

How Do Newly Diagnosed Chronic Health Conditions Affect Older Workers' Vitality and Worries About Functional Ability?

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Abstract

With increasing retirement ages, older workers are working longer while being newly diagnosed with chronic health conditions (CHCs). Our knowledge on how newly diagnosed CHCs influence older workers' vitality and worries is limited. We examine how four newly diagnosed CHCs affect older workers' vitality and worries about physical and mental functional ability. We used data from a Dutch pension panel survey. A sample of 1,894 older workers (60–62 years) was analyzed using conditional change OLS regression models. Having CHCs decreased vitality and increased worries. This effect was worse for older workers newly diagnosed with CHCs. Being newly diagnosed with physically disabling conditions increased worries about physical functioning, while being newly diagnosed with mentally disabling conditions increased worries about mental functioning. These findings aid the identification of vulnerable groups of older workers, thereby informing interventions that could improve quality of life, while promoting healthy aging at work.

Keywords

diagnosis time, wellbeing, work ability, healthy aging

What this paper adds to existing literature:

- This study is among the first to examine how newly diagnosed CHCs might lead to changes in older workers' vitality and worries about functional ability.
- It also distinguishes the effects of existing CHCs from the effects of newly diagnosed CHCs on older workers' vitality and worries about functional ability.
- It longitudinally examines how the experience of CHCs changes older workers' vitality and worries about functional ability.

Applications of study findings:

- The findings aid in the identification of vulnerable groups of older workers, which gives organizations and policy makers direction on whom they should target when providing suitable interventions.
- Older workers newly diagnosed with psychological disorders, sleep disorders, and arthritis, who experience the largest decreases in vitality, could be provided with worksite vitality interventions.
- Older workers newly diagnosed with CHCs experience increased worries about functional ability: it would be helpful to adapt their workplaces to meet their needs and to provide them access to psychological care.

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Retirement ages are increasing throughout the Western world. Consequently, many older workers are working longer while experiencing chronic health conditions (CHCs). To better protect and promote older workers' wellbeing and functional ability in the last years of their careers, stakeholders—including policy makers, employers, and researchers—need to better understand the effects of CHCs on workers in their pre-retirement years. It is well established that aging is associated with an increase in the likelihood of being diagnosed with CHCs (Calvo, Azar, & Shura, 2021; McMahan & Sturz, 2006) and many older workers are diagnosed with a CHC in the years before their retirement (Eurostat, 2021). Till date, not much is known about the effects of these newly diagnosed CHCs on older workers in their pre-retirement years. This study is among the first to look at how newly diagnosed CHCs impact older workers' vitality and psychological health. Using 3-year panel data among older workers aged 60–65 years, this study longitudinally assessed how newly diagnosed CHCs impact changes in older workers' vitality, worries about physical functional ability, and worries about mental functional ability. We will study the effects of newly diagnosed arthritis, cardiovascular disease, sleep disorders, and psychological disorders and compare these with effects of existing arthritis, cardiovascular disease, sleep disorders, and psychological disorders. We chose these conditions as they are among the highest prevailing CHCs in the general population (OECD, 2016). Moreover, according to the World Health Organization, these CHCs are also the largest contributors to the burden of disease (WHO, 2018). Further, it has been shown that these CHCs cause severe work limitations for older workers who are still employed (Vanajan, Bültmann, & Henkens, 2020).

Vitality is the feeling of aliveness, both in a physical (feeling healthy, capable, and energetic) and a mental sense (feeling like one's actions have meaning and purpose). Vitality provides a holistic picture on older workers' perception of their health (Hennekam, 2016). On an individual level, vitality is associated with good health (Kubzansky & Thurston, 2007). In organizations, vital employees are known to be productive, satisfied, and successful at their jobs (Carmeli, 2009). On a larger scale, vital individuals benefit the society by contributing to economic growth and social participation (van Steenbergen et al., 2016). Taken together, past research depicts that it is highly beneficial to keep individuals, especially older workers, vital. A past study has shown how existing arthritis, cardiovascular diseases, sleep disorders, and psychological disorders were associated with lower vitality among older workers (Vanajan et al., 2020a). The effects of newly diagnosed CHCs on vitality were, however, not examined. We hypothesize that newly diagnosed CHCs will decrease vitality more than existing CHCs (*newly diagnosed CHCs-vitality hypothesis*).

Emotions, such as worry, are reactions to events that carry importance to the individual (Lazarus & Lazarus, 1991). Before reacting through emotions, individuals evaluate these

events based on their goals, values, and beliefs, taking also their ability to cope with the consequences of the event into account (Lazarus & Lazarus, 1991). This means that individuals will vary in the way they react to events. Past studies have also shown that “normal” aging changes the capacity of older individuals to appraise, respond to (both physiologically and psychologically), and adapt to stressors (Hansson et al., 2001). Reaching a 60th birthday, retirement, policy changes about statutory pension age, and being diagnosed of a CHC are examples of events that could cause strong emotional reactions, such as the worry about physical and mental functional ability at work (Hansson et al., 2001; van Solinge & Henkens, 2017). These emotions, in turn, may affect older individuals' wellbeing and performance at work (Fisher et al., 2016). Although existing studies have shown that many older workers worry about their ability to function and endure in the last years of their careers (van Solinge & Henkens, 2017), not much is known about the health-related precursors of older workers' worries. Being newly diagnosed with a CHC may trigger older workers to worry about their capability to function as they did before their diagnosis. Considering the differences in how the symptoms of physically and mentally disabling CHCs may affect functional ability, we hypothesize that newly diagnosed physically disabling CHCs would increase worries about physical functional ability (*newly diagnosed physical CHC-worries hypothesis*), while newly diagnosed mentally disabling CHCs would increase worries about mental functional ability (*newly diagnosed mental CHC-worries hypothesis*).

This study contributes to the literature and practice in three ways. First, this study is among the first to examine how newly diagnosed CHCs might lead to changes in older workers' vitality and worries about functional ability. We will distinguish the effects of four newly diagnosed CHCs—arthritis, cardiovascular disease, sleep disorders, and psychological disorders—on older workers' vitality and worries. By doing so, we aspire to identify groups of older workers who are most vulnerable.

Second, we study the effects of CHC status on changes in older workers' vitality and worries about physical and mental functioning. While vitality provides a holistic picture on older workers' perceptions of how healthy and alive they feel (Hennekam, 2016), worries about physical and mental functional ability give insight into older workers' perceptions on what they can do. Previous studies have rarely assessed these constructs longitudinally: we aim to fill this gap. Moreover, these health-related concepts can also be subjected to change, making them targets for health interventions such as the Vital@Work intervention, cognitive behavioral therapy, and mindfulness-based interventions (Querstret & Cropley, 2013; Strijk et al., 2012). As a result, the outcomes of this study can contribute to practice by informing intervention efforts.

Lastly, the 3-year follow up panel data used in our study offers the opportunity to analyze a unique sample of 1,894 older workers between the ages of 60–65 years. This birth cohort of older workers was closest to retirement when

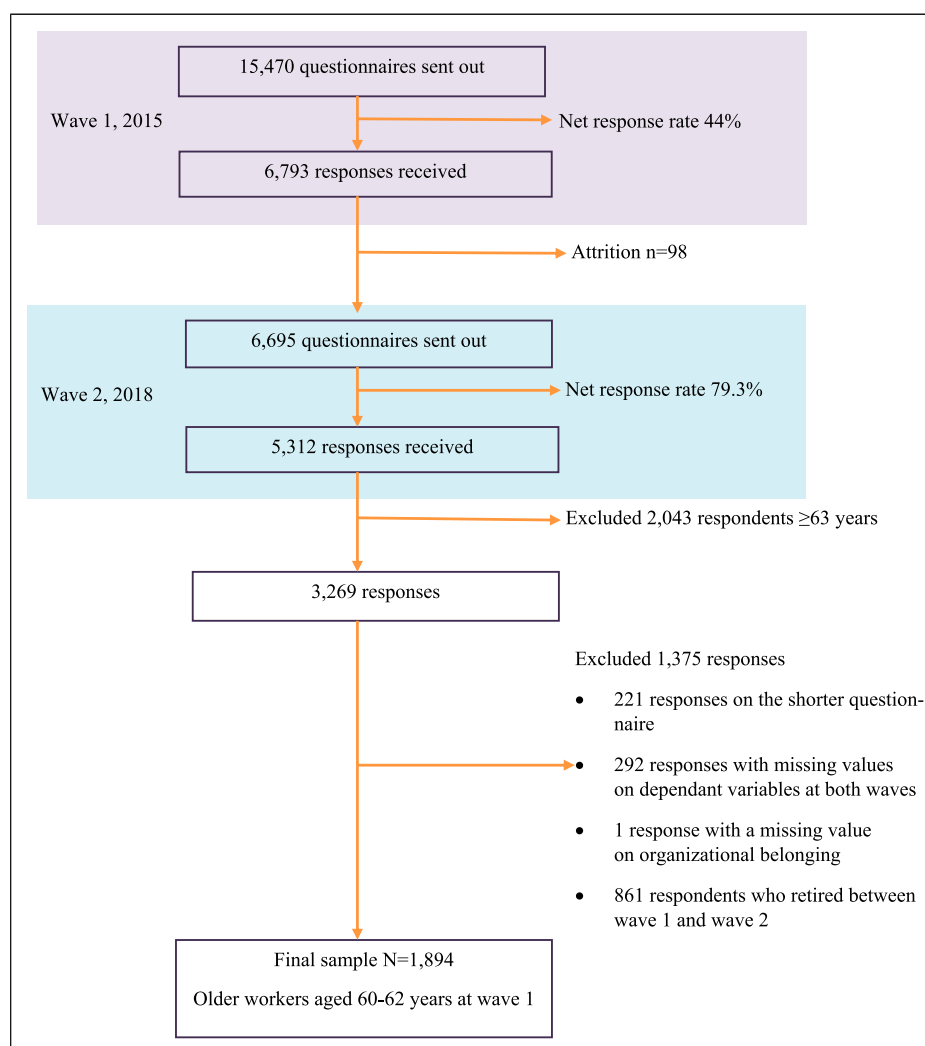


Figure 1. Flow chart illustrating the recruitment and retention of older workers in the NPPS and derivation of our study sample.

increases to retirement age were implemented. This study is carried out in the Netherlands. Due to pension reforms, the Netherlands has witnessed a sharp increase in the net labor participation of older workers between 60–65 years from 21.7% in 2003 to 62.8% in 2020 (Centraal Bureau voor de Statistiek, 2021). Older workers who were close to retirement age (essentially, those born between the years of 1955 and 1960), were faced with the reality that they would need to change their retirement expectations and prepare to work several years more than they previously imagined. This not only caused uproar from employees, but also from labor unions and employers alike (van Solinge & Henkens, 2017; Oude Mulders et al., 2020).

Methods

Study design and sample

We used data from the first and second waves of the Netherlands Interdisciplinary Demographic Institute's (NIDI)

Pension Panel Survey (NPPS), conducted in 2015 and 2018 in the Netherlands. The NPPS follows a cohort of employed older workers between the ages of 60–65 years (Henkens et al., 2017), recruited using a stratified approach. Initially, a sample of organizations was drawn from the files of three pension funds in the Netherlands (ABP, PfwZ, and BpBouw) along the dimensions of organizational size and sector. These pension funds together represent 49% of wage employed workers in the Netherlands (DNB, 2015). Following this, older workers aged between 60–65 years who worked at least 12 hours a week, were randomly sampled from the selected organizations. Of the 15,470 questionnaires that were sent out to older workers at wave 1, a total of 6,793 older workers responded to the questionnaire (net response rate of 44%). Between the two waves attrition led to the reduction of the sample by 98 respondents. A total of 6,695 questionnaires were sent out by the second wave, to which 5,312 older workers responded (net response rate of 79.3%). [Supplementary](#)

Table 1 describes and contrasts characteristics of older workers who did and did not respond to the second wave. The statutory pension age in the Netherlands currently stands at 66 years and 4 months: this is the mandatory age of retirement. Once workers reach this age, working contracts are usually terminated. To ensure that all respondents in our sample have not reached statutory pension age by wave 2, we included 3,269 workers who were 60–62 years old at wave 1. From those, we excluded 221 responders who received a shorter version of the questionnaire that did not include all relevant variables. Additionally, 292 workers who did not respond to the questions on vitality and worries about physical and mental functional ability at both waves, 1 respondent who had a missing value in which organization he/she belonged to and 861 respondents who retired between wave 1 and wave 2 were excluded from the analyses. Figure 1 further illustrates how we derived our study sample from the NPPS. Our final sample consisted of 1,894 older workers between the ages of 60–62 years at wave 1.

Measurements

Outcome variables

Vitality. We measured vitality using the 36-item Short Form Health Survey's (Ware, 1993) 4-item question "How much of the time during the past 30 days did you feel: a. full of energy, b. tired, c. worn out, and d. full of pep?" Each item was answered on a six-point scale, ranging from *constantly* (1) to *never* (6). After reverse coding items a. and d., we summed all items up to construct a single continuous measure of vitality that ranged from 1 to 6. Higher values indicated higher levels of vitality. This measure of vitality demonstrated high reliability at wave 1 (Cronbach's alpha = 0.80) and at wave 2 (Cronbach's alpha = 0.84).

Worries about physical and mental functional ability. Worries about physical functional ability were evaluated using the self-formulated question "To what extent do you experience the following issues because of higher retirement ages: insecurity whether I can physically maintain?" Similarly, worries about mental functional ability were evaluated using the question "To what extent do you experience the following issues because of higher retirement ages: insecurity whether I can mentally maintain?" Respondents answered by choosing one of five response options which ranged from *not at all* (1) to *very much* (5). We treated both variables as continuous measures, with higher values indicating high levels of worries about physical or mental functional ability.

Primary explanatory variables. We used the first item of the Limiting Long-standing Illnesses (LLSI) measure (Bajekal et al., 2004) to measure the existence and the new diagnosis of the four specific CHCs: arthritis, cardiovascular

diseases, sleep disorders, and psychological disorders. At both waves, respondents were asked, "Do you have one or more of the following longstanding doctor-diagnosed diseases?" which was followed by a list of CHCs (Bajekal et al., 2004). Older workers answered this question by indicating whether they had that particular CHC. Based on their responses to this question at wave 1, we created four dichotomized variables that represent existing CHCs ($1 = I \text{ have this CHC}$, $0 = I \text{ do not have this CHC}$). Based on the responses to the LLSI at both waves, we created four dichotomized variables that represent newly diagnosed CHCs. If respondents confirmed the diagnosis of a CHC at wave 2 in the absence of an affirmative diagnosis at wave 1, the variable was coded 1 ($1 = I \text{ have been newly diagnosed with this CHC}$, $0 = I \text{ have had this CHC for the last 3 or more years or I do not have this CHC}$).

Covariates. We controlled for age (continuous, measured in years), sex (dichotomized, $1 = \text{male}$), and presence of partner (dichotomized, $1 = \text{partner present}$). Moreover, we controlled for education attainment, which was first categorized as elementary school (1), lower vocation education (2), lower general secondary education (3), intermediate vocational education (4), upper general secondary education (5), higher vocational education (6), and university education (7). Thereafter, educational attainment was recoded into three dichotomized variables: low (1, 2, 3), moderate (4, 5), and high (6, 7) educational attainment. We also controlled for wealth, which was measured as 3 dichotomized variables: low ($1 = \text{low, less than €50,000}$), moderate ($1 = \text{moderate, between €50,000–€250,000}$), and high ($1 = \text{high, more than €250,000}$). With regards to health, we controlled for the experience of comorbidity at wave 1 which was represented using a dichotomized variable coded 1 if older workers stated that they were diagnosed with more than one CHC in the LLSI measure at wave 1. Additionally, we controlled for manual work, supervisory position, and full-time employment, all of which were dichotomized. If respondents' jobs were associated with manual work based on the international standard classification of occupation (Ganzeboom, 2010), manual work was coded 1. If respondents answered affirmatively to the question "Do you have a supervisory position?", supervisory position as coded 1. If older workers were employed for 36 hours or more per week, full-time employment was coded 1. Moreover, we controlled for organizational sector, a variable with three categories: government and education, construction, and health and welfare. Each category was treated as a separate dichotomized variable.

Additional Variables for Heckman Maximum Likelihood Selection Models. We included two additional variables in the Heckman models that are explained in the analysis section: caregiving responsibilities and work stress. Caregiving

Table 1. Results of multivariate regression analyses (second stage output of a two-step Heckman model) to explain the effects of existing chronic health conditions at wave 1 and newly diagnosed chronic health conditions between wave 1 and wave 2 on vitality, worries about physical functional ability, and worries about mental functional ability at wave 2

Variables	Vitality w2		Worries about physical functional ability w2		Worries about mental functional ability w2	
	Coef.	SE	Coef.	SE	Coef.	SE
Vitality w1	0.55**	0.04				
Worries about physical functional ability w1			0.51**	0.05		
Worries about mental functional ability w1					0.45**	0.06
Arthritis—Existing	−0.12*	0.05	0.14*	0.05	0.05	0.06
Arthritis—Newly diagnosed	−0.21*	0.06	0.27**	0.07	0.08	0.07
Cardiovascular diseases—Existing	−0.10	0.06	0.16*	0.08	0.11	0.08
Cardiovascular diseases—Newly diagnosed	−0.09	0.09	0.17*	0.08	−0.01	0.08
Sleep disorders—Existing	−0.12*	0.06	0.17*	0.05	0.17*	0.08
Sleep disorders—Newly diagnosed	−0.38**	0.10	0.19	0.11	0.37*	0.14
Psychological disorders—Existing	−0.04	0.13	0.11	0.12	0.06	0.13
Psychological disorders—Newly diagnosed	−0.69**	0.14	0.17	0.11	0.47**	0.12
Constant	−2.12	4.10	11.55*	4.46	13.94*	6.39
Lambda	0.10	0.42	0.37	0.53	0.54	0.71
N (censored/uncensored)	861/1894		861/1894		861/1894	
Wald χ^2	1613.23**		2842.43**		2180.84**	

Note. Coef. = coefficient, SE = standard error, w1 = wave 1, w2 = wave 2. Analysis was controlled for age, sex, presence of a partner, education, wealth, multimorbidity, full-time work, supervisory position, manual work, and organizational sector. ** $p < .001$, * $p < .05$.

responsibilities was a dichotomized variable coded 1 if respondents replied affirmatively to the question “Do you provide help to family members or friends who are ill or in need of help?” Work stress was also a dichotomized variable: respondents who replied affirmatively to the question “is your work stressful?” were coded 1. Descriptive statistics and details on the survey questions and coding as well as relevant psychometric properties of all variables are presented in [Supplementary Table 2](#).

Analyses

To study the effects of existing and newly diagnosed CHCs on the change in 1) vitality (model 1), 2) worries about physical functional ability (model 2), and 3) worries about mental functional ability (model 3) from wave 1 to wave 2, three conditional change ordinary least square regression models were run. We regressed the dependent variable at wave 2 on the dependent variable at wave 1, independent variables, and controls ([Aickin, 2009](#)). The inclusion of the dependent variable at wave 1 as a covariate control for a possible ceiling effect. In our models, the wave 2 measures of vitality, worries about physical functional ability, and worries about mental functional ability were dependent variables. These variables were regressed against their measures at wave 1, existing CHCs, and newly diagnosed CHCs. The results of the three models were interpreted as change effects from wave 1 to wave 2.

In these conditional change models, we only observed vitality and worries of older workers who did not exit the workforce through early retirement during the study period. Whether respondents younger than statutory pension age continued to work or retire could be a result of a selective process. To prevent this selection bias, we estimated Heckman maximum likelihood selection models. Initially, selection into the sample (i.e., whether the older worker is working or retired) was estimated based on all explanatory and control variables and two additional variables, namely, caregiving responsibility and work stress. These variables are described in the measures section. These two variables were assumed to not only affect vitality and worries but also working/retirement status. Thereafter, the probability of remaining in the panel—converted to Lambda—was calculated using parameter estimates of the first model. This Lambda value was then included in the models predicting the change in vitality and worries. Even though correcting for selection did not lead to any significant changes in our main findings, [Table 1](#) (and [Supplementary Table 3](#) which presents the full table also with the results of covariates) presents the results of the conditional change models corrected for sample selection.

All dependent variables were standardized prior to regression analysis. This allowed for the interpretation of dichotomized variables, especially the existing and newly diagnosed CHCs, as Cohen’s d effect sizes ([Cohen, 2013](#)). We used robust standard errors clustered on organizational belonging to account for the multilevel structure of the data

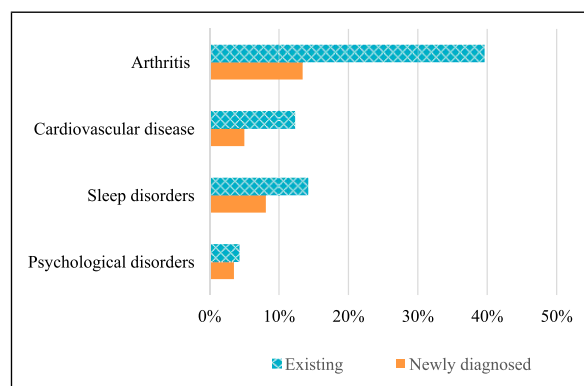


Figure 2. Percentage of older workers with existing CHCs and newly diagnosed CHCs.

(older workers were nested within organizations). Item non-response was less than 5% in all our variables. This permitted the use of a less vigorous missing data imputation method (Little et al., 2014). As a result, all missing data (except those of dependent variables) were imputed using single stochastic regression imputation (Enders, 2010).

Results

At wave 1, 39.6% of older workers reported experiencing arthritis, 12.3% reported cardiovascular diseases, 14.2% reported sleep problems, and 4.3% reported psychological disorders (Figure 2). Between wave 1 and 2, 13.4% of older workers were newly diagnosed with arthritis, 5.0% with cardiovascular disease, 8.1% with sleep problems, and 3.5% with psychological disorders (Figure 2).

Also, at wave 1, 16.2% older workers reported low levels of vitality, 36.2% of older workers were worried much or very much about their physical functional ability, while 31.5% of older workers were worried much or very much about their mental functional ability until retirement age.

The effects of existing and newly diagnosed CHCs on the change in vitality and worries

The results of the conditional change regression analyses are presented in Table 1 (and Supplementary Table 3). Model 1 examined the effects of existing and newly diagnosed CHCs on the change in vitality. The results show that among existing CHCs, existing arthritis (Cohen's $d = -0.12$, $p = .03$) and existing sleep disorders (Cohen's $d = -0.12$, $p = .03$) had a small negative effect on the change in vitality from wave 1 to 2. Compared to the effects of existing CHCs, CHCs newly diagnosed between wave 1 and wave 2 had a larger detrimental effect on vitality. Older workers who were newly diagnosed with psychological disorders (Cohen's $d = -0.69$, $p = .000$), sleep disorders (Cohen's $d = -0.38$, $p = .000$), and arthritis (Cohen's $d = -0.21$, $p = .001$) reported declines in vitality

between wave 1 and wave 2. Considering the effect sizes, our results support our *newly diagnosed CHCs-vitality hypothesis*.

Model 2 demonstrated that most existing and newly diagnosed CHCs are associated with a general increase in older workers' worries about physical functional ability. Older workers who experienced arthritis, cardiovascular diseases, or sleep disorders at wave 1 increasingly worried about their physical functional ability by wave 2. The sizes of these effects, however, were small. Newly diagnosed physically disabling CHCs—arthritis (Cohen's $d = 0.27$, $p = .000$) and cardiovascular diseases (Cohen's $d = 0.17$, $p = .03$)—led to increased worries about physical functional ability by wave 2. This effect was not evident for newly diagnosed mentally disabling CHCs. This confirms our *newly diagnosed physical CHC-worries hypothesis*.

Model 3 revealed that worries about mental functional ability is generally affected by the existence or the new diagnosis of mental health conditions. Among existing CHCs, only sleep disorders at wave 1 (Cohen's $d = 0.17$, $p = .04$) increased worries about mental functional ability between wave 1 and wave 2. Moreover, our findings show that older workers who were newly diagnosed with the two mentally disabling CHCs, sleep disorders (Cohen's $d = 0.37$, $p = .01$) and psychological disorders (Cohen's $d = 0.47$, $p = .000$), reported larger increases in their worries about their mental functional ability. This effect was not evident for the newly diagnosed physically disabling CHCs. These results confirm our *newly diagnosed mental CHC-worries hypothesis*.

Discussion

This study is, to the best of our knowledge, the first to longitudinally distinguish how newly diagnosed CHCs affect older workers' vitality and worries about physical and mental functional ability until retirement. While many older workers report experiencing a CHC (e.g., almost half of the sample experience arthritis and cardiovascular diseases), a considerable number of older workers are being newly diagnosed with CHCs (for instance, around 13% of our sample was newly diagnosed with arthritis). In general, existing CHCs at wave 1 (i.e., the experience of CHCs for more than 3 years) were associated with decreased vitality and increased worries about physical and mental functional ability at wave 2. In comparison, newly diagnosed CHCs (i.e., a new diagnosis of a CHC in the 3 years between wave 1 and 2) were associated with larger detrimental effects on vitality and steeper incremental effects on worries. Interestingly, newly diagnosed physically disabling CHCs increased worries about physical functional ability, while newly diagnosed mentally disabling CHCs increased worries about mental functional ability.

We initially assumed that older workers who have had CHCs for a longer time may accept their limitations and adjust to life and work with their CHC, resulting in levels of vitality and worries that is comparable to that of the average population of older workers. However, we observed that

existing CHCs continued to have a modest negative impact on vitality and a modest positive impact on worries. These findings may indicate some possibilities. Older workers might experience a worsening of their existing CHCs over time. This worsening could possibly lead to decreased vitality and increased worries about functional ability. Perhaps, older workers might find it increasingly difficult to deal with existing CHCs as they get older. Regardless of how existing CHCs affect older workers, nearing the prospect of retirement should provide older workers, especially those with CHCs, a feeling of relief, and a lessening of worries. Our results, however, suggests that levels of worry among older workers with existing CHCs do not decline as they approach the retirement age. This goes to show that older workers who have had longstanding CHCs should not be neglected in the provision of care and accommodations just because they seem to be experienced in managing their conditions.

By separating the effects of existing and newly diagnosed CHCs, we provided insights into how and when CHCs influence vitality and worries. Although both existing and newly diagnosed CHCs influence vitality and worries about functional ability, newly diagnosed CHCs had a stronger detrimental effect on both measures. Older workers who are newly diagnosed with CHCs could still be learning about and adjusting to the symptoms of their illnesses and the ways to manage their CHCs in day-to-day life (Lacaille et al., 2007). They might still be dealing with the side effects of their newly prescribed medication and building a new support system to help them manage their condition at home and at work (Lacaille et al., 2007). This demonstrates the importance of paying extra attention to assist older workers who are newly diagnosed with CHCs to adjust in their workplaces until they find stable strategies to manage their CHC/s and/or to accommodate their work. Older workers newly diagnosed with CHCs may find it difficult to disclose their conditions to colleagues or supervisors. They might face issues in adapting their work patterns and work environment because of the limitations imposed by CHCs. Previous research has shown that an organizational climate that ensures psychological safety is associated with low health-related work limitations among older workers with CHCs (Vanajan et al., 2020). If older workers feel safe and have confidence in their organization, they are more inclined to disclose their difficulties and ask for the work accommodations they need (Gignac & Cao, 2009; Vanajan et al., 2020). This calls for organizational-level interventions that focus on improving psychological safety climate, open communication, and collegiality. Conversations built on open communication could lead to older workers with CHCs obtaining flexible work arrangements, such as working time flexibility, which is also associated with low health-related work limitations (Vanajan et al., 2020).

Intriguingly, newly diagnosed CHCs with more physically disabling symptoms—arthritis and cardiovascular disease—increased older workers' worries about their physical functional ability at work. Arthritis and cardiovascular disease

manifests in symptoms such as chronic pain, restricted movement, and exertion which can extensively limit the range of physical activities older workers can perform at the workplace (Vanajan et al., 2020). Older workers with work limitations due to arthritis and cardiovascular disease are also known to prefer early retirement (Vanajan et al., 2020a). This may explain our results: in a public pension system that mandates older workers to work until retirement age despite health-related work limitations, older workers with existing and newly diagnosed arthritis and cardiovascular disease will continue to work while worrying about their physical functional ability at work.

Similarly, older workers who were newly diagnosed with sleep and psychological disorders worried most about their mental functional ability at work. These conditions are characterized by fatigue, muted enthusiasm, depression, inability to cope with stress, and impaired cognitive performance. Moreover, sleep and psychological disorders are strongly associated with low vitality, low quality of life (Reimer & Flemons, 2003; Vanajan et al., 2020a), and diminished work performance (Knebelmann & Prinz, 2016): all of which could lead to increased worries among older workers about their mental functional ability at work.

The core strength of this study lies in its ability to provide novel and comprehensive knowledge to current literature by simultaneously distinguishing the effects of the existence and the new diagnosis of four highly burdensome CHCs on holistic measures of health and functional ability. Moreover, we use data from a large panel dataset on a unique yet representative sample of older workers between the ages of 60–62 years, who are not only burdened by the requirement to work in to old age, but also the need to do so while coping with existing or newly diagnosed CHCs. The panel data also allows us to make longitudinal associations and captures the dynamic nature of the CHCs, vitality, and worries.

This study is not without limitations. We do not have information on the severity of CHCs that are experienced by older workers. Severity could play a role in determining the size of the effects of CHCs on vitality and worries. Future research could examine how severity of existing or newly diagnosed CHCs could influence older workers' vitality and worries as they strive to remain in the workforce. Due to the nature of the LLSI measure, we also do not have information on the conditions covered within the umbrella terms of psychological and sleep disorders. The conditions within each umbrella CHC could vary greatly in nature and severity of symptoms. Perhaps, future studies could dig deeper into the conditions covered within umbrella CHCs to examine how different conditions within each umbrella CHC influences change in vitality and worries. Moreover, we measure worries about physical and mental functional ability using a single-item measure of unknown reliability. Future studies could benefit from a multi-item measure of worries. Despite the limited opportunity to retire early, the Netherlands has a well-organized public pension system that provides generous retirement benefits. As a result, the

findings of this study may not be generalizable to countries with different pension schemes. Moreover, the results may also not be generalizable to older workers who are not enrolled in a pension scheme, such as self-employed workers. The NIDI pension panel survey collects data from workers enrolled in a pension scheme. These workers have a broader choice in retirement than workers who are not enrolled in a pension scheme. Future studies could study how older workers from other welfare states or who are not attached to pension schemes experience existing and newly diagnosed CHCs. Future studies could also study how the exact time since diagnosis may influence vitality, functional ability, and general wellbeing of older workers.

By studying the effects of the different CHCs individually and the timing of their diagnosis, this study makes identification of vulnerable groups of older workers possible. This gives organizations and policy makers direction on whom they should target for the provision of suitable interventions. For example, older workers who are newly diagnosed with psychological conditions experience declines in vitality: they could be provided with worksite vitality interventions, such as the Vital@Work intervention (Strijk et al., 2009). Similarly, older workers who are newly diagnosed with arthritis seem to worry greatly about their physical functional ability. To comfort their worries about their current and future physical functional abilities, organizations could adapt older workers' workspaces to their needs (for instance, by providing ergonomic furniture or a lower floor in the building) or with flexible working hours that give older workers the freedom to choose when they would like to work (Vanajan et al., 2020). In general, older workers with high levels of worry could be encouraged to attend mindfulness-based interventions and/or cognitive behavioral therapy (Querstret & Cropley, 2013). The timely identification of vulnerable groups of older workers and the efficient provision of effective interventions will improve both the quality and sustainability of working lives.

Author Contributions

A.V. wrote the paper and performed the statistical analysis. K.H. collected the data, supervised the data analysis and writing process. U.B. advised on statistical analysis and supervised the writing process.

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Availability of Data, Materials or Code

The data that support the findings of this study are available from the corresponding author, A.V., upon reasonable request.

Consent for Participation and Publication

Participant consent for participation and publication was obtained during data collection.

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Supplemental Material

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