prove that new perceptions of the WE can be captured. Hence, analysis of open-ended questions serves as a starting point for discussing our results.[20 46] Moreover, the WE is in constant flux due to changing circumstances (eg, due to COVID-19 or negotiating a collective bargaining agreement) so what employees find crucial elements of WE evolve over time.[16 47] Analysing open-ended questions facilitates improvements that align with employees' experiences and requirements.[20 46] To use responses to open-ended questions, the responses ought to contain sufficient contextual information on experiences with the WE. Given the substantial proportion of excluded responses in our data set, future research should highlight the importance of providing rich responses to open-ended questions that include information on context.

Strengths and limitations

Analyses of responses to open-ended questions have been criticised as they rarely 'meet the bar' for rigorous qualitative research and hence, a rigorously method is recommended.[20 48] A strength of our study is the application of RADaR[27] technique to systematically analyse and quantify the large number of comments on the open-ended question of the CoCB-NL. Moreover, to avoid the risk of missing hidden themes with RADaR only,[49] at least two junior researchers performed the data analysis by independently allocating comments to themes. Additionally, responses to open-ended questions often lack context, emotional and social nuances, and layers of detail; sometimes these are private opinions.[20] As context information is essential to developing themes, we had to exclude the responses lacking context, which means we might have missed relevant information. However, the leading researcher (SMM) in the labelling process knows the hospital context well.

This study is based on data from a single survey conducted in a university hospital during a specific point in time. The strength is the substantial size of the dataset, and the inclusion of all employees in this large university hospital. However, there is a risk of response bias in this survey, as only 42% of employees responded of which 37% responded to the open-ended question. This might impact the generalisability of our findings to other (university) hospitals worldwide. Additionally, the study was performed in the last phase of the COVID-19 pandemic in the Netherlands. Hence, the dire circumstances and the employees' need to work from home may have influenced the results. Because of the size of the dataset and the participation of all the employees of this large university hospital, it is likely that other employees of (university) hospitals worldwide will recognise the themes found in our study.

We welcome further studies to expand the body of knowledge on the applicability of RADaR technique to analyse an extensive dataset of open-ended responses. Furthermore, studies examining the frequency of occurrence of the newly identified themes relevant to measuring WE are important. Moreover, additional studies assessing and improving the WE are essential to prevent even more workforce shortages as this poses a threat to the quality of care.[1]

CONCLUSION

Analysing comments on the open-ended question of the CoCB-NL in one Dutch hospital, led us to identify nine additional themes considered important by healthcare employees of their WE. WE suggest that healthcare organisations should consider these themes to improve their employees' WE. They are also useful input for further development of the CoCB-NL; even the original CoCB and all its other translations. As WE is constantly changing and employees perceptions of their WE evolve over time, we recommend analysing comments on the open-ended question to ensure adequate improvements in measuring employees' WE. Ultimately, such analysis contributes to a more positive WE for personnel which in turn contributes to enhancing the quality of care.[8 9 46]

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REFERENCES

1. Organization WH. Global strategy on human resources for health: workforce 2030. Geneva, 2016.
2. World Health Organization. State of the world's nursing 2020: investing in education, jobs and leadership. Geneva, 2020.
3. Haddad LM, Annamaraju P, Toney-Butler T. *Nursing Shortage*. 2024.
4. Nantsupawat A, Kunaviktikul W, Nantsupawat R, et al. Effects of nurse work environment on job dissatisfaction, burnout, intention to leave. *Int Nurs Rev* 2017;64:91–8.
5. Wan Q, Li Z, Zhou W, et al. Effects of work environment and job characteristics on the turnover intention of experienced nurses: the mediating role of work engagement. *J Adv Nurs* 2018;74:1332–41.
6. Burmeister EA, Kalisch BJ, Xie B, et al. Determinants of nurse absenteeism and intent to leave: an international study. *J Nurs Manag* 2019;27:143–53.
7. Leineweber C, Chungkham HS, Lindqvist R, et al. Nurses' practice environment and satisfaction with schedule flexibility is related to intention to leave due to dissatisfaction: a multi-country, multilevel study. *Int J Nurs Stud* 2016;58:47–58.
8. Wei H, Sewell KA, Woody G, et al. The state of the science of nurse work environments in the United States: a systematic review. *Int J Nurs Sci* 2018;5:287–300.
9. Aiken LH, Sermeus W, Van den Heede K, et al. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ* 2012;344:e1717.
10. Braithwaite J, Herkes J, Ludlow K, et al. Association between organisational and workplace cultures, and patient outcomes: systematic review. *BMJ Open* 2017;7:e017708.
11. Lasater KB, Mchugh MD. Nurse staffing and the work environment linked to readmissions among older adults following elective total hip and knee replacement. *Int J Qual Health Care* 2016;28:253–8.
12. Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implementation Sci* 2009;4:50.
13. Maassen SM, van Oostveen C, Vermeulen H, et al. Defining a positive work environment for hospital healthcare professionals: a delphi study. *PLoS One* 2021;16:e0247530.
14. Huebner LA, Zacher H. The role of mean item ratings, topic distance, direct leadership, and voice climate in action planning after employee surveys. *Acta Psychol (Amst)* 2023;238:103950.
15. Chang YC, Chang HY, Feng JY. Appraisal and evaluation of the instruments measuring the nursing work environment: a systematic review. *J Nurs Manag* 2022;30:670–83.
16. Maassen SM, Weggelaar Jansen AMJW, Brekelmans G, et al. Psychometric evaluation of instruments measuring the work environment of healthcare professionals in hospitals: a systematic literature review. *Int J Qual Health Care* 2020;32:545–57.
17. Rattray J, Jones MC. Essential elements of questionnaire design and development. *J Clin Nurs* 2007;16:234–43.
18. Ho GWK. Examining perceptions and attitudes: a review of likert-type scales versus q-methodology. *West J Nurs Res* 2017;39:674–89.
19. de Vet HCW, Terwee CB, Mokkink LB. In: *Measurement in Medicine: a practical guide*. Cambridge: Cambridge University Press, Available: https://www.cambridge.org/core/product/identifier/9780511996214/type/book
20. O'Cathain A, Thomas KJ. Any other comments?" open questions on questionnaires - a bane or a bonus to research. *BMC Med Res Methodol* 2004;4:25.
21. Lake ET. Development of the practice environment scale of the nursing work index. *Res Nurs Health* 2002;25:176–88.
22. Kramer M, Schmalenberg C. Development and evaluation of essentials of magnetism tool. *J Nurs Adm* 2004;34:365–78.
23. Sexton JB, Helmreich RL, Neilands TB, et al. The safety attitudes questionnaire: Psychometric properties, Benchmarking data, and emerging research. *BMC Health Serv Res* 2006;6:44.
24. Boussat B, Kamalanavin K, François P. The contribution of open comments to understanding the results from the hospital survey on patient safety culture (HSOPS): A qualitative study. *PLoS One* 2018;13:e0196089.

25 Rafferty AM, Philippou J, Fitzpatrick JM, *et al*. "Development and testing of the 'culture of care barometer' (Cocb) in Healthcare organisations: a mixed methods study". *BMJ Open* 2017;7:e016677.

26 Maassen S, van Oostveen C, Weggelaar AM, *et al*. Measuring the work environment among Healthcare professionals: validation of the Dutch version of the culture of care barometer. *PLoS ONE* 2024;19:e0298391.

27 Watkins DC. "Rapid and rigorous qualitative data analysis: the "radar" technique for applied research". *Int J Qual Meth* 2017;16:1609406917712131.

28 O'Brien BC, Harris IB, Beckman TJ, *et al*. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245–51.

29 Haerkens MH, van Leeuwen W, Sexton JB, *et al*. Validation of the Dutch language version of the safety attitudes questionnaire (SAQ-NL). *BMC Health Serv Res* 2016;16:385.

30 Schaufeli WB, Bakker AB, Salanova M. The measurement of work engagement with a short questionnaire. *Educational and Psychological Measurement* 2006;66:701–16.

31 Fox ML, Dwyer DJ. An investigation of the effects of time and involvement in the relationship between stressors and work–family conflict. *J Occup Health Psychol* 1999;4:164–74.

32 Ebener M, Hasselhorn HM. Validation of short measures of work ability for research and employee surveys. *Int J Environ Res Public Health* 2019;16:3386.

33 Grant S, Davidson J, Manges K, *et al*. Creating healthful work environments to deliver on the quadruple aim: a call to action. *JONA* 2020;50:314–21.

34 Ying L, Fitzpatrick JM, Philippou J, *et al*. Front-line staff perspectives on a caring culture in Chinese hospitals: validation of a Chinese version of the culture of care barometer. *J Nurs Manag* 2022;30:2093–102.

35 Eurostat. Rise in EU population working from home. European Union; 2022. Available: https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/ddn-20221108-1

36 Samuelsson J, Johansson G, Forsell Y, *et al*. How the shift toward working from home has impacted people's work and private life. *J Occup Environ Med* 2022;64:970–5.

37 NFU. Vakbonden positief over nieuwe CAO UMC: Nederlandse Federatie van Universitair Medische Centra, 2021. Available: https://www.nfu.nl/actueel/alle-vakbonden-positief-over-nieuwe-cao-umc

38 Lemieux-Charles L, McGuire WL. What do we know about health care team effectiveness? A review of the literature. *Med Care Res Rev* 2006;63:263–300.

39 Rosen MA, DiazGranados D, Dietz AS, *et al*. Teamwork in healthcare: key discoveries enabling safer, high-quality care. *Am Psychol* 2018;73:433–50.

40 Maben J, Ball J, Edmondson AC. Workplace Conditions. Cambridge: Cambridge University Press, Available: https://www.cambridge.org/core/product/identifier/9781009363839/type/element

41 Schwartz SP, Adair KC, Bae J, *et al*. Work-life balance behaviours cluster in work settings and relate to burnout and safety culture: a cross-sectional survey analysis. *BMJ Qual Saf* 2019;28:142–50.

42 Gomez LE, Bernet P. Diversity improves performance and outcomes. *J Natl Med Assoc* 2019;111:383–92.

43 Smith A. Theoretical framework of inclusiveness at workplace. Int j res anal rev 2020;7:595–605.

44 RVS. *Passende Zorg Is Inclusieve Zorg: Een Verkennend Essay over Wat Ervoor Nodig Is Om de Zorg Inclusiever Te Maken*. Den Haag: Raad Volksgezondheid & Samenleving, 2022.

45 Kato T, Miura T. The impact of questionnaire length on the accuracy rate of online surveys. *J Market Anal* 2021;9:83–98.

46 Gilles I, Mayer M, Courvoisier N, *et al*. Joint analyses of open comments and quantitative data: added value in a job satisfaction survey of hospital professionals. *PLoS One* 2017;12:e0173950.

47 Jingxia C, Longling Z, Qiantao Z, *et al*. The changes in the nursing practice environment brought by COVID-19 and improvement recommendations from the nurses' perspective: a cross-sectional study. *BMC Health Serv Res* 2022;22:754.

48 LaDonna KA, Taylor T, Lingard L. Why open-ended survey questions are unlikely to support rigorous qualitative insights. *Acad Med* 2018;93:347–9.

49 Taylor B, Henshall C, Kenyon S, *et al*. Can rapid approaches to qualitative analysis deliver timely, valid findings to clinical leaders? A mixed methods study comparing rapid and thematic analysis. *BMJ Open* 2018;8:e019993.