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# Public health care staff during the COVID-19 pandemic: a comparison of job demands and work functioning between temporary and permanent staff

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## Abstract

**Background** The COVID-19 pandemic posed an enormous challenge on the public health workforce, leading to the hiring of much temporary staff. Temporary staff may experience poorer working conditions compared to permanent staff. From a public health perspective, we need to know how working conditions are experienced when there is an acute pressure on recruiting sufficient public health care staff. This study aimed to investigate differences in job demands and work functioning between temporary and permanent public health care staff, during the fourth wave of the COVID-19 pandemic in the Netherlands and compare it with available pre-pandemic data from the general working population.

**Methods** This cross-sectional study included temporary ( $n = 193$ ) and permanent ( $n = 98$ ) public health care staff from a municipal health care service in the north of the Netherlands. The participants completed a questionnaire with items about quantitative, cognitive, emotional demands (Copenhagen PsychoSOcial Questionnaire, COPSQQ, range 1-100) and work functioning (Work Role Functioning Questionnaire, WRFAQ, range 1-100). The participants' scores were compared to the general working population and differences between temporary and permanent staff were investigated using linear regression analysis. In addition, explorative analyses were conducted with temporary staff stratified by task and permanent staff by department.

**Results** Permanent staff had relatively high scores on job demands compared to the general working population, whereas temporary staff had relatively low scores. On work functioning, permanent staff had similar scores as the general working population and temporary staff had better scores. Compared to permanent staff, temporary staff had lower, i.e. better, scores on quantitative (regression coefficient (B) = -26.7; 95% Confidence Interval (CI) -30.8 to -22.5), cognitive (B = -24.4; 95% CI -29.0 to -19.9), and emotional demands (B = -11.8; 95% CI -16.0 to -7.7), and better scores on work functioning (B = 7.8; 95% CI 4.5 to 11.3).

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**Conclusions** Temporary staff experienced lower job demands and reported better work functioning than permanent staff. The acute expansion of the public health workforce did not seem to negatively impact the job demands and work functioning of temporary public health care staff.

**Keywords** COVID-19 pandemic, Public health workforce, Work force capacity

## Background

The Coronavirus Disease 2019 (COVID-19) pandemic posed an enormous challenge on the public health workforce to implement testing, contact tracing and vaccination [1]. There was a sudden need for a substantial number of temporary staff to perform these tasks [2]. Solutions to expand the public health workforce included the integration of medical students, retired medical staff, volunteers, or staff recruited by outsourcing services [3–6]. Globally, much attention has been given to the impact of the COVID-19 pandemic on frontline, patient-facing health care staff [7, 8]. However, little is known about the impact of the COVID-19 pandemic on public health care staff. In the limited literature available, an increased workload, restrictions on personal life, job related threats, and difficulties to quickly adapt to changed policies and processes are reported by public health care staff during COVID-19 [9–13]. Even fewer studies investigated temporary public health care staff during the COVID-19 pandemic. These studies, focusing on temporary contact tracers, reported both motivators (opportunity to work from home, gain experience, and to help during the pandemic) and challenges (confusion about roles, need for training, poor communication, and long working hours) of temporary work [14, 15].

Public health services in the Netherlands are organized at three levels: central, regional and local. At the central (government) level, health care legislation, regulations and policies are developed. The Ministry of Health, Welfare and Sport provides the financial resources for health care facilities and establishes the contents and size of the statutory health insurance package, available for all residents in the Netherlands. The National Healthcare Authority ensures that health care is delivered in accordance with rules and regulations, and the Dutch Health Care Inspectorate oversees and enforces the quality and safety of health care. At the regional level, authorities are responsible for supervising the availability, distribution and planning of medical facilities (hospitals and municipal health services). Furthermore, regional authorities are responsible for environmental health, development of public health care plans, implementation of public health education, and for licensing ambulance services. At the local level, municipal health services provide health care education, infection prevention and treatment for sexually transmitted infections, youth support and vaccination, services for the elderly and chronically ill, and travelers advice and vaccination. There are 25 municipal

health services in the Netherlands, organized in an overarching umbrella organisation (GGD-GHOR) financed by the Ministry of Health, Welfare and Sport.

Since the first outbreak of COVID-19 in the Netherlands, municipal health services needed temporary staff for testing and contact-tracing. Supervised by the GGD-GHOR, municipal health services recruited temporary staff from employment agencies. The capacity of municipal health services tripled to 670 full time equivalent (FTE) [16, 17]. When vaccinations started in January 2021, an extra 12,500 FTE was needed, which amounted to about 30,000 additional part time jobs. Temporary staff was involved in COVID-19 testing, contact-tracing and (if medically educated) vaccination. [17]. During the COVID-19 pandemic, urgent actions and policies were needed, which may well have increased job demands and impacted the work functioning of permanent municipal health services staff as well as temporary staff from employment agencies. Given that staff in unfavorable working conditions are more likely to experience substantial mental health impacts during the COVID-19 pandemic [18], it is important to measure job demands and work functioning that may underlie these mental health effects.

Storrie et al. (2015) and Hünefeld et al. (2020) showed that temporary agency staff generally experience poorer working conditions than permanent staff [19, 20], but evidence lacks on whether this also holds for the pandemic. Storrie (2015) reported that a frequent change of workplace and working for two employers (the employment agency and labor hirer) may raise health and safety issues among temporary agency staff [19]. In a systematic review, temporary staff were found to receive fewer benefits, less training, hold lower professional ranks, have less access to health promotion measures and work under more stressful and hazardous conditions than permanent staff [20]. While the general perception is that temporary agency staff have poorer working conditions, positive consequences such as opportunities to acquire a broad range of experiences and networks or better working-time flexibility are also reported [19].

In sum, information on the working conditions of public health care staff during the COVID-19 pandemic is scarce, in particular regarding the comparison between temporary and permanent staff. The aim of the current study is to investigate differences in job demands and work functioning between temporary and permanent public health care staff during the COVID-19 pandemic

and compare it with available pre-pandemic data from the general working population. Insights in the experienced job demands and work functioning of public health care staff can support policy makers to prepare adequate work solutions for possible upcoming pandemics and other public health care emergencies.

## Methods

### Design and procedures

In this cross-sectional study, data were collected from July 12, 2021 to August 11, 2021, which is during the fourth wave of COVID-19 infections in the Netherlands [21]. Three municipal health services in the Northern part of the Netherlands were asked in June 2021 to participate in the current study. One municipal health service agreed to do so, the other two services were interested, but could not participate because of reorganization or involvement in other research activities. In the present study, permanent staff held an employment at the municipal health service. Temporary staff had fixed-term or on-call contracts at employment agencies and were paid in line with the amount of hours worked per day or week. Hence, temporary workers were uncertain about work times, places and conditions.

### Data collection

Data were collected through an online questionnaire built in Redcap. The link to the questionnaire was sent to the human resource managers of the municipal health care service (for permanent staff) and to employment agencies (for temporary staff). The human resource managers distributed the questionnaire to their organizations' staff. Questionnaire responses were sent directly to the researchers. The employers (i.e., municipal health care service and employment agencies) were not informed about who participated in the study nor about the answers of those participating.

The Medical Ethical Review Board of the University Medical Centre Groningen approved of the study (number METc 2021/371). Informed consent was given by the participants in Redcap by clicking on the consent button. If no consent was given, the questionnaire could not be filled in.

### Outcome variables

Job demands and work functioning were the study's outcomes. Job demands were measured using the short version of the Copenhagen Psychosocial Questionnaire (COPSOQ) [22]. Three COPSOQ scales were used: quantitative demands (four items, Cronbach's  $\alpha=0.82$ ), cognitive demands (four items, Cronbach's  $\alpha=0.83$ ) and emotional demands (three items, Cronbach's  $\alpha=0.66$ ). All items were answered on a five-point scale "always" (=0), "often" (=1), "sometimes" (=2), "seldom" (=3) and "never"

(=4). In line with the COPSOQ guideline [22], scale scores were divided by the number of items and multiplied by 25 so that scores ranged from 0 to 100, whereby higher scores express higher levels of the job demands. Scores of the general working population [22] were used for comparison with the study's outcomes.

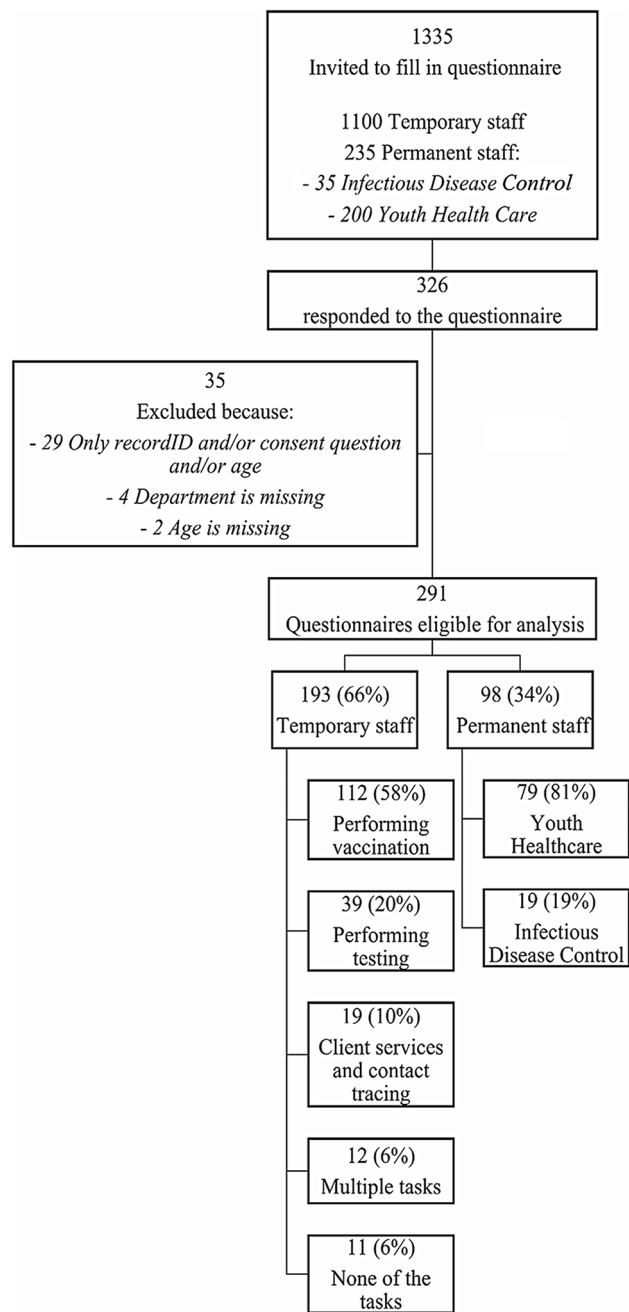
Work functioning was measured using the 10 item Work Role Functioning Questionnaire [23]. The WRFQ asks respondents to what extent health complaints hindered them in work scheduling, mental demands, physical demands and flexibility demands. All items were answered on a four-point scale (0=difficult all the time/most of the time to 3=difficult none of the time). The answers were converted to a score of 0-100, whereby higher scores indicate better work functioning. Scores of the general working population [23] were used to interpret the outcomes.

### Independent and other variables

Permanent and temporary staff were compared in this study. Participants working at the municipal health care service at the department of infection prevention or youth health care were regarded as permanent staff, whereas participants working at the employment agency were regarded as temporary staff. Furthermore, temporary staff were categorized based on the COVID-19 related tasks they performed: (1) vaccination, (2) testing, (3) client services and contact-tracing via telephone or (4) multiple tasks.

### Data analysis

For all analyses the Statistical Package for the Social Sciences (SPSS version, v 26.0, IBM, Armonk, NY, USA) was used. To describe the study population, frequencies were used for categorical variables and means with standard deviations (SD) or medians with interquartile ranges (IQR) for continuous variables. Differences in job demands and work functioning between permanent and temporary staff were analyzed with linear regression analyses adjusted for age and gender as reported by the participants. When dependent variables were not normally distributed, bootstrapping was performed with a minimum of 8,000 bootstraps per estimate. We used bootstrapping to provide more accurate confidence intervals, CIs (Bias corrected and accelerated (Bca) intervals). Exploratory descriptive analyses were performed using boxplots to investigate differences between groups performing different tasks within the group of temporary staff and between different departments within the group of permanent staff.



**Fig. 1** Flowchart of study participants

**Table 1** Descriptive characteristics of the participants (n = 291)

Variables	All (n=291)	Permanent staff (n=98)	Temporary staff (n=193)
Age, mean (SD, range)	45.7 (15.9, 19–73)	47.08 (12.8, 24–68)	45.0 (17.2, 19–73)
Gender, n (%)			
Men	54 (18.6)	6 (6.1)	48 (24.9)
Women	237 (81.4)	92 (93.9)	145 (75.1)

**Table 2** Descriptives of outcome variables

Variables	Total study population (n=291)	Perma- nent staff (n=98)	Tempo- rary staff (n=193)	General working population <sup>a, b</sup>
Quantitative demands, mean (SD, range)	36.6 (20.1, 0–100) <sup>1</sup>	53.2 (17.8, 12.5–100)	27.9 (15.1, 0–100)	46.8 (18.6, 0–100) <sup>a</sup>
Cognitive demands, mean (SD, range)	47.7 (21.0, 0–100) <sup>2</sup>	63.5 (14.3, 25–100)	39.5 (19.1, 0–93.8)	62.9 (21.5, 0–100) <sup>a</sup>
Emotional demands, mean (SD, range)	44.5 (16.9, 0–91.7) <sup>3</sup>	51.8 (15.1, 8.3–91.7)	40.8 (16.6, 0–91.7)	37.8 (25.5, 0–100) <sup>a</sup>
Work functioning, median (interquartile range, range)	90.0 (15.0, 25–100) <sup>4</sup>	85.0 (19.7, 25–100)	92.5 (15.0, 35–100)	84.2 (15.8, 5.8–100) <sup>b</sup>

Note: Higher scores implicate lower job demands and better work functioning  
Missing (n, %): <sup>1</sup>(14, 4.8), <sup>2</sup>(14, 4.8), <sup>3</sup>(14, 4.8), <sup>4</sup>(46, 15.8)

<sup>a</sup>Kristensen et al. 2005 [22]. Validity and reliability study among an age-stratified representative sample of Danish employees. N=1603–1850, <sup>b</sup>Abma et al. 2013 [23]. Validity and reliability study among a sample of Dutch employees in diverse work settings. N=535

**Results**

The questionnaire was filled in by 326 employees. A total of 35 participants were excluded from the analysis because information regarding age and department was missing (Fig. 1). Consequently, the data of 291 questionnaires (temporary staff, n=193; permanent staff, n=98) were eligible for analysis (Table 1). The response rates were 41.7% and 17.6% for permanent and temporary staff respectively. The temporary staff group was slightly younger (M=45.0, SD=17.21) than the permanent staff group (M=47.1, SD=12.8) and included relatively more men (24.9% and 6.1% respectively) (Table 1).

Permanent staff had higher scores on quantitative and emotional demands (Table 2) and a similar score on cognitive demands, compared to the general working population [22]. Temporary staff had relatively low scores on both quantitative and cognitive demands and a similar score on emotional demands. On work functioning (Table 2), permanent staff reported similar and temporary staff better work functioning compared to the general working population [23].

Compared to permanent staff (Table 3), temporary staff had lower scores on quantitative (Regression coefficient (B)=-26.66; 95% CI -30.77 to 22.54), cognitive (B=-24.42; 95% CI -28.97 to -19.87), emotional demands (B=-11.82; 95% CI -15.97 to -7.68) and higher scores on work functioning (B=7.83; 95% CI 4.48 to 11.33).

**Differences within temporary and permanent staff**

Different task groups within temporary staff (performing vaccination, testing, client services and contact-tracing) showed similar scores on all outcomes (quantitative, emotional, cognitive demands and work

**Table 3** Results from regression analysis comparing permanent with temporary staff, with permanent staff as reference category

	Crude model			Adjusted model <sup>1</sup>			
	B	p	95% CI	B	p	95% CI	
Quantitative demands	-25.34	<0.001	-29.35 -21.33	-26.66	<0.001	-30.77 -22.54	
Cognitive demands	-23.96	<0.001	-28.35 -19.57	-24.42	<0.001	-28.97 -19.87	
Emotional demands	-11.00	<0.001	-15.02 -6.99	-11.82	<0.001	-15.97 -7.68	
Work functioning	7.65	<0.001	4.33 <sup>2</sup> 11.10 <sup>2</sup>	7.83	<0.001	4.48 <sup>2</sup> 11.33 <sup>2</sup>	

<sup>1</sup>Adjusted for age and gender

<sup>2</sup>Bias Corrected accelerated interval. Bootstrap results are based on 8,000 wild bootstrap samples

B=regression coefficients; CI=95% confidence interval

functioning) (Supplementary Fig. 1). Within the permanent staff group, the department of Infectious Disease Control had better scores on quantitative, emotional demands and work functioning and a worse score on cognitive demands compared to the department of Youth Healthcare (Supplementary Fig. 2).

## Discussion

This study aimed to investigate differences between permanent and temporary public health care staff in job demands and work functioning during the COVID-19 pandemic. We found that temporary staff experienced lower job demands, particularly lower quantitative demands (i.e., workload) and reported better work functioning than permanent staff. Task groups within temporary staff performing vaccination, testing, client services and contact-tracing did not differ in job demands and working functioning. Among permanent staff, those working in Infectious Disease Control had better scores on quantitative demands, emotional demands and work functioning than Youth Healthcare staff.

The favorable outcomes for temporary staff contrast the findings in previous studies [19, 20]. Temporary staff are precarious workers, in the sense that they are insecure of work and income. In a recent systematic review, precarious employment was found to be associated with poorer workplace wellbeing, general health, mental health and emotional wellbeing [24]. Possibly temporary staff felt a responsibility towards society rather than a necessity to work, which may explain why they reported lower job demands and better work functioning. Some respondents (e.g., medical and nursing students) might have found the temporary work attractive, because it enabled them to acquire skills and useful experiences for their career [19, 25]. Furthermore, temporary staff could decide themselves whether or not to sign up for the COVID-19-related roles, whereas for permanent staff the COVID-19 related tasks were added to their usual work.

Compared to the general working population permanent staff reported higher quantitative and emotional demands. The higher quantitative demands of permanent staff might be related to extra infection preventive tasks such as contact-tracing. Particularly Youth Healthcare

staff is not used to such infection prevention tasks and it may have been difficult to juggle their usual tasks with additional COVID-19 related tasks [11, 24]. This may have caused higher quantitative demands as compared to Infectious Disease Control staff. Youth Healthcare staff may potentially have been confronted with harrowing situations and a feeling of neglecting their societal tasks regarding children [25], which might also explain why they reported higher emotional demands than Infectious Disease Control staff.

We did not find pre-pandemic data on job demands and work functioning of public health care staff. Therefore, we could not ascertain whether the job demands increased and work functioning worsened among permanent staff during the COVID-19 pandemic. The workload of permanent public health care staff may already have been high before the COVID-19 pandemic due to pre-existing staffing shortages [26]. However, the high workload and changes in tasks imply that public health care organizations should monitor experienced work demands and mental health of permanent public health staff, foster resilience and involve healthcare staff in designing psychosocial support [27–30]. To support permanent staff in this matter, the COVID-19 preparedness of public health care organizations can be improved by for example emergency training [31]. Additionally, a healthy worker effect [32] may have influenced the recruitment of temporary staff, when the healthiest individuals within the labor market were selected for these jobs. Furthermore, the temporary status of employment, along with potentially less organizational commitment could contribute to reduced concern of temporary staff regarding working conditions.

## Strengths and limitations of the study

To our knowledge this is the first study comparing temporary and permanent public health care staff in times of the COVID-19 pandemic, when there was an acute pressure on recruiting sufficient public health care staff. Although we did not have pre-pandemic data of our sample, the use of validated instruments to measure job demands and work functioning enabled us to make comparisons with outcomes of other populations. A

limitation of our study is first its relatively small sample, which limited its power to detect differences between subgroups. A second limitation is the relatively low response rate, particularly among temporary staff, which may have led to selection bias. Possibly, their response rate was lower because they did not work on the premises of the employer who distributed the link to the Redcap survey. Another explanation might be that temporary workers are less committed to work because they don't have a fixed employer. We have sent all approximately 1100 temporary staff an e-mail invitation on their work e-mail address, but that didn't substantially increase the response rate. In the permanent staff group, we reached about half of the staff. Furthermore, the comparisons of our work functioning scores with those of the general working population must be interpreted with caution, because we used four answer options instead of five, merging "often" and "always" together. Respondents were employed all over the Netherlands, but the sample sizes at regional level were too small to investigate if the results were affected by where respondents worked. Another limitation is that there were many unmeasured factors that could potentially confound the results, for example education, income, other jobs, socioeconomic status and subjective health status, though work functioning reflects one's health status in the sense that respondents with many and/or severe health complaints will be hindered in their work to a higher extent, resulting in lower WRFQ scores as compared to those without health complaints.

Our finding of relatively favorable outcomes for temporary staff during the COVID pandemic invites for further research on different types of temporary work. The finding with regard to temporary public health care staff experiencing relatively low job demands and good work functioning while performing COVID-19 related tasks, is relevant to consider when the public health care workforce needs to expand rapidly.

## Conclusions

Temporary staff experienced lower job demands and reported better work functioning than permanent staff during the COVID-19 pandemic. The acute expansion of the public health workforce did not seem to negatively impact on the job demands and work functioning of temporary public health care staff. Further studies are needed to investigate long-term health effects of permanent public health care staff.

## Abbreviations

COVID	19-Coronavirus Disease 2019
fte	Full time equivalent
COPSOQ	Copenhagen Psychosocial Questionnaire
WRFQ	Work Role Functioning Questionnaire
SD	Standard deviation
IQR	Interquartile range
M	Mean

N	Number
B	Regression coefficient
CI	Confidence interval
Bca	Bias corrected accelerated

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12913-024-11429-7>.

Supplementary Material 1

## Acknowledgements

The authors would like to thank all public health care staff and temporary agency staff who took part in the study.

## Author contributions

YvD, SJ, SZ, SAR and CR conceptualized the study. YvD and MdB set up the data analysis and analyzed the data. YvD wrote the original draft supervised by SJ and CR. All authors, including YvD, SJ, MdB, SZ, SAR and CR contributed to proofreading and critical revision of the manuscript. All authors have read and agreed to the published version of the manuscript.

## Funding

Partly external funding by the Dutch Ministry of Health Welfare and Sport (grant number 330562) and partly internal UMCG funding.

## Data availability

The dataset supporting the conclusions of this article is available upon reasonable request.

## Declarations

### Ethics approval and consent to participate

The Medical Ethical Review Board of the University Medical Center Groningen approved of the study. Informed consent was given by the participants in the online questionnaire.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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Received: 17 January 2024 / Accepted: 12 August 2024

Published online: 04 September 2024

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