

Contextualizing the Job Demands-Resources Model across Healthcare Workers: A Cross-sectional Study of the Psychosocial Work Environment in Healthcare

Britta Elsert Gynning

britta.elsert.gynning@ki.se

Karolinska Institute: Karolinska Institutet <https://orcid.org/0009-0001-2634-1896>

Elin Karlsson

Linköping University: Linköpings universitet

Kevin Teoh

Birkbeck College: Birkbeck University of London

Per Gustavsson

Karolinska Institute: Karolinska Institutet

Filip Christansen

Karolinska Institute: Karolinska Institutet

Emma Brulin



Karolinska Institute: Karolinska Institutet

Research Article

Keywords: Job Demands-Resources Model, Job demands, Job Resources, Health Care Workers, Cross-Sectional

Posted Date: February 26th, 2024

DOI: <https://doi.org/10.21203/rs.3.rs-3896614/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Abstract

Background

The deteriorating psychosocial work environment among healthcare workers in Sweden, influenced by demanding working conditions and resource constraints, affects individual well-being and patient care quality. Healthcare workers, including physicians, registered nurses, and assistant nurses, often work interdependently and share workplaces yet are three completely different professions. Nonetheless, comprehensive studies comparing their psychosocial work environments are scarce; often focusing on healthcare workers either separately or as a homogenous group, but rarely comparative.

Aim

Utilizing the Job Demands-Resources model this study investigated variations in the psychosocial work environment among Swedish healthcare workers. We wanted to identify how the antecedents of individual well-being, in the form of demands and resources, differed between healthcare workers.

Method

Data from the 2022 Longitudinal Occupational Health Survey for Health Care Professionals in Sweden were analysed; the participants included 7589 physicians, registered nurses, and assistant nurses. The analysis involved descriptive statistics, including measures of means and analysis of covariance (ANCOVA), employing the Bonferroni correction for multiple post hoc comparisons. The ANCOVA was also stratified by working factors, including years of work experience and employment within the private/public sector.

Results

The study revealed significant variations in how healthcare workers perceive their psychosocial work environment. Physicians faced the highest level of Quantitative Demands (Mean (\bar{x}) 3.15; 95% CI: 3.11–3.19), while registered nurses reported the most Emotional Demands (\bar{x} 3.37; 95% CI: 3.32–3.41). Assistant nurses had the highest grand means for the imbalance between Efforts and Rewards (Effort Reward Imbalance) (\bar{x} 1.49; 95% CI: 1.49–1.49) and an imbalance between Work and Private Life (Work-Life Interference) (\bar{x} 3.20, 95% CI: 3.15–3.25), along with limited resources. The stratified analysis showed that years of experience and the sector affected healthcare workers' perceptions of their psychosocial working environment. For example, registered nurses working in the private sector reported better working conditions than nurses working in the public sector. The situation for assistant nurses was reversed.

Conclusion

Different psychosocial work environments are experienced differently both between and within different healthcare occupations in Sweden. This study provides crucial insights for improving workplace conditions and consequently enhancing healthcare professionals' well-being and quality of patient care.

1. Background

Healthcare workers worldwide face escalating strains characterized by heavy workloads and increased absenteeism due to demanding working conditions and constrained resources (1–5). While extensive research has examined the psychosocial work environment of healthcare workers, most studies often focus on individual occupations or study them as a uniform group. Despite the diverse roles and responsibilities within healthcare, the interdependence of different healthcare professions necessitates a more comprehensive approach, simultaneously studying healthcare workers jointly, comparatively and independently, to, in the long run, unveil how the intricate dynamics of healthcare may implicate care and safety for patients (6–9).

The challenging psychosocial work environment faced by healthcare workers, marked by heightened job demands, role conflicts, and an imbalance between effort and reward, as well as the imposition of illegitimate tasks, has consistently been associated with increased stress levels (3, 5, 9–15). This stress, in turn, has the potential to result in adverse outcomes such as sickness absence and loss of competence, including lower quality of care (16–19). Conversely, the availability of various job resources, including social support and a sense of control, has been demonstrated to enhance work engagement and reduce the likelihood of healthcare workers leaving their occupation (4, 9, 20).

Previous research underscores how variation in healthcare workers' psychosocial work environment¹ may vary based on occupational and sociocultural differences both between and within occupations (10, 22, 23). A scoping review by McVicar (10) emphasized the need to consider interpersonal and inter-occupational factors when researching differences in healthcare workers' work environments to decipher how each specific context affects their well-being (10). While previous Swedish studies have compared the work environment of healthcare occupations (24–27) and shown differences between two occupations (e.g., registered nurses versus assistant nurses (25) or physicians versus registered nurses (26), many often focused on one main outcome, such as job satisfaction (26), or on one specific context, such as primary care (6). Few previous studies have explicitly charted and compared the psychosocial work environment of Sweden's three major healthcare occupations: physicians, registered nurses, and assistant nurses. Comparisons that are crucial for understanding the similarities and differences within and between occupations and between occupations and the psychosocial work environment.

This study uses the Job Demands-Resources (JD-R) model to address the lack of comparative research across healthcare workers in Sweden. The JD-R model posits that each work setting harbours unique factors influencing job performance by impacting employee well-being. These factors are categorized as job demands or job resources, ultimately leading to burnout or work engagement (28, 29). Job demands necessitate effort and deplete energy, incurring physiological and psychological costs (30). Conversely, job resources increase motivation and have been hypothesized to buffer the effect of demands on health outcomes (28, 30). However, what might be a demand or resource within one context or within one group might not apply to others (9, 31, 32). Therefore, while there have been studies concerning healthcare workers using the JD-R model (e.g. 3, 5, 10, 11, 13, 32, 33), we cannot presume that the demands or resources (or the degree of them) will be the same for each of the three groups of healthcare workers within the Swedish context.

In this study, we aimed to investigate variations in the psychosocial work environment among Swedish healthcare workers, including physicians, registered nurses, and assistant nurses, using the JD-R model. Through this comparative analysis, we seek to unpack differences in the job demands and job resources of different healthcare workers, paving the way for occupation-specific interventions to enhance the individual work environment of healthcare workers within a uniform healthcare system.

2. Method

2.1. Study design, study participation and data collection

This study applied data from the Longitudinal Occupational Health Survey for HealthCare Occupations in Sweden (LOHHCS). The LOHHCS cohort included a sample of practicing physicians, registered nurses, and assistant nurses in Sweden. For more information, see Hagqvist et al (35).

The survey sample of physicians included 7908 individuals, 2712 of whom answered the survey (34.3%). The sample of registered nurses included 7790 individuals, 2903 of whom responded (33.5%). For assistant nurses, the sample included 7748 individuals who responded to 2043 assistant nurses (26.4%). The final study population included 7658 individuals; after excluding individuals over the age of 69, the final analytical sample consisted of 7589 individuals, 2643 physicians (34.8%), 2903 registered nurses (38.3%) and 2043 assistant nurses (26.9%).

The data for all healthcare workers were collected in 2022. This study was approved by the Swedish Ethical Review Authority (Review number removed for anonymity).

2.2. Study measures

Our study integrated different job demands and job resources and was selected on the basis of a comprehensive review authored by the Swedish Agency for Work Environment Expertise noting specific job demands and job resources important for the work environment of Swedish healthcare workers (36). Cronbach's alpha (α) for each measurement for the total sample is presented in the methods section. Cronbach's alpha for each healthcare occupation can be found in the supplementary material (Appendix A).

2.2.1. Demands

Quantitative- and Emotional Demands were measured by three and one item, respectively, retrieved from the validated COPSOQIII (37). Respondents rated both types of demands on a 5-point Likert scale ranging from "Always" to "Aever/Almost never". The three items of Quantitative Demands were compiled into a grand mean score ranging from 1 to 5 (α : .866).

Effort Reward Imbalance [ERI] examines the balance between an individual's work effort and subsequent rewards (38). The ERI is measured by a ratio formula², accounting for the unequal number of items in both Effort (3 items; α : .782) and Reward (7 items; α : .769). Each item was measured using a 4-point Likert scale ("strongly disagree" to "strongly agree") utilizing the validated ERI scale (38). The ERI-ratio cut-off value was set at 1: <1 indicates more rewards than effort, = 1 signifies balance, and > 1 indicates an imbalance, where more effort than rewards has been associated with increased stress and deteriorated health (38).

Illegitimate tasks were assessed through the Berns Illegitimate Task Scale (BITS) (39) and included two main categories: Unnecessary tasks (avoidable or pointless tasks) and Unreasonable tasks (tasks outside of the occupational role that should be handled by others). Both categories were evaluated using four items each, employing a 5-point Likert scale ranging from "very often" to "never". The two categories were generated using a grand mean score ranging from 1 to 5 (α : .770 and .839, respectively).

Work to Life Interference (WLI), pertains to an imbalance between coping with expectations and time management from one's work role in parallel with expectations from one's private life role (40). The WLI was assessed using the validated scale from Fisher et al. (41) and refers to an inter-role conflict between balancing one's work role with one's life role (family, friends, leisure), creating strain and stress (40, 41). The WLI contains five items on a 5-point Likert

scale ranging from “Not at all” to “Almost all the time”. The five items were compiled into an index using a grand mean score ranging from 1–5 (α : .927).

2.2.2. Resources

Control was assessed through three categories: (1) *Work Content Control*, (2) *Work Time Control* and (3) *Influence* (the possibility of making clinical decisions and giving high-quality care). Each item was measured on a 6-point Likert scale ranging from “To a very high degree” to “To a very low degree”, and the sixth option was “Not relevant”. Work Content Control (5 items), Work Time Control (3 items) and Influence (3 items) were indexed through factor analysis³, which indicated the best fit for each item (α : .908; .911 & .777, respectively). For each control index, the option “Not relevant” was excluded and handled as missing. Questions for Work Content Control and Work Time Control were drawn from the Swedish Longitudinal Occupational Survey of Health (SLOSH) (42, 43). The questions for Influence included items such as “In my workplace, I have the freedom to make clinical decisions that meet the needs of the patient”.

Social support was assessed using two categories from the validated COPSOQIII (37): (1) Support from Managers and (2) Support from Colleagues. Each category featured one item on a 5-point Likert scale, from “Always” to “Never/Almost never”, with the fifth option being “not relevant”.

2.2.3. Confounders and stratifying variables

The analysis considered several potentially confounding variables that were chosen with regard to recommendations by Becker et al. (44) and notions of influence on how individuals within the healthcare sector perceive their work environment. The confounding demographic variables included *age* (10, 45), *sex* (10, 27, 46), and *birth country* (10, 47, 48); the occupational variables included *working hours* (22, 45) and years of *working experience* (10, 49).

The demographic variables (age, sex, and birth country), along with the healthcare workers’ *place of work* and their *county of work*, were also used to regulate skewed sampling from collection to avoid selection bias.

Concerning stratification, years of *working experience* and employment within the *private vs. public sector* were used as stratification variables to uncover differences within each profession. *Work experience* has been noted to influence the perception of one’s work environment (10, 49, 50). In Sweden, healthcare has traditionally been publicly available. However, in recent decades, an increasing number of healthcare services (mostly primary care) have been provided privately but with public funding. Increased patient numbers and reduced accessibility have propelled this evolution (51), prompting healthcare workers to choose between working within either a public or private employer sector. Each employer has its own characterizations of patient composition (52), demands and resources affecting the work environment (12, 53)

In the analysis, *age* was treated as a continuous variable, measured in years but categorized into quartiles for demographic description (i.e., < 36, 37–47, 48–57, > 58). *Sex* was categorized as male or female. *Birth country* was dichotomized into born within Sweden and born outside of Sweden.

Workplace was categorized into three main workplaces for healthcare workers in Sweden (primary care, municipality, and hospital), along with a fourth category, “other”, which included work within occupational health service, consulting or other. *The county of work* represents the 21 self-governing counties of Sweden.

Working hours were categorized as < 36 h/week, between 36 and 40 h and > 40 h/week. *Working experience* (confounder and stratification variable) was categorized into < 5 years of working experience, 5–15 years and > 15 years.

Private vs. public sector employment was measured by dichotomizing the variable of main employment into working for either a private or public employer, excluding the options of working for governments, staffing agencies or self-employment.

2.3. Statistical analysis

All analyses were performed using SPSS version 28.0.

The analysis involved the calculation of descriptive summary statistics, encompassing demographic and work characteristics, as well as the means of each demand and resource across each profession. Additionally, to identify significant inter-occupational differences between the three occupations' psychosocial work environments, an analysis of covariance (ANCOVA) was utilized employing the Bonferroni correction for multiple post hoc comparisons at the .05 p-level. To uncover interpersonal differences within each occupation, the ANCOVA was stratified by work characteristics, including years of work experience and employment sector.

3. Results

In the following section, we present the findings of the current study. We begin with an overview of the demographic and work characteristics of individuals in each occupation. We subsequently compare grand means across occupations, which are thereafter stratified by two separate work characteristics.

3.1. Study sample

Table 1 describes the sample characteristics. The majority of the healthcare workers in our study were women (79.4%), and this trend continued across all three occupations, with physicians being the most evenly distributed in terms of sex (52.9%). Ages ranged from 21 to 69 years, although physicians had the lowest age, 25 years. The physicians had a mean age of 44 years, the registered nurses had a mean age of 47 years, and the assistant nurses had an age of 51 years.

—————*TABLE 1 about here (found at the end of the document)*

There was a large variation between occupations regarding working hours. Physicians reported working more than 40 hours per week (66.9%), while registered nurses and assistant nurses reported working between 36 and 40 hours per week most often (38.4% and 41.8%, respectively). Most of the participants worked publicly (88.1%).

3.2. Grand means per profession

In Table 2, the grand means for each variable and occupation are described, along with p values ($p > .05$) for differences. Adjusting for potential confounders, physicians faced the highest level of Quantitative Demands (mean (\bar{x}) 3.15), while registered nurses reported most Emotional Demands (\bar{x} 3.37), although these demands were significantly different only from those of assistant nurses. Assistant nurses had the highest grand means for ERI (\bar{x} 1.49) and WLI (\bar{x} 3.20) after adjustment.

The differences in ERI between occupations increased after we adjusted for confounders, suggesting that the variations in ERI are more likely attributed to the occupations themselves rather than to external factors. Notably, all occupations reported an ERI mean over 1, indicating a shared experience of exerting more effort than receiving a reward.

—————*TABLE 2 about here (found at the end of the document)*

Regarding available resources (Table 2), after adjusting for potential confounders, the assistant nurses reported the lowest grand means across all the researched resources. The most notable difference was in terms of experience of Influence where assistant nurses reported a mean of 2.97 points, whereas physicians reported a mean of 3.64 points and registered nurses 3.52 points.

3.2.1. Stratified analysis by years of working experience and private vs. public sector.

When stratified by years of working experience and adjusted for potential confounders (Table 3), physicians with >15 years of working experience reported the highest grand mean for Quantitative Demands (\bar{x} 3.37). Concerning resources, however, physicians with < 5 years of working experience reported lower Work Time Control (\bar{x} 2.19) and Influence (\bar{x} 3.50) than did more experienced colleagues.

Registered nurses showed a clear pattern in which individuals with <5 years of experience encountered more job demands and fewer resources than did more experienced registered nurses. For example, compared with registered nurses >15 years of experience, registered nurses with <5 years of experience reported a WLI grand mean of 3.36 and a grand mean of 3.10 concerning the feeling of Influence (\bar{x} 2.95 and \bar{x} 3.68, respectively).

There were few significantly different patterns of experience with job demands and resources among assisted nurses with different years of working experience.

—————*TABLE 3 about here (found at the end of the document)*

According to the stratification by employment sector (Table 4), compared with physicians working for a public employer, physicians with only significant differences in experience with Emotional Demands and working for a private employer had greater Emotional Demands (\bar{x} 3.47) and less Support from Colleagues (\bar{x} 4.22).

Compared with registered nurses with a private employer, those working within the public employment sector reported higher means of ERI (\bar{x} 1.38), Illegitimate Tasks (\bar{x} 2.98 & \bar{x} 2.93) and WLI (\bar{x} 3.06). Similarly, registered nurses with a public employer consequently also reported fewer resources than did those working within the private sector.

For assistant nurses, the pattern differed. Those working within the private employment sector reported higher grand means of job demands, including Quantitative Demands (\bar{x} 2.83), ERI (\bar{x} 1.56) and Illegitimate Tasks (\bar{x} 3.10 & \bar{x} 3.10). The authors also reported a notably lower mean regarding Support from Managers (\bar{x} 3.31) than from assistant nurses working for a public employer.

—————*TABLE 4 about here (found at the end of the document)*

4. Discussion

In this study, we aimed to investigate variations in the psychosocial work environment among Swedish healthcare workers using the JD-R model. Overall, we found noticeable variations between and within the three groups of healthcare workers in Sweden, both with regard to job demands and resources. Despite variations in education, responsibilities, and compensation between physicians, registered nurses, and assistant nurses, they often work side-by-side within the same employer context. While previous research has focused primarily on the implications of diverse demands and resources, this study lays a foundation for understanding the origins of work environment implications.

This study addresses an important gap in the literature, offering crucial insights into occupation-specific health risks for Sweden's three major healthcare occupations. This allows for the potential development of tailored interventions aimed at safeguarding employee and patient well-being that account for this variation in the psychosocial working

environment. Our results reveal the intricate relationship between experienced work environments, in the form of job demands and resources, and individual occupational roles.

4.1. Demands: Variations among healthcare workers

Our study aligns with prior research revealing occupation-specific demands. Physicians articulated pronounced Quantitative Demands (20, 26), and registered nurses experienced high levels of Emotional Demands (5, 10). In contrast, assistant nurses reported a high imbalance between Efforts and Rewards and between WLI (24). However, previous studies rarely compare within and between healthcare occupations, which is why this study makes important contributions.

Our results diverge from those of Eriksson et al.'s study among Swedish nursing occupations (25), which reported that registered nurses experience both greater demands and fewer resources than assistant nurses (25), contrary to our findings, in which assistant nurses recurrently reported a worse working environment than both physicians and registered nurses did. Methodological differences in sample size and time may contribute to these discrepancies. Our study used a larger and more representative sample of all registered and assistant nurses working in Sweden, whereas Eriksson et al. (25) collected their sample from 2012 to 2014 with a total sample of 840 nurses. This emphasizes the need for more comprehensive studies examining how each occupation perceives its work environment in various contexts.

4.2. Resources: Assistant nurses at risk

Our findings reveal an apparent trend indicating that assistant nurses encounter a distinct shortage of resources. Particularly prominent was the pronounced lack of control, notably over working hours, and influence, differentiating them from their healthcare colleagues with longer educational backgrounds.

Physicians and registered nurses differ in their experience of resources; however, with their greater access to resources than assistant nurses, workers' education level and status may be involved in explaining the differences between occupations. In the general Swedish population, educational level has been shown to work as a predictor of experiencing control, where more highly educated individuals tend to experience greater job control despite having more psychologically demanding jobs (48).

Moreover, given the established association between job resources and heightened work engagement and job satisfaction (5, 9, 29), our data prompt concerns about diminished work engagement among assistant nurses in contrast to their colleagues. This raises concerns about potential consequences, notably competence loss—a paramount issue concerning a profession already characterized by precarious employment and competence draught (54). This is particularly noteworthy considering the integral role that assistant nurses play in the direct personal care of patients within the healthcare landscape.

4.3. Interaction between job demands and resources: Re-evaluating the buffer hypothesis

Our results emphasize the critical consideration of the balance between demands and resources across healthcare occupations. While variations in demands among workers suggest the need to address occupation-specific health risks, the more pronounced disparities in resource perception prompt a revisitation of previous research and the buffering hypothesis of the JD-R model.

The buffer hypothesis, integral to the JD-R model, posits that access to resources mitigates the adverse effects of confronting job demands (28). In essence, individuals with elevated job demands risk exhaustion and those with limited job resources risk disengagement, while individuals in work roles with both high demands and limited resources face simultaneous exhaustion and disengagement (55). However, as articulated by Marzocchi et al. (34), even in the face of moderate demands, access to resources significantly influences the impact of a demanding work environment on job satisfaction and well-being rather than the demands themselves (34). This implies that although assistant nurses reported fewer Quantitative and Emotional Demands than physicians and registered nurses did, their restricted resources may elevate their risk of experiencing both exhaustion and disengagement compared to their healthcare colleagues. This underscores the need for nuanced considerations beyond the linear buffer hypothesis.

Moreover, newly published studies have articulated the need to review and revise the buffer hypothesis (9, 31, 56). Huth and Chung-Yan's Bayesian meta-analysis in 2023 challenges the compensatory role of increased job control in high workload situations. Similar conclusions were established in a longitudinal study of Swedish workers (56), demonstrating that high demands correlate with an elevated risk of burnout irrespective of the level of the supportive environment (decision latitude and social capital). While our study did not directly test the demands-resources interaction, our results underscore the necessity for nuanced discussions, contextualizing the work environment of each healthcare worker.

4.4. Recognizing additional contextual factors on demands and resources

Our results indicate significant variations in the psychosocial work environment among healthcare workers, both within the same context and within each occupation. For instance, our findings align with those of previous studies (12, 53), highlighting the distinct differences between private vs. public employers. Registered nurses working within the public employment sector reported a less favourable work environment, while public assistant nurses indicated lower job demands than did those with a private employer. These differences may stem from variations in patient composition (52) or diverse tasks and responsibilities, especially in privately funded primary and elderly care settings, where assistant nurses are most often employed.

Additionally, our findings, consistent with prior research (57, 58), underscore a clear relationship between years of working experience and the psychosocial work environment. Fewer years of experience seem to be related to a poorer psychosocial work environment, which is particularly evident among registered nurses. Surprisingly, compared with their more experienced counterparts, physicians with less than 5 years of experience reported similar or even lower quantitative and emotional demands and fewer unnecessary tasks. This contrasts with earlier studies highlighting deteriorating conditions for junior physicians (49). Explaining these nuanced differences, Dyrbye's research suggested that, compared to early career physicians (< 10 years), mid-career physicians (11 to 20 years) report a worsened psychosocial work environment. Educational factors may play a role, as fully qualified post basic training nurses are immediately immersed in the demanding healthcare work environment, while physicians continue their education for several years post basic training. This could afford them greater protection against certain job demands.

Once again, the divergences found in this study underscore the need to discard the uniform treatment of healthcare workers. Each occupation and worker face unique stressors, influenced by contextual differences and individual compositions (9). Our findings affirm that explicit demands and resources are shaped by both individual and occupation-specific factors rooted in distinct job roles and experiences (8, 9, 32). These insights emphasize the need for tailored interventions that address the unique challenges faced by each worker and occupation, ultimately impacting the well-being of healthcare occupations and, by extension, patient care.

4.5. Strengths and limitations

This study has both strengths and limitations worth noting. First, the reliance on self-reported measures, with Emotional Demands and Social Support being measured by one item each, may introduce common method bias, potentially influencing the results. Second, the cross-sectional nature of the study limits our ability to investigate temporal changes in the psychosocial work environment between healthcare occupations. On the other hand, the study aimed to uncover current differences, that is, to identify any possible pattern in the perception of the work environment. Additionally, the use of a representative and large analytical sample comprising 7589 individuals, including division of three different occupations physicians, registered nurses, and assistant nurses, is a major strength allowing for more generalizable and coherent results. Nonetheless, future research should adopt a longitudinal approach with multiple time intervals to assess the stability of these variations over time.

4.6. Practical implications and future research

In practice, projections by Liu et al. indicate a critical global shortage of healthcare personnel, estimated at 80 million by 2030, partly attributed to adverse psychosocial work environments (59). This shortage is evident in Nordic (18, 57) and Swedish healthcare settings (20, 25, 35, 60). In addition to individual repercussions, these challenges compromise patient safety and quality care (11, 19, 22, 33, 61) and sustain significant societal and economic costs (62, 63). Research (64) and legislation (65) emphasize the need for interventions to improve the well-being of employees, whereby the identification of relevant factors through risk assessments is imperative. Therefore, a comprehensive investigation of demands and resources and how they interact within explicit contextual settings across healthcare workers is imperative. Accounting for context, including how the individual, private life, job, and organization interact in the experience of job demands and resources and their accumulative effect on health outcomes, could contribute to identifying occupation-specific health risks and understanding their potential consequences for patient care.

5. Conclusion

Our research emphasizes the distinctive psychosocial work environments experienced by the three major healthcare occupations in Sweden. We have shown that healthcare occupations, though often viewed as one group, experience vastly different psychosocial work environments, even those who often work under the same employer and the same unit. To safeguard both staff and patients, we must stop studying physicians, registered nurses, and assistant nurses in isolation. To identify occupation-specific health risks and to understand their possible consequences for patient care, we need a unified approach, treating healthcare workers as different occupations with different demands and resources but who are interdependent within the same healthcare context.

Declarations

Ethics approval and consent to participate

The Longitudinal Occupational Health Survey for Health Care Occupations in Sweden was approved by the Swedish Ethical Review Authority (Ethical review number removed for anonymity). All of the physicians, registered nurses and assistant nurses provided consent to participate when they logged in to the web survey or posted the paper survey.

Consent for publication

All of the physicians, registered nurses and assistant nurses provided consent for publication when they logged in to the web survey or posted the paper survey.

Availability of data and materials

The datasets analysed during the current study are not publicly available for ethical reasons but are available from the corresponding author upon reasonable request.

Competing interests

The authors declare no competing interests.

Funding

This article was funded by the Swedish Research Council (grant number removed for anonymity).

Authors' contributions

BG drafted the manuscript and performed the statistical analysis. All the authors contributed critical support to the design and statistical approach of the article and interpreted the data. EK and EB contributed support to the content and structure of the discussion and conclusion. FC, PG, KT, EK and EB contributed important revisions regarding content and language. All the authors have read the manuscript and approved the final version of the manuscript.

Acknowledgements

We would like to thank all the physicians, registered nurses and assistant nurses who participated in this study and made this article possible.

Authors' information

Not applicable

References

1. Hariharan TS, Griffin B. A review of the factors related to burnout at the early-career stage of medicine. *Med Teach*. 2019;41(12):1380–91.
2. Lidwall U, Bill S, Palmer E, Olsson Bohlin C. Mental disorder sick leave in Sweden: A population study. *WOR*. 2018;59(2):259–72.
3. Dall'Ora C, Ball J, Reinius M, Griffiths P. Burnout in nursing: a theoretical review. *Hum Resour Health*. 2020;18(1):41.
4. Brborović H, Daka Q, Dakaj K, Brborović O. Antecedents and associations of sickness presenteeism and sickness absenteeism in nurses: A systematic review. *Int J Nurs Pract*. 2017;23(6):e12598.
5. Broetje S, Jenny GJ, Bauer GF. The Key Job Demands and Resources of Nursing Staff: An Integrative Review of Reviews. *Front Psychol*. 2020;11:84.
6. Anskär E, Lindberg M, Falk M, Andersson A. Legitimacy of work tasks, psychosocial work environment, and time utilization among primary care staff in Sweden. *Scand J Prim Health Care*. 2019;37(4):476–83.
7. Trender och SCB. Prognoser 2017: befolkningen, utbildningen, arbetsmarknaden med sikte på år 2035 [Internet]. Statistics Sweden; 2017 [cited 2023 Oct 18]. Report No.: AM85. Available from: https://www.scb.se/contentassets/60312e5030114512b5b58a94a4ae25e2/uf0515_2017i35_br_am85br1701.pdf
8. Schooley B, Hikmet N, Tarcan M, Yorgancioglu G. Comparing Burnout Across Emergency Physicians, Nurses, Technicians, and Health Information Technicians Working for the Same Organization. *Med (Baltim)*.

2016;95(10):e2856.

9. Teoh KRH, Hassard J, Cox T. Individual and organizational psychosocial predictors of hospital doctors' work-related well-being: A multilevel and moderation perspective. *Health Care Manage Rev.* 2020;45(2):162–72.
10. McVicar A. Scoping the common antecedents of job stress and job satisfaction for nurses (2000–2013) using the job demands-resources model of stress. *J Nurs Manag.* 2016;24(2):E112–36.
11. O'Connor DB, Hall LH, Johnson J, Job Strain. Burnout, Wellbeing and Patient Safety in Healthcare Professionals. In: Montgomery A, van der Doef M, Panagopoulou E, Leiter MP, editors. *Connecting Healthcare Worker Well-Being, Patient Safety and Organisational Change* [Internet]. Cham: Springer International Publishing; 2020 [cited 2023 May 24]. p. 11–23. (Aligning Perspectives on Health, Safety and Well-Being). Available from: https://link.springer.com/10.1007/978-3-030-60998-6_2.
12. Thapa DR, Stengård J, Ekström-Bergström A, Areskoug Josefsson K, Krettek A, Nyberg A. Job demands, job resources, and health outcomes among nursing professionals in private and public healthcare sectors in Sweden – a prospective study. *BMC Nurs.* 2022;21(1):140.
13. West CP, Dyrbye LN, Shanafelt TD. Physician burnout: contributors, consequences and solutions. *J Intern Med.* 2018;283(6):516–29.
14. Leo CG, Sabina S, Tumolo MR, Bodini A, Ponzini G, Sabato E, et al. Burnout Among Healthcare Workers in the COVID 19 Era: A Review of the Existing Literature. *Front Public Health.* 2021;9:750529.
15. Kilponen K, Huhtala M, Kinnunen U, Mauno S, Feldt T. Illegitimate tasks in health care: Illegitimate task types and associations with occupational well-being. *J Clin Nurs.* 2021;30(13–14):2093–106.
16. Bakker AB, Killmer CH, Siegrist J, Schaufeli WB. Effort–reward imbalance and burnout among nurses. *J Adv Nurs.* 2000;31(4):884–91.
17. Hu Q, Schaufeli WB, Taris TW. How are changes in exposure to job demands and job resources related to burnout and engagement? A longitudinal study among Chinese nurses and police officers. *Stress and Health.* 2017;33(5):631–44.
18. Kaiser S, Patras J, Adolfsen F, Richardsen AM, Martinussen M. Using the Job Demands–Resources Model to Evaluate Work-Related Outcomes Among Norwegian Health Care Workers. *SAGE Open.* 2020;10(3):215824402094743.
19. Vu-Eickmann P, Li J, Müller A, Angerer P, Loerbroks A. Associations of psychosocial working conditions with health outcomes, quality of care and intentions to leave the profession: results from a cross-sectional study among physician assistants in Germany. *Int Arch Occup Environ Health.* 2018;91(5):643–54.
20. Strömgren M. Intention to leave among health care professionals: The importance of working conditions and social capital. *JHA.* 2017;6(3):58.
21. Rugulies R. What is a psychosocial work environment? *Scand J Work Environ Health.* 2019;45(1):1–6.
22. Virtanen M, Kurvinen T, Terho K, Oksanen T, Peltonen R, Vahtera J, et al. Work Hours, Work Stress, and Collaboration Among Ward Staff in Relation to Risk of Hospital-Associated Infection Among Patients. *Med Care.* 2009;47(3):310–8.
23. Taylor C, Mattick K, Carrieri D, Cox A, Maben J. The WOW factors': comparing workforce organization and well-being for doctors, nurses, midwives and paramedics in England. *Br Med Bull.* 2022;141(1):60–79.
24. Hochwälder J. The psychosocial work environment and burnout among Swedish registered and assistant nurses: The main, mediating, and moderating role of empowerment. *Nurs Health Sci.* 2007;9(3):205–11.
25. Eriksson A, Jutengren G, Dellve L. Job demands and functional resources moderating assistant and Registered Nurses' intention to leave. *Nurs Open.* 2021;8(2):870–81.

26. Jönsson S. Psychosocial work environment and prediction of job satisfaction among Swedish registered nurses and physicians - a follow-up study: Psychosocial work environment and prediction of job satisfaction. *Scand J Caring Sci.* 2012;26(2):236–44.
27. Brulin E, Lidwall U, Seing I, Nyberg A, Landstad B, Sjöström M, et al. Healthcare in distress: A survey of mental health problems and the role of gender among nurses and physicians in Sweden. *J Affect Disord.* 2023;339:104–10.
28. Bakker AB, Demerouti E, Sanz-Vergel A. Job Demands–Resources Theory: Ten Years Later. *Annual Rev Organizational Psychol Organizational Behav.* 2023;10(1):25–53.
29. Lesener T, Gusy B, Wolter C. The job demands-resources model: A meta-analytic review of longitudinal studies. *Work Stress.* 2019;33(1):76–103.
30. Demerouti E, Bakker AB, Nachreiner F, Schaufeli WB. The job demands-resources model of burnout. *J Appl Psychol.* 2001;86(3):499–512.
31. Huth KBS, Chung-Yan GA. Quantifying the Evidence for the Absence of the Job Demands and Job Control Interaction on Workers' Well-Being: A Bayesian Meta-Analysis. *J Appl Psychol.* 2023;108(6):1060–72.
32. Demerouti E, Bakker AB. Job demands-resources theory in times of crises: New propositions. *Organizational Psychol Rev.* 2023;13(3):209–36.
33. Teoh KRH, Hassard J, Cox T. Doctors' perceived working conditions and the quality of patient care: a systematic review. *Work Stress.* 2019;33(4):385–413.
34. Marzocchi I, Ghezzi V, Di Tecco C, Ronchetti M, Ciampa V, Olivo I, et al. Demand–Resource Profiles and Job Satisfaction in the Healthcare Sector: A Person-Centered Examination Using Bayesian Informative Hypothesis Testing. *IJERPH.* 2023;20(2):967.
35. Hagqvist E, Kerstin Ekberg, Lidwall U, Nyberg A, Landstad BJ, Wilczek A, et al. The Swedish HealthPhys Study: Study Description and Prevalence of Clinical Burnout and Major Depression among Physicians. *Chronic Stress.* 2022;6:1–8.
36. Brulin E, Elsert Gynning B. En kartläggning av arbetsmiljö och hälsa hos undersköterskor, sjuksköterskor och läkare i den offentliga hälso- och sjukvården [Internet]. Gävle: Myndigheten för arbetsmiljökunskap; 2023 [cited 2023 Dec 12] p. 63. Report No.: 2023:12. Available from: <https://mynak.se/wp-content/uploads/2023/11/En-kartlaggning-av-arbetsmiljo-och-halsa-hos-underskoterskor-sjukskoterskor-och-lakare-i-den-offentliga-halso-och-sjukvarden.pdf>.
37. Burr H, Berthelsen H, Moncada S, Nübling M, Dupret E, Demiral Y, et al. The Third Version of the Copenhagen Psychosocial Questionnaire. *Saf Health Work.* 2019;10(4):482–503.
38. Siegrist J, Starke D, Chandola T, Godin I, Marmot M, Biedhammer I et al. The Measurement of Effort-Reward Imbalance at Work. *Soc Sci Med.* 2004;(58):1483–99.
39. Jacobshagen N. Illegitimate tasks, illegitimate stressors: Testing a New stressor-strain concept. Bern: University of Bern; 2006.
40. Greenhaus J, Beutell NJ. Sources of conflict between work and family roles. *Acad Manage Rev.* 1985;10(1):76–88.
41. Fisher GG, Bulger CA, Smith CS. Beyond work and family: A measure of work/nonwork interference and enhancement. *J Occup Health Psychol.* 2009;14(4):441–56.
42. Magnusson Hanson LL, Leineweber C, Persson V, Hyde M, Theorell T, Westerlund H. Cohort Profile: The Swedish Longitudinal Occupational Survey of Health (SLOSH). *Int J Epidemiol.* 2018;47(3):691–692i.
43. Albrecht SC, Kecklund G, Rajaleid K, Leineweber C. The longitudinal relationship between control over working hours and depressive symptoms: Results from SLOSH, a population-based cohort study. *J Affect Disord.*

- 2017;215:143–51.
44. Becker TE, Atinc G, Breaugh JA, Carlson KD, Edwards JR, Spector PE. Statistical control in correlational studies: 10 essential recommendations for organizational researchers. *J Organizational Behav.* 2016;37(2):157–67.
 45. Larsen AD, Ropponen A, Hansen J, Hansen ÅM, Kolstad HA, Koskinen A, et al. Working time characteristics and long-term sickness absence among Danish and Finnish nurses: A register-based study. *Int J Nurs Stud.* 2020;112:103639.
 46. Davies K. The body and doing gender: the relations between doctors and nurses in hospital work. *Sociol Health Illn.* 2003;25(7):720–42.
 47. Aalto AM, Heponiemi T, Keskimäki I, Kuusio H, Hietapakka L, Lamsa R, et al. Employment, psychosocial work environment and well-being among migrant and native physicians in Finnish health care. *Eur J Public Health.* 2014;24(3):445–51.
 48. Almroth M, Hemmingsson T, Sörberg Wallin A, Kjellberg K, Burström B, Falkstedt D. Psychosocial working conditions and the risk of diagnosed depression: a Swedish register-based study. *Psychol Med.* 2022;52(15):3730–8.
 49. Hariharan TS, Griffin B. A review of the factors related to burnout at the early-career stage of medicine. *Med Teach.* 2019;41(12):1380–91.
 50. Dyrbye LN, Varkey P, Boone SL, Satele DV, Sloan JA, Shanafelt TD. Physician satisfaction and burnout at different career stages. *Mayo Clin Proc.* 2013;88(12):1358–67.
 51. Mason C. Public-private health care delivery becoming the norm in Sweden. *Can Med Assoc J.* 2008;179(2):129–31.
 52. Tynkkynen LK, Vrangbæk K. Comparing public and private providers: a scoping review of hospital services in Europe. *BMC Health Serv Res.* 2018;18(1):141.
 53. Pires BSM, de Oliveira LZ, Siqueira CL, Feldman LB, Oliveira RA, Gasparino RC. Nurse work environment: comparison between private and public hospitals. *Einstein (São Paulo).* 2018;16(4):eAO4322.
 54. Hult M, Kallio H, Kangasniemi M, Pesonen T, Kopra J. The effects of precarious employment and calling on the psychosocial health and work well-being of young and older workers in the care sector: a longitudinal study. *Int Arch Occup Environ Health.* 2023;96(10):1383–92.
 55. Demerouti E, Bakker AB, Nachreiner F, Schaufeli WB. The job demands-resources model of burnout. *J Appl Psychol.* 2001;86(3):499–512.
 56. Fagerlind Ståhl AC, Ståhl C, Smith P. Longitudinal association between psychological demands and burnout for employees experiencing a high versus a low degree of job resources. *BMC Public Health.* 2018;18(1):915.
 57. Flinkman M, Salanterä S. Early career experiences and perceptions – a qualitative exploration of the turnover of young registered nurses and intention to leave the nursing profession in Finland. *J Nurs Adm Manag.* 2015;23(8):1050–7.
 58. Rudman A, Gustavsson P. Konsekvenser av utbrändhet i början av sjuksköterskors arbetsliv för karriärutveckling. *Socialmedicinsk tidskrift.* 2020;97(1):92–102.
 59. Senek M, Robertson S, King R, Wood E, Ryan T. Should I stay or should I go? Why nurses are leaving community nursing in the UK. *BMC Health Serv Res.* 2023;23(1):164.
 60. Ahlstedt C, Moberg L, Brulin E, Nyberg A. Do illegitimate tasks matter for registered nurses' work motivation? A cross-sectional study based on a nationally representative sample of Swedish nurses. *Int J Nurs Stud Adv.* 2023;100159.

61. Hall LH, Johnson J, Watt I, Tsipa A, O'Connor DB. Healthcare Staff Wellbeing, Burnout, and Patient Safety: A Systematic Review. Harris F, editor. PLoS ONE. 2016;11(7):e0159015.
62. Cimiotti JP, Aiken LH, Sloane DM, Wu ES. Nurse staffing, burnout, and health care-associated infection. *Am J Infect Control*. 2012;40(6):486–90.
63. Hassard J, Teoh KRH, Visockaite G, Dewe P, Cox T. The cost of work-related stress to society: A systematic review. *J Occup Health Psychol*. 2018;23(1):1–17.
64. Fox KE, Johnson ST, Berkman LF, Sianoja M, Soh Y, Kubzansky LD, et al. Organisational- and group-level workplace interventions and their effect on multiple domains of worker well-being: A systematic review. *Work Stress*. 2022;36(1):30–59.
65. Jain A, Torres LD, Teoh K, Leka S. The impact of national legislation on psychosocial risks on organisational action plans, psychosocial working conditions, and employee work-related stress in Europe. *Soc Sci Med*. 2022;302:114987.

Footnotes

1. The interactions of social structures, environmental exposures, and psychological processes within an individual's work environment (21)
2. ER-Ratio = effort score/(reward score x c); c = effort/reward = 3/7 = 0.42857143 (38)
3. A factor analysis was conducted to discern the relationship between 11 variables related to decision power over meetings with patients, over time sheets, length, start and end of shifts along with variables concerning time with patients and freedom for clinical decisions. The factor analysis produced 3 components (Eigenvalues > 1.0, ...% of the variance). Concerning a factor loading over 0.3, components 1 and 2 were deemed as measuring two different forms of control: Work Content Control (component 1, 5 items) and Work time Control (component 2, 3 items). Component 3 was deemed as measuring feelings of influence at work (3 items).

Tables

Table 1: Demographic- and work charecteristics by each healthcare occupation				
	Total	Physicians	Nurses	Ass. Nurses
	n(%)	n(%)	n(%)	n(%)
Total	7589 (100%)	2643(34.8%)	2903(38.3%)	2043(26.9%)
Demographics				
<i>Sex</i>				
Men	1563(20.6%)	1114(42.1%)	288(9.9%)	161(7.9%)
Women	6026(79.4%)	1529(57.9%)	2615(90.1%)	1882(92.1%)
<i>Age</i>				
<36 years	1840(24.2%)	811(30.7%)	741(25.5%)	288(14.1%)
37-47 years	1941(25.6%)	883(33.4%)	724(24.9%)	334(16.3%)
48-57 years	1861(24.5%)	491(18.6%)	700(24.1%)	670(32.8%)
>58 years	1947(25.7%)	458(17.3%)	738(25.4%)	751(36.8%)
<i>Birth country</i>				
Within Sweden	6438(85.4%)	2117(80.8%)	2641(91.7%)	1680(82.2%)
Outside Sweden	1105(14.6%)	502(19.2%)	240(8.3%)	363(17.8%)
Work factors				
<i>Years of working experience</i>				
<5 years	1159(15.3%)	547(20.7%)	474(16.4%)	138(6.8%)
5-15 years	2515(33.3%)	1044(39.6%)	869(30.0%)	602(29.6%)
>15 years	3889(51.4%)	1046(39.7%)	1552(53.6%)	1291(63.6%)
<i>Self-estimated number of working hours per week</i>				
<36 h	2073(27.5%)	369(14.0%)	883(30.6%)	821(40.7%)
36-40 h	2451(32.5%)	501(19.0%)	1108(38.4%)	842(41.8%)
>40 h	3011(40.0%)	1761(66.9%)	898(31.1%)	352(17.5%)
<i>Public/private sector</i>				
Public	6436(88.1%)	2174(85.3%)	2456(88.6%)	1806(90.8%)
Private	872(11.9%)	375(14.7%)	315(11.4%)	872(11.9%)

Tables 2 and 3 are available in the Supplementary Files section.

Table 4: Mean values for Job Demands and Job Resources stratified working for a public or private employer for each occupation adjusted by confounderst

		Public vs. private employment				
		Public		Private		Bonferroni P value
		Mean (95% CI)	n	Mean (95% CI)	n	Public sector vs. private sector
Job Demands (measurement scale)						
Quantitative Demands (1-5)	Physicians	3.25(3.21-3.29)	2124	3.15(3.06-3.25)	363	.059
	Registered Nurses	2.83(2.79-2.86)	2400	2.80(2.70-2.89)	307	.545
	Assistant Nurses	2.63(2.59-2.67)	1756	2.83(2.69-2.97)	172	.009
Emotional Demands (1-5)	Physicians	3.29(3.24-3.34)	2123	3.47(3.35-3.59)	367	.006
	Registered Nurses	3.38(3.33-3.42)	2407	3.42(3.29-3.55)	309	.541
	Assistant Nurses	3.16(3.11-3.22)	1764	3.25(3.07-3.44)	171	.371
Effort Reward Imbalance (1-4)	Physicians	1.25(1.23-1.27)	2073	1.24(1.19-1.29)	355	.842
	Registered Nurses	1.38(1.36-1.41)	2359	1.24(1.18-1.30)	300	.001
	Assistant Nurses	1.44(1.42-1.47)	1695	1.56(1.45-1.67)	157	.045
Illegitimate Tasks - Unnecessary (1-5)	Physicians	3.21(3.18-3.24)	2115	3.17(3.09-3.25)	365	.365
	Registered Nurses	2.98(2.95-3.02)	2385	2.81(2.72-2.90)	305	.001
	Assistant Nurses	2.94(2.9-2.98)	1740	3.10(2.97-3.24)	167	.030
Illegitimate Tasks - Unreasonable (1-5)	Physicians	3.05(3.01-3.08)	2122	3.02(2.94-3.10)	368	.565
	Registered Nurses	2.93(2.89-2.96)	2397	2.72(2.63-2.81)	307	.001
	Assistant Nurses	2.92(2.88-2.96)	1757	3.10(2.96-3.25)	171	.023
Work Life Interference (1-5)	Physicians	3.18(3.14-3.23)	2115	3.25(3.15-3.36)	367	.258
	Registered Nurses	3.06(3.02-3.10)	2394	2.88(2.76-2.99)	309	.004
	Assistant Nurses	3.10(3.05-3.15)	1747	3.15(2.97-3.33)	167	.606

Job Resources (measurement scale)						
Work Content Control (1-5)	Physicians	2.33(2.28-2.37)	1765	2.22(2.11-2.33)	340	.098
	Registered Nurses	2.93(2.87-2.99)	1513	3.02(2.87-3.17)	256	.244
	Assistant Nurses	2.27(2.20-2.35)	779	2.43(2.18-2.67)	81	.249
Work Time Control (1-5)	Physicians	2.40(2.35-2.45)	1988	2.38(2.26-2.51)	341	.770
	Registered Nurses	2.29(2.24-2.34)	2142	2.56(2.41-2.71)	280	.001
	Assistant Nurses	2.05(1.99-2.11)	1369	1.93(1.71-2.15)	131	.330
Influence (1-5)	Physicians	3.60(3.57-3.63)	2025	3.61(3.54-3.69)	364	.724
	Registered Nurses	3.51(3.48-3.54)	2297	3.70(3.61-3.79)	299	.001
	Assistant Nurses	3.02(2.98-3.06)	1506	3.01(2.85-3.17)	141	.895
Social Support - Managers (1-5)	Physicians	3.64(3.59-3.69)	2040	3.66(3.54-3.79)	354	.705
	Registered Nurses	3.53(3.48-3.57)	2331	3.83(3.70-3.97)	298	.001
	Assistant Nurses	3.54(3.48-3.60)	1712	3.31(3.10-3.51)	172	.031
Social Support - Colleagues (1-5)	Physicians	4.33(4.30-4.37)	2123	4.22(4.14-4.31)	362	.020
	Registered Nurses	4.43(4.40-4.46)	2397	4.54(4.46-4.62)	305	.012
	Assistant Nurses	4.28(4.24-4.32)	1764	4.26(4.12-4.39)	174	.765
<i>Text in italics indicates Bonferroni p value <.05</i>						
† Confounders include sex, birth country, working hours, working experience, place of work and county of work						

Supplementary Files

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

- [Appendix.docx](#)
- [Tables23.docx](#)