Work-Related Well-Being Among Dutch Cardiologists – A National Survey

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Abstract: This is the first study to provide a holistic examination of cardiologists' well-being, investigating positive and negative dimensions, and its determinants. We conducted a national, multicenter, self-administered web-based questionnaire. We used frequencies to depict scores on three well-being indicators (professional fulfillment, work exhaustion and interpersonal disengagement) and performed three multiple regression analyses to elucidate their determinants. Cardiologists' mean scores (scale 1 to 5) were 3.85 (SD = 0.62) for professional fulfillment, 2.25 (SD = 0.97) for work exhaustion and 2.04 (SD = 0.80)

Conflicts of interest: Dr. Keuken has a supporting/facilitating role at the Netherlands Society of Cardiology. Dr. Hassink was chair of the Quality Committee of the Netherlands Society of Cardiology during the period of data-collection. Dr. Henriques is board member at the Netherlands Society of Cardiology.

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for interpersonal disengagement. Workload, work-home interference and team atmosphere predicted the negative dimensions of well-being. Autonomy predicted cardiologists' professional fulfillment. Physician-patient interactions, person-job fit and individual resilience affected both dimensions. Dutch cardiologists score relatively high on professional fulfillment and average on work exhaustion and interpersonal disengagement. In order to foster cardiologists' well-being it is critical to increase energy providing work- and individual aspects. (Curr Probl Cardiol 2023;48:101538.)

Introduction

Physician well-being is critical for physicians, healthcare systems and patients. High levels of well-being are found to increase job satisfaction and workplace productivity, and also improve the quality and safety of patient care.[1-7] Unfortunately, the medical profession is facing an actual well-being crisis. Alarming percentages of burnout, mental ill-health and even suicides are being reported across specialties worldwide.[2] Cardiology is no exception; as a leading area of medicine, working in the field of cardiology can be extremely rewarding and at the same time very demanding and strenuous – potentially having detrimental consequences for mental health, resulting in cardiologists withdrawing from the profession, workforce shortages and further rising healthcare costs.[8-11]

Only a handful of studies investigated the well-being of cardiologists specifically.[9-11] These studies primarily focused solely on the negative dimension of work-related well-being: burnout. Results show that the burnout rates amongst cardiologists are significant and have been reported up to 50% of the US cardiologists in 2017.[9,11-14] Potential causes are, amongst others, excessive workloads, loss of autonomy, loss of connectedness with patients, and compensation models linked to volume load rather than to quality of care.[9] In addition, cardiologists are reported to experience difficulties in managing work-home balance, especially in the light of their generally perfectionistic attitudes.[9,11] Although these studies are informative, physician well-being encompasses more than just "not being burned out". As a matter of fact, a more comprehensive understanding should also include positive aspects of being well personally and professionally.[2,15]

Professional fulfillment can be seen as a positive dimension of work-related well-being.[15] It includes a larger palette of intrinsic rewards that cardiologists might experience from doing their job, such as work engagement, self-worth, self-efficacy, and happiness.[15] Through experiencing these and other intrinsic rewards, professionally fulfilled cardiologists work with joy and meaningfulness, are less likely to leave the profession, and indeed deliver better measurable patient care.[16-18] Thus, it is critical to hold on to a holistic perspective on physician well-being and look beyond merely the absence of distress.

In order to study the current status quo of well-being of its members, the Netherlands Society of Cardiology ordered a national survey into cardiologists' well-being and its determinants. The specific aims of this study were to investigate (1) Dutch cardiologists experienced positive and negative work-related well-being and (2) What specific work- and individual aspects determine their work-related well-being.

Methods

Study Design and Population

This study into the occupational well-being of Dutch cardiologists was commissioned by the Netherlands Society of Cardiology (NVVC). In 2020, the Professional Performance & Compassionate Care research group conducted a cross-sectional survey study amongst all cardiologists who were registered as NVVC members. Cardiologists in the Netherlands provide their services in general hospitals (hospitals that provide all basic patient care), top clinical teaching hospitals (highly specialized referral centers that provide top clinical care), academic hospitals and independent outpatient care facilities (single-specialty stand-alone centers for specialist care). Based on internal documents of the NVVC, they are either self-employed (approx. 48%) or employed by hospitals (approx. 52%). In 2021, approximately 72% of all cardiologists in the Netherlands were male and their average age was 48 years.

Ethical Approval

The institutional ethical review board of the Amsterdam UMC of the University of Amsterdam provided a waiver declaring the Medical Research Involving Human Subjects Act (WMO) did not apply to the current study (reference number W20_324 # 20.323).

Questionnaire Development

In designing the questionnaire, we built on 2 models: the Stanford Model of Professional Fulfillment and the Job-Demands and Resources (JD-R) model[20] (Fig 1). The latter identifies job resources of energy (JR) and energy-consuming determinants (JD) that affect work-related well-being, and the Stanford model suggests to categorize these work-related aspects as related to (1) work structure and efficiency of practice, (2) the organizational culture and the work environment, and (3) personal skills, behaviors and attitudes that promote individual resilience. It is theorized that aspects in all three domains may affect physician well-being.[19]

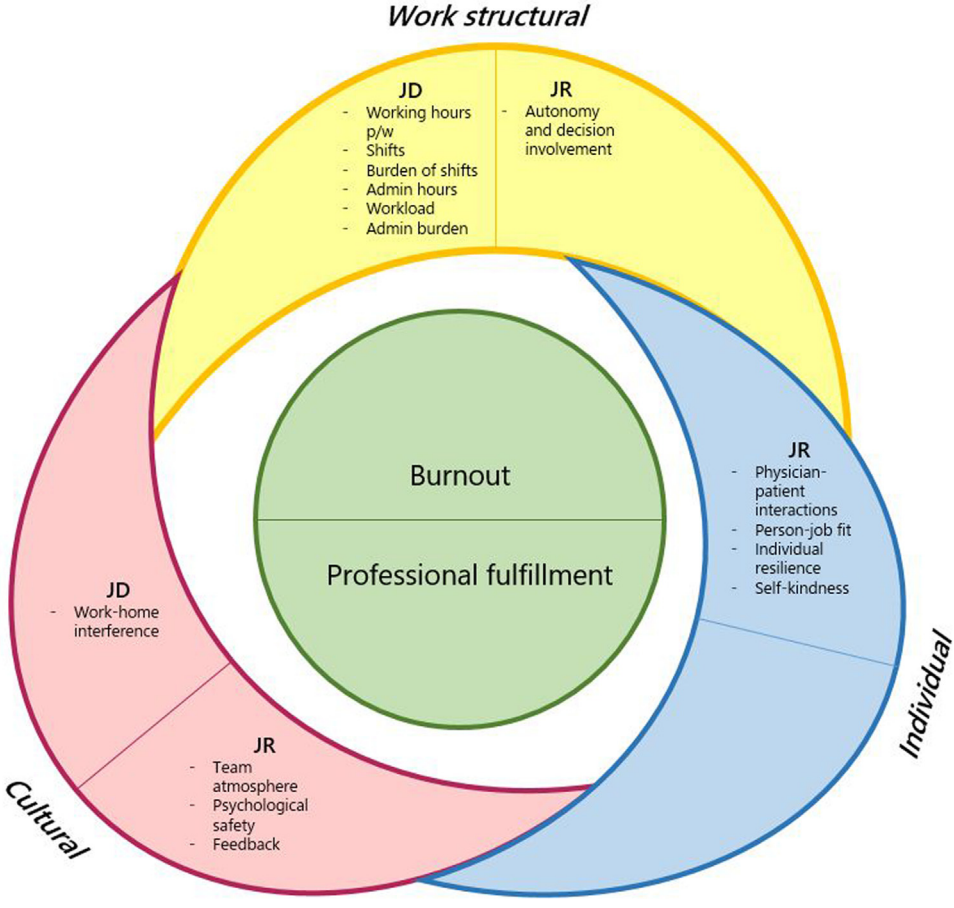

FIG 1. Conceptual model of cardiologists' work-related well-being and the possible modifying energy consuming job demands, JD and energy providing resources, JR, divided over the work structural, cultural and individual domain. Not depicted but included in the model are the covarying factors sex, years of experience as a cardiologist and type of institution.

Figure 1 depicts per domain all the potential determinants included in the current study. Most included were considered theoretically relevant (ie psychological safety, individual resilience); after discussion with the Quality Committee of the NVVC a few items (ie working hours per week, burden of shifts) were constructed by the authors because they were relevant for the Dutch context specifically. As control variables, the authors included sex, first registration year and type of hospital (academic/ nonacademic) in the questionnaire. Lastly, since this this study was conducted in September 2020, 10 questions were included to inquire whether, and if yes how, the COVID-19 pandemic had impacted different aspects of the work and work experience.

Measures

We measured cardiologists work-related well-being using the Professional Fulfillment Index (PFI).[15] The previously validated PFI consists of 16 items categorized in 3 domains, professional fulfillment (6 items), work-exhaustion (4 items) and interpersonal disengagement (6 items). The first is the positive well-being indicator, the latter 2 domains are the negative wellbeing domains, also considered burnout symptoms. All items are measured on a 5-point Likert scale.

We measured determinants of well-being in three domains. The *work structure domain* consisted of the following sub-constructs: acutal working hours per week (1 item), weekend-, evening- and night shifts per month in total (2 items), hours spent on administrative tasks per week (1 item), experienced burden of shifts (1 item), experienced workload (1 item), experienced administrative burden (1 item), autonomy and decision involvement (5 items). The first 3 scales were answered with an open box and the other 4 were scored on a 5 point-Likert scale.

The *cultural domain* included 4 sub-constructs: work-home interference (9 items), experienced team atmosphere (5 items), experienced psychological safety (7 items) and feedback (4 items). All items were scored on a 5-point Likert scale, except for those assessing work-home interference which were measured on a 4-point Likert scale.

The *individual domain* consisted of: physician-patient interactions (4 items), person-job fit (4 items), individual resilience (6 items) and self-kindness (5 items). All items were scored on a 5-point Likert scale.

Table 1 summarizes all the measures (subconstructs) used, the number of items per subconstruct, the answer scales, their place of origin (reference) and the calculated reliability score (Cronbach's alpha). A

TABLE 1. Details of measures used in the questionnaire

Domain	Sub-construct	No. of items	Example item	Answer option(s)	Reference†	Crohnbach's alpha
Occupational well-being	Professional fulfillment	6	*"My work is meaningful to me."*	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Trockel et al. (2018)*[15]	0.88
	Work exhaustion	3 (originally 4)	*"During* the past two wks I have felt emotionally exhausted at work." *The authors left out the item: "During the past two wk I have felt physically exhausted at work."**	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Trockel et al. (2018)*[15]	0.87
	Interpersonal disengagement	6	*"During the past two wk my work has contributed to me feeling less empathetic with my patients."*	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Trockel et al. (2018)*[15]	0.92
Work structure	(Actual) working h per wk	1	*"On average, how many h do you actually work per wk?"*	Open box	N/A	N/A
	Weekend-, evening- and night-shifts per mo	2	*"On average, how many weekend-shifts do you work per mo?"*	Open box	N/A	N/A
	H spent on administrative tasks p/w	1	*"How many h per wk do you spend on administrative tasks?"*	Open box	N/A	N/A
	Experienced burden of shifts	1	*"In general, how do you experience the burden of shifts at work?"*	5-point Likert scale (1 = Not at all heavy, 5 = Very heavy)	N/A	N/A
	Experienced workload	1	*"My workload is too high."*	5-point Likert scale (1 = Never, 5 = Always)	N/A	N/A
	Experienced administrative burden	1	*"My administrative burden is too high."*	5-point Likert scale (1 = Never, 5 = Always)	N/A	N/A
	Autonomy and decision involvement	5	*"I am allowed to decide myself how to perform my work."*	5-point Likert scale (1 = Never, 5 = Always)	*Schaufeli (2017).*[49,57]	0.82
Cultural	Work-home interference	9	*"How often does it happen that you are irritable at home because your work is demanding?"*	4-point Likert scale (1 = Never, 4 = Always)	*Marais et al. (2009)*[50]	0.87
	Experienced team atmosphere	5 (originally 4)	*"People support one another in this unit."* *"The atmosphere in my unit is good."* *(Item added by authors)**	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Smits et al. (2008)*[51]	0.89

(*continued on next page*)

TABLE 1. (*continued*)

Domain	Sub-construct	No. of items	Example item	Answer option(s)	Reference†	Crohnbach's alpha
	Experienced psychological safety	7	*"Members of this team are able to bring up problems and tough issues."*	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Edmondson (1999)*[52]	0.79
	Feedback	4	*"I often receive positive feedback from my fellow cardiologists". (Items were adjusted for our study population)**	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Lombarts et al. (2010)*[53]	0.73
Individual	Physician-patient interactions	4	*"The gratitude displayed by my patients keeps me going."*	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Williams et al. (1999)*[54]	0.62
	Person-job fit	4 (originally 3)	*"My total compensation package is fair." "My work matches my competencies and what gives me energy." (Item added by authors)**	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Williams et al. (1999)*[54]	0.73
	Individual resilience	6	*"I tend to bounce back quickly after hard times."*	5-point Likert scale (1 = Totally disagree, 5 = Totally agree)	*Smith et al. (2008)*[55]	0.86
	Self-kindness	5	*"I try to be loving towards myself when I am feeling emotional pain."*	5-point Likert scale (1 = Never, 5 = Always)	*Neff (2016)*[56]	0.82
Covariates	Sex	1	*"What is your sex?"*	Male/ female/other	N/A	N/A
	Y of experience as a cardiologist	1	*"In what y were you first registered as a medical specialist?"*	Open box	N/A	N/A
	Type of institution (transformed into dummy academic/ non-academic)	1	*"In what type of institution are you working?"*	General hospital, top clinical hospital, university hospital, independent outpatient care facility	N/A	N/A

*All added/ removed/ adjusted items were the result of thorough discussion between the research team and the NVVC.
†N/A in this column means that the item(s) were created by the authors themselves.

combination of open text boxes, fixed boxes with multiple answer options and Likert-scales was used to measure the various items.

Data Collection

Late September 2020, a little over half a year into the COVID pandemic, in total 1081 NVVC registered cardiologists were individually invited per email by the principal researcher (RB) to participate in a web-based questionnaire, using the Castor EDC program. The NVVC provided the email addresses. Digital informed consent was obtained and participants' anonymity and confidentiality were safeguarded. Data collection lasted till December 2020 and up till 4 reminders were sent during that period. After completion of the data collection, data were extracted from Castor EDC and stored on a secure drive for analysis.

Statistical Analyses

Data from participants with more missing than two thirds of the survey item responses were excluded from further analysis (n=8), leaving 374 cases available for analysis. The data were screened for extreme or unrealistic data using the SPSS functions 'Sort ascending' and 'Sort descending'. No extreme or unrealistic scores were found in the data.

First, we estimated the descriptive statistics (proportions) in order to understand the characteristics of our study sample using frequencies. Second, we calculated the reliability coefficients of all included scales in our survey using Cronbach's alpha. The alpha's were found to be good to high varying between 0.73 and 0.92, with the exception of 4-item subscale 'Physician-patient interactions' which had a Cronbach's alpha of 0.62 (see Table 1). After internal discussion, this variable remained in the sample due to its relevance. For multiple-item variables, scale scores were computed by averaging the individual items.

For the primary research question on the status quo of Dutch cardiologists' perceived positive and negative work-related well-being (defined as professional fulfillment, work exhaustion, interpersonal disengagement), we calculated the mean, minimum and maximum scores on all job-demands and resources and the 3 subscales of the Professional Fulfillment Index (PFI) using descriptive statistics.

Subsequently, we used Pearson's Correlations for calculating the associations among the variables and a Variance Inflation Factor (VIF) to check for multicollinearity. Recommended VIF cut-off scores for problematical levels of multicollinearity may vary, but have been set at 2.5 at

the lowest.[20,21] We used a Variance Inflation Factor (VIF)-cut off score of 2.5 which was not exceeded, with an exception of psychological safety (VIF = 2.536). Psychological safety showed a correlation with team atmosphere of r = 0.731. Since the VIF-cut off score was only just exceeded and both factors were considered relevant for the second research question, the investigators decided to keep both variables for analysis.

Lastly, 3 unadjusted and 3 adjusted multiple regression analyses, using the covariates listed in the questionnaire development section, were performed to answer the second part of our research question: What specific work- and individual aspects determine cardiologists' work-related well-being? The various determinants were included as independent variables and respectively professional fulfillment, work exhaustion and interpersonal disengagement as the dependent variable. Rather than using $\alpha = 0.05$, we interpreted results with a Bonferroni corrected adjustment of $\alpha = 0.017$ to account for performing 3 multiple regression analyses in the same sample. All analyses were performed using the SPSS Statistics (version 26; IBM, Armonk, New York).

Results

In total, 382 (response rate 34.6%, which is in line with response rates found in similar published works on physician well-being, also during COVID)[11,22] cardiologists entered the survey, of which 374 were available for analysis. Most respondents were male ($n = 273$, 73.0%), between 36 and 45 years old ($n = 145$, 38.8%) and worked in a general hospital ($n = 154$, 42.2%). Table 2 reports the demographic characteristics of the respondents in this study – showing that our sample is representative for the population with regards to sex and age.

Table 3 reports the outcomes of the 3 subscales of the Professional Fulfillment Index (PFI) and the work- and individual aspects per domain. The reported PFI scores were 3.85 (SD = 0.62) for professional fulfillment, 2.25 (SD = 0.97) for work exhaustion and 2.04 (SD = 0.80) for interpersonal disengagement, all measured on a 5-point Likert scale. Regarding *work structure* aspects Dutch cardiologists worked on average 50.25 hours per week of which they spent 7.10 hours on administrative tasks. The experienced burden of shifts (M = 3.06 out of 5, SD = 0.89) and the experienced workload (M = 2.75 out of 5, SD = 0.92) were lower than the experienced administrative burden (M = 3.38 out of 5, SD = 1.06). 'Autonomy and decision involvement' was rated with a mean score of 2.80 (SD = 0.75) on a 5-point Likert scale. With regard to *cultural aspects*, the experienced team atmosphere was given the highest

TABLE 2. Demographic characteristics of the participants

Demographic characteristics	N (374)	Frequency (%)
Sex		
Male	273	73.0
Female	101	27.0
Age (y)		
< 36	15	4.0
36-45	145	38.8
46-55	112	29.9
56-65	95	25.4
> 65	7	1.9
First registration (y)		
1981-1990	19	5.1
1991-2000	64	17.1
2001-2010	139	37.2
2011-2021	152	62.8
Type of institute		
General hospital	154	41.2
Top clinical hospital	129	34.5
Academic hospital	62	16.6
Independent outpatient care facility	20	5.5
Missing	9	2.4

score (M = 3.75, SD = 0.72) and feedback the lowest (M = 3.07, SD = 0.59). Work-home interference scored a 2.21 (SD=0.47) on a 4-point Likert scale. For *individual aspects*, the physician-patient interactions rated highest (M = 3.71 out of 5, SD = 0.55) and self-kindness lowest (M = 2.67 out of 4, SD = 0.68).

Table 4 reports the outcomes of the multiple linear regression analyses (both adjusted and unadjusted) of all work and individual aspects with professional fulfillment, work exhaustion and interpersonal disengagement as the dependent variables. We report the coefficients of the adjusted models in text.

Professional Fulfillment

'Autonomy and decision involvement' was the only work structure aspect that showed a significant positive association with professional fulfillment (b = 0.160, 95% CI, 0.083 to 0.238, $P = 0.000$). No cultural aspects were found to significantly predict Dutch cardiologists' professional fulfillment. As for the individual aspects, we found significant positive associations with professional fulfillment for physician-patient interactions (b = -.376, 95% CI, 0.293 to 0.460, $P = 0.000$), person-job fit (b = 0.159, 95% CI, 0.086 to 0.231, $P = 0.000$) and individual resilience (b = 0.125, 95% CI, 0.045 to 0.205, $P < 0.01$).

TABLE 3. Mean scores, standard deviations, minimum and maximum scores for the various job demands and resources and the three subscales of the Professional Fulfillment Index (PFI)

	Mean (SD)	Minimum (Min)	Maximum (Max)
Occupational well-being			
Professional fulfillment (1-5)	3.85 (0.62)	1.33	5.00
Work exhaustion (1-5)	2.25 (0.97)	1.00	5.00
Interpersonal disengagement (1-5)	2.04 (0.80)	1.00	4.83
Work structure aspects			
(Actual) working h (h per wk)	50.25 (10.14)	9.00	90
Weekend-, evening- and night-shifts (shifts per mo)	5.79 (4.51)	0.00	28.00
Experienced burden of shifts (1-5)	3.06 (0.89)	1.00	5.00
H spent on administrative tasks (h per wk)	7.10 (4.77)	0.00	36.00
Experienced workload (1-5)	2.75 (0.92)	1.00	5.00
Experienced administrative burden (1-5)	3.38 (1.06)	1.00	5.00
Autonomy and decision involvement (1-5)	2.80 (0.75)	1.00	5.00
Cultural aspects			
Work-home interference (1-4)	2.21 (0.47)	1.00	4.00*
Experienced team atmosphere (1-5)	3.75 (0.71)	1.20	5.00
Experienced psychological safety (1-5)	3.71 (0.60)	1.29	5.00
Feedback (1-5)	3.07 (0.59)	1.25	5.00
Individual aspects			
Physician-patient interactions (1-5)	3.71 (0.55)	1.75	5.00
Person-job fit (1-5)	3.39 (0.73)	1.00	5.00
Individual resilience (1-5)	3.46 (0.66)	1.33	5.00
Self-kindness (1-5)	2.76 (0.68)	1.20	5.00

*Work-home interference was the only (ordinal) variable measured on a 4-point Likert scale.

Work Exhaustion

For work structure aspects we found a significant positive association between experienced workload and work exhaustion (b = 0.188, 95% CI, 0.077 to 0.299, $P = 0.001$). Within the cultural domain, work-home interference was the only aspect related to work exhaustion (b = 0.470, 95% CI, 0.251 to 0.690, $P = 0.000$). As for the individual aspects, physician-patient interactions (b = -0.309, CI 95% -0.445 to -0.173, $P = 0.000$), person-job fit (b = -0.169, 95% CI -0.286 to -0.051, $P < 0.01$), and individual resilience (b = -0.263, 95% CI, -0.393 to -0.133, $P = 0.000$) were found to predict work exhaustion.

Interpersonal Disengagement

We found no significant associations between work structure aspects and interpersonal disengagement. As for the cultural aspects, we found a significant positive association with interpersonal disengagement for work-home interference (b = 0.520, 95% CI, 0.336 to 0.704, $P = 0.000$)

TABLE 4. Unadjusted and adjusted associations of job demands and resources with professional fulfillment, work exhaustion and interpersonal disengagement

	Unadjusted model for professional fulfillment	Adjusted model for professional fulfillment*	Unadjusted model for work exhaustion	Adjusted model for work exhaustion*	Unadjusted model for interpersonal disengagement	Adjusted model for interpersonal disengagement*
	Unstandardized regression coefficient (95% CI)/ Standardized coefficient Beta	Unstandardized regression coefficient (95% CI)/ Standardized coefficient Beta	Unstandardized regression coefficient B (95% CI)/ Standardized coefficient Beta	Unstandardized regression coefficient (96% CI)/ Standardized coefficient Beta	Unstandardized regression coefficient (95% CI)/ Standardized coefficient Beta	Unstandardized regression coefficient (95% CI)/ Standardized coefficient Beta
Work structure						
(Actual) working h per wk	0.001 (-0.004 - 0.006)/ 0.015	0.000 (-0.005 - 0.005)/ 0.000	-0.010 (-0.018 - -0.002)†/ -0.103	-0.009 (-0.017 - 0.000)/ -0.091	-0.006 (-0.013 - 0.001)/ -0.079	-0.006 (-0.013 - 0.002)/ -0.072
Weekend-, evening- and night-shifts per mo	-0.003 (-0.014 - 0.007)/ -0.025	-0.005 (-0.015 - 0.006)/ -0.035	0.007 (-0.010 - 0.024)/ 0.032	0.008 (-0.010 - 0.026)/ 0.037	0.013 (-0.001 - 0.027)/ 0.074	0.014 (-0.001 - 0.029)/ 0.080
Experienced burden of shifts	0.003 (-0.057 - 0.064)/ 0.005	0.017 (-0.045 - 0.079)/ 0.024	0.111 (0.015 - 0.208)/ 0.101	0.105 (0.004 - 0.206)/ 0.096	0.058 (-0.023 - 0.138)/ 0.064	0.053 (-0.032 - 0.137)/ 0.059
H spent on administrative tasks p/wk	0.003 (-0.007 - 0.013)/ 0.022	0.000 (-0.010 - 0.010)/ 0.000	-0,000 (-0.016 - 0.017)/ -0.000	-0.000 (-0.017 - 0.017)/ -0.000	-0.001 (-0.013 - 0.015)/ 0.005	0.002 (-0.013 - 0.016)/ 0.011
Experienced workload	0.025 (-0.043 - 0.093) / 0.037	0.004 (-0.064 - 0.072)/ 0.006	0.174 (0.066 - 0.282)‡/ 0.165	0,188 (0.077 - 0.299)‡ / 0.178	0.034 (-0.056 - 0.125)/ 0.040	0.054 (-0.039 - 0.147)/ 0.063
Experienced administrative burden	-0.077 (-0.130 - -0.023)‡/ -0.131	-0.062 (-0.116 - -0.009)/ -0.109	- 0.000 (-0.028 - 0.087)/ 0.000	-0.001 (-0.089 - 0.087)/ -0.001	0.003 (-0.068 - 0.074) / 0.004	-0.005 (-0.079 - 0.068)/ -0.007
Autonomy and decision involvement	0.172 (0.096 - 0.249)§/ 0.208	0.160 (0.083 - 0.238)§/ 0.196	-0.013 (-0.135 - 0.109)/ -0.010	0.024 (-0.102 - 0.150)/ 0.018	0.038 (-0.064 - 0.140)/ 0.036	0.051 (-0.055 - 0.157)/ 0.048
Cultural						
Work-home interference	-0.123 (-0.257 - 0.011)/ -0.094	-0.117 (-0.252 - 0.017)/ -0.092	0.485 (0.271- 0.699)§/ 0.236	0.470 (0.251 - 0.690)§/ 0.229	0.526 (0.347 - 0.705)§/ 0.312	0.520 (0.336 - 0.704)§/ 0.310
Experienced team atmosphere	0.124 (0.026 - 0.221)†/ 0.140	0.109 (0.012 -0.207)/ 0.126	-0.194 (-0.349 - -0.039)†/ -0.141	-0.184 (-0.343 - -0.025)/ -0.132	-0.228 (-0.357 - -0.098)§/ -0.202	-0.218 (-0.351 - -0.084)§/ -0.192
Experienced psychological safety	0.147 (0.027 - 0.266)‡/ 0.143	0.145 (0.026 - 0.263)†/ 0.143	-0.085 (-0.276 - 0.106)/ -0.053	-0.081 (-0.274 - 0.112)/ -0.050	-0.060 (-0.220 - 0.099)/ -0.045	-0.062 (-0.224 - 0.100)/ -0.047
Feedback	-0.013 (-0.097 - 0.072)/ -0.012	-0.014 (-0.099 - 0.070)/ -0.014	-0.015 (-0.150 - 0.120)/ -0.009	-0.029 (-0.166 - 0.109)/ -0.018	-0.041 (-0.153 - 0.072)/ -0.030	-0.043 (-0.158 - 0.073)/ -0.032
Individual						

(*continued on next page*)

TABLE 4. (*continued*)

	Unadjusted model for professional fulfillment	Adjusted model for professional fulfillment*	Unadjusted model for work exhaustion	Adjusted model for work exhaustion*	Unadjusted model for interpersonal disengagement	Adjusted model for interpersonal disengagement*
Physician-patient interactions	0.368 (0.283 - 0.452)§/ 0.325	0.376 (0.293 - 0.460)§/ 0.342	-0.304 (-0.439 - -0.169)§/ -0.171	-0.309 (-0.445 - -0.173)§/ -0.176	-0.312 (-0.424 - -0.199)§/ -0.214	-0.317 (-0.431 - -0.203)§/ -0.220
Person-job fit	0.159 (0.086 - 0.231)§/ 0.188	0.159 (0.086 - 0.231)§/ 0.192	-0.170 (-0.285 - -0.055)‡/ -0.129	-0.169 (-0.286 - -0.051)‡ / -0.127	-0.139 (-0.235 - -0.043)†/ -0.128	-0.132 (-0.230 - -0.033)/ -0.121
Individual resilience	0.108 (0.029 - 0.188)‡ / 0.116	0.125 (0.045 - 0.205)†/ 0.136	-0.245 (-0.372 - -0.119)§/ -0.168	-0.263 (-0.393 - -0.133)§/ -0.179	-0.200 (-0.305 - -0.094)§/ -0.167	-0.202 (-0.312 - -0.093)§/ -0.168
Self-kindness	-0.013 (-0.087- 0.061)/ -0.014	-0.021 (-0.095 - 0.052)/ -0.024	-0.155 (-0.273 - -0.038)/ -0.108	-0.158 (-0.277 - -0.039)†/ -0.110	-0.088 (-0.186 - 0.010)/ -0.074	-0.084 (-0.185 - 0.016)/ -0.072

N = 371.

*Adjusted for sex, years registered as a cardiologist and type of hospital (academic vs nonacademic)

†$P \leq 0.05$

‡$P \leq 0.01$

§$P \leq 0.001$

and team atmosphere (b = -0.218, 95% CI, -0.351 to -0.084, $P = 0.001$). Physician-patient interactions (b = -0.317, 95% CI, -0.431 to -0.203, $P = 0.000$) and individual resilience (b = -0.202, 95% CI, -0.312 to -0.093, $P = 0.000$) were the two individual aspects related negatively to interpersonal disengagement. Table 4 also reports which coefficients would have been significant if we had interpreted our results with an alpha of 0.05 instead of with a Bonferroni adjusted alpha of 0.017 (see † $P \leq 0.05$). With respect to our COVID control questions, we assess the findings are at the most slightly impacted by the pandemic (Supplemental File I).

Discussion

Main Findings

This study showed that Dutch cardiologists score 3.85 out of 5 on professional fulfillment, 2.25 out of 5 on work exhaustion and 2.04 out of 5 interpersonal disengagement. Cardiologists with satisfying patient interactions, a good person-job fit and high levels of personal resilience reported higher levels of professional fulfillment and at the same time lower levels of work exhaustion and interpersonal disengagement. Autonomy and involvement in overall managerial decision-making was associated with professional fulfillment. Experienced workload, work-home interference and (negative) team atmosphere were related to burn-out symptoms.

Explanation of Findings

This is 1 of the first studies to examine cardiologists' work-related well-being looking beyond the traditional burnout related dimensions to also include the positive dimension of professional fulfillment. What stands out is the reported relatively high levels of professional fulfillment experienced by Dutch cardiologists, compared to those of physicians in general as presented by Trockel and colleagues.[15] This may point to the highly rewarding and meaningful nature of the specialty, as cardiologists often operate on the verge of life and death, and have an important role in guiding patients who suffer from life threatening illnesses.[9]

Indeed, by far the greatest predictor for cardiologists' professional fulfillment (see Table 4) was their interaction with patients. Although this may not be new,[23] the importance of enabling cardiologists to spend sufficient meaningful time with patients cannot be stressed enough. Satisfying

physician-patient interactions result in feelings of happiness, connectedness and being able to contribute which increases both cardiologists' well-being and, ultimately, results in better clinical outcomes for patients.[17,24,25] For cardiologists and their healthcare institutions, for specialty societies such as the NVVC and ones alike in other European healthcare systems and for regulating bodies, this study provides valuable insight when facing the challenge of designing policies or undertaking actions to boost cardiologists' well-being. Initiatives neglecting professional fulfillment and focusing solely on extrinsic motivational factors, ie financial incentives, may not result in the same high levels of professional fulfillment and thus performance. Research has shown that in the long run extrinsic motivators may undermine professionals' intrinsic drives and so may even be detrimental to professionals and patient care quality.[17]

With regards to the work- and individual aspects affecting cardiologists' professional fulfillment, our findings show that 'autonomy and decision involvement' was the only *work-structure related* factor that affected cardiologists' feelings of fulfillment. We found that the cardiologists that had more opportunities to participate in decision-making processes and could self-determine on how and when to do specific tasks, reported higher levels of professional fulfillment. In contrast to previous research,[26] our study did not find that a diminished sense of autonomy increases the risk of burnout. We have no clear explanation for this unexpected finding, which demands further investigations. We can only speculate that the baseline level of autonomy was sufficient enough to maintain health at work. Not surprising was the found positive relation between autonomy and professional fulfillment, which may be explained by the fact that higher levels of autonomy create the opportunity for physicians to dedicate their time to what they find to be the most meaningful aspects of their job.[18] Being able to partly customize one's job according to individual preferences stimulates intrinsic motivation – an important element of professional fulfillment.[15,27]

For Dutch cardiologists, work-home interference was the most important predictor for experiencing burnout symptoms (see Table 4). In general, physicians are found to struggle with work-home balance and it is often mentioned as a major source of distress and a driver for burnout.[28-30] Dyrbye et al., for example, reported on the general medical U.S. workforce that physicians who had recently experienced a work-home conflict were more likely to suffer from burnout symptoms compared to those who had not (47.1% vs 26.6%).[28] The relation between work-home interference and burnout, however, is complex and may be affected by many other factors such as age, working hours per week, relationship status or

gender.[31] For the latter, the literature reports inconsistent findings.[9,14,30,32,33] A recent study amongst female doctors in Australia and New-Zealand found that women in cardiology were less likely to agree that they led a balanced life compared to other female physicians.[34] In our study, work-home interference affected all cardiologists and put them at greater risk of experiencing burnout symptoms. This finding resonates with many other studies,[30,33,35] all underpinning that being a doctor and 'being on all the time' is experienced by many as burdensome. Finding ways to maintain or restore a proper work-home balance amongst all cardiologists, thus, may be a meaningful inference of our study.

This study suggests that 3 included aspects, amongst them physician-patient interactions and personal resilience, may boost cardiologists' well-being and simultaneously prevent them from suffering from burnout symptoms. This is an interesting finding in itself, as it underpins that professional fulfillment is not the opposite of being burned-out; that is, professional fulfillment and being burnout are not the 2 extremes of 1 construct. Rather, fulfillment adds a dimension to the construct of work-related well-being.[15] In other words, a professionally fulfilled cardiologist may, at the same time, still be suffering from burnout symptoms. These aspects that both stimulate professional fulfillment and protect for burnout thus have a two-way impact on cardiologists' work-related well-being.

In a recent study, Scheepers et al. (2020) found that physicians who regularly experience patients' gratitude and perceive their patient contact as positive were less likely to get exhausted, despite common exposure to excessive bureaucracy.[24] It does make sense that it is less likely for doctors to feel callous towards colleagues or patients and become cynical, when they regularly experience positive patient-interactions, gratefulness and a sense of being able to contribute to a greater cause. Research on compassionate care has reported salutary effects on its practitioners; physicians who consistently practice with compassion turn out to be more resilient and less burned out.[36] In contrast to the idea that human connection in healthcare settings is or eventually will be emotionally taxing, this study adds to the rising evidence that connecting with patients may counteract burnout.[36] Additionally and in line with previous research, this study shows that resilience moderates the negative effects of distress and that resilient physicians thus have a greater ability to "bounce back" following adverse events.[19,37-39] Enhancing cardiologists' resilience decreases their chances of burnout and creates space for them to enjoy the positive intrinsic rewards that arise from doing their work. Despite its positive impact, Panagioti et al. stress that the concept of resilience should not be misused to blame clinicians for not being strong

enough to cope with pressure and to take away healthcare organizations' responsibility for fostering the well-being of their clinicians.[9]

All in all, this study suggests that there is room to further strengthen cardiologists' work-related well-being. While work-home interference and experienced workload were found to be important demanding aspects that jeopardize cardiologists' well-being, in line with recent research,[18,40] we found that promoting cardiologists' well-being can most effectively be achieved by investing in increasing (work-related) sources of energy. Indeed, some energizing resources were found to positively relate to physicians' experienced professional fulfillment *and* to protect them from work-exhaustion and interpersonal disengagement.

Strengths and Limitations

This study was set up as the first Dutch nationwide survey among cardiologists, thereby including cardiologists from all types of institutions (both academic and non-academic), thus strengthening the validity and generalizability of our findings. However, a few limitations need to be taken into account. The response rate of this study was 34.6 %. Although a higher response rate is preferable, response rates of approximately 35% are considered high in studies on occupational well-being of physicians, especially those conducted during the COVID pandemic.[11,22] For example, national survey studies performed by Shanafelt and colleagues, leading experts in the field of physician well-being, often report response rates below 30%.[35,39,41] Also, it is reassuring to find our study's sample to be representative, since its demographics resemble those of the population of all Dutch cardiologists as reported in internal documents of the NVVC. Second, we cannot guarantee that our results have not been impacted by the COVID-19 pandemic. However, given the results of our additional control questions (Supplemental File I), we assess the overall findings are at the most slightly impacted. Research on the impact of the pandemic on physician well-being internationally shows contradictory results.[22,42,43] Finally, as always, due to the cross-sectional nature of this study, causality cannot be determined. However, we find our findings to be in line with previous longitudinal research showing that work- and individual aspects (either energy demanding or providing) predict occupational well-being.[44,45]

Implications for Practice and Research

Based on this study, the most significant well-being promoting resources for Dutch cardiologists can be found in the individual realm and in

building a work environment where well-being is not just given lip service but taken seriously by the department and organization. Clearly, changing the work culture is extremely challenging, requiring leadership, role models, and commitment from all staff.[46,47] This may explain why most organizations choose to first address inhibiting work structures and inefficient practices,[47] although these too are not always easily changed.

More specifically, considering this study's findings, we suggest a two-track approach for fostering Dutch cardiologists' well-being. First, organizational efforts and support could be aimed at promoting a healthy work-life balance amongst cardiologists; eg normalizing "striving to be home for dinner" and allowing them control over their work schedules.[30]

Second, cardiologists would further benefit from spending more dedicated time with their patients. This study is yet another 1 to underscore the negative impact of the limited time physicians have with their patients. Successfully addressing this structural issue will likely require system changes at a national level; cardiologists and organizations should however continue to think of local answers. Research provides some possible answers; eg employing scribes (non-lincensed team members specifically trained to document physician-patient encounters) or pre-visit planning may help making patient visits more focused on the patient rather than administrative tasks. These efforts may contribute to more fulfilled cardiologists.[48]

Conclusions

Dutch cardiologists report relatively high levels of professional fulfillment and average levels of burnout symptoms compared to previous research. Although excessive workloads have been found to jeopardize cardiologists' work-related well-being, our study findings show that it is critical to invest in resources of energy. Promoting the well-being of cardiologists seems most effective by boosting, for example, their professional autonomy and ensuring satisfying physician-patient interactions. We suggest investing in creating a culture of wellness, in institutions and the medical profession, which fosters a healthy work-life balance and promotes personal resilience – ultimately benefiting the quality of patient care. This can only be a joint effort of leaders within the profession, role models in healthcare organizations, and commitment of every individual cardiologist.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.cpcardiol.2022.101538.

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