


# Unemployment and associations with diagnosed health problems in the Norwegian GP-DEP study: a repeated cross-sectional register study (2010–2016)

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## ABSTRACT

**Introduction** While differences in mental health between recipients and non-recipients of unemployment benefits are well known, it is not known whether such differences exist for musculoskeletal and cardiovascular health problems. This study examined the difference in registry-based diagnoses between short term, long term and non-recipients of unemployment benefits in the Norwegian working-age population and further examined if these associations differed by educational level.

**Methods** A cross-sectional repeated register study comprising all working-age individuals (age 21–67 years) with pensionable income in Norway in the period 2010 (N=2 610 956) to 2016 (N=2 791 103). Data were retrieved from the Norwegian population registry, the Education Database, the Database of Social Insurance and the Control and Reimbursement of Health Care Claims Database and linked on individual level. Associations between recipients and non-recipients of unemployment benefits and physician-certified diagnoses were examined with Poisson regression with robust variance estimates (relative risk (RR) with 95% CI) and stratified by education.

**Results** Both short-term and long-term recipients of unemployment benefits were associated with an increased likelihood of having one or more musculoskeletal, psychological or cardiovascular diagnoses compared with non-recipients. The strength of the associations increased with cumulative days of unemployment, with adjusted RRs (95% CIs) for musculoskeletal disorder 1.7 (1.7 to 1.7); psychological diagnoses 2.2 (2.2 to 2.3); subgroup depression 3.3 (3.2 to 3.3) and for cardiovascular disease 1.3 (1.3 to 1.3) compared with non-recipients. Among highly educated people, the association between unemployment and having a diagnosis was stronger than among unemployed with medium and low education.

**Conclusions** Unemployment benefits reciprocity were associated with musculoskeletal, psychological and cardiovascular diagnoses, and the strength of the association increased with higher education. The direction of the relationship could not be determined in this study.

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Unemployment is associated with mental health problems.

## WHAT THIS STUDY ADDS

⇒ Unemployment is associated with physician-certified musculoskeletal, cardiovascular and psychological diagnoses. Associations between unemployment and health problems increased with higher education.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Early and timely collaboration between primary healthcare, social security services and labour organisations is crucial to prevent the escalation of poor health among the unemployed and to support and promote fair employment.

## INTRODUCTION

People moving ‘in and out of work’ are easily trapped in low-paid jobs, minimum standard contracts, poor-quality working environments and unemployment benefits. These circumstances are closely related to lower social position and contribute to the health gradient of work participation.<sup>1 2</sup> In the Michael Marmot Review, *Fair Society, Healthy Lives*, one of the main policy objectives is ‘to create fair employment and good work for all’ (Marmot and Peter, p26–27).<sup>3</sup>

Unemployment is more common among those with lower education who are less skilled,<sup>4</sup> people with disabilities and mental health problems,<sup>5 6</sup> and other subgroups, such as lone parents, migrants, older workers and younger people.<sup>7–10</sup> Moreover, sick leave seems to be prevalent in unemployment

trajectories.<sup>11</sup> When working, people at risk of unemployment are likely to be offered repetitive and/or physically demanding work combined with low job control, which in turn may reinforce and steepen the health gradient.<sup>12</sup> In the long run, transitions between work, unemployment and sickness absence are highly disadvantageous<sup>11</sup> and reduce future opportunities for stable employment—a necessary condition for career development, wage increases and a reasonable retirement pension.

We know that musculoskeletal disorders (MSDs) tend to accumulate in occupations with physically demanding work and low control.<sup>13</sup> While previous studies have indicated a significantly higher risk of MSD and cardiovascular disease (CVD) among the unemployed compared with the employed,<sup>14 15</sup> our knowledge and understanding of these disparities remain limited.

Finally, the question of how differences in health between employed and unemployed individuals present within educational levels still needs to be answered.<sup>5</sup> Addressing group differences in certified diagnoses between recipients and non-recipients of unemployment benefits using high-quality registry data may support arguments for fair employment and sustainable return to work.

This study aimed to examine differences in psychological problems, MSDs and CVDs, measured as clinical diagnoses made by general practitioners (GPs), between recipients of short-term and long-term unemployment benefits and non-recipients in the Norwegian working-age population from 2010 to 2016. Moreover, we aimed to examine those differences across educational levels.

## MATERIALS AND METHODS

The study design is a repeated cross-sectional registry-based study, that is, we performed cross-sectional examinations of the Norwegian working-age population for each year from 2010 to 2016.

### Setting

#### Social security benefits

Unemployment benefits are paid to workers who register as job seekers in the Norwegian social insurance system and submit an employment status form fortnightly. Unemployment benefits cover 62.4% of mean income during the last 12 or 36 months and may last up to 52 or 104 weeks depending on income level (<€20 972 or ≥€20 972, respectively (exchange rates per 13 December 2024)). The benefit replaces ordinary income and is registered as pensionable income. Recipients of unemployment benefits must agree to work at least 50% anywhere in Norway and participate in active labour market initiatives under the auspices of the Norwegian Labour and Welfare Administration (NAV). The right to unemployment benefits (at least 50%) also includes partially sick-listed workers up to 50% and disability pensioners who work at least 30%. The unemployed also have sick leave

rights in health-related reduced working capacity cases. Thus, work and health-related benefits and unemployment benefits may run parallel or sequentially during 1 year. Therefore, in this study, 'a recipient' can have one or more cumulative days of unemployment benefits during the year in question and may transit between and combine work, unemployment benefits and health-related benefits.

### Healthcare

Norway offers universal healthcare, ensuring all residents equal access to low-cost medical care covered by the National Insurance Scheme. More than 99% of the population has a designated GP providing assessments and care for a broad range of health problems. GPs act as gatekeepers to specialised healthcare, certify sickness absence and recommend disability pension.<sup>16</sup> Statistics from the Norwegian Directorate of Health report that 64% of the working-age population consulted their GP each year during the study period.<sup>17</sup>

### The Norwegian GP-DEP study

The Norwegian GP-DEP study aimed to increase knowledge of the impact of the Regular General Practitioner Scheme for integrated and equitable pathways of GPs' depression care, facilitating work participation. The study is a closed cohort that includes all Norwegian citizens aged ≥12 years as of 1 January 2008 (N=4 017 989) and followed from 2008 to 2016. The population was drawn from The Norwegian population registry by Statistics Norway and linked to data from national registries using the (encrypted) unique personal identification number assigned to all residents of Norway.

### Study sample

This study comprises men and women with a pensionable income (ie, ordinary income, sick pay, work-allowance benefit and unemployment benefit), aged 21–67 years over the years 2010 (N=2 610 956) to 2016 (N=2 791 103). Pensionable income was used as an inclusion criterion to ensure that only people eligible for unemployment benefits were included in the study. The retirement age in Norway was 67 throughout the study period.

### Variables and data sources (national registries)

The Population Registry provided information on age, marital status and sex. Sex was recorded as 'man' or 'woman,' age was recoded to '21–29', '30–39', '40–49', '50–59', '60–67' years, marital status to 'married/registered partner,' 'single/no registered partner,' 'divorced/separated/widowed'.

The National Education Database registers the highest level of completed education corresponding to the International Standard Classification of Education.<sup>18</sup> We recoded education into three categories: ≤10th grade and high school 1 year='lower education,' high school, graduated='medium education' and college/university lower and higher='higher education.'

The National Database of Social Insurance (FD-trygd) provided detailed information on payment dates (start-end) for unemployment benefits and certified sickness absence. Days of unemployment benefits were summed up for each year and recoded into a variable named employment status with three categories: no days of unemployment benefits='non-recipients',  $\leq 180$  cumulative days of unemployment benefits='short-term recipients',  $>180$  cumulative days='long-term recipients'. Persons defined by the European Union as unemployed (receiving full unemployment benefits for 12 months or more) are hence included in the last group. A small proportion received unemployment benefits without being registered with a pensionable income (approximately 0.5%).

Certified sickness absence was dichotomised as 'zero days of sickness absence' or ' $\geq 1$  day of sickness absence'. This measure was included because sick leave requires an assessment of work capacity and a diagnosis from the GP, which were included in the dataset. Pensionable income in NOK was presented in Euro (€) (exchange rate December 2024).

The Control and Reimbursement of Health Care Claims Database (KUHR) stores data on all fee-for-service claims from public primary care providers, including diagnostic codes according to the International Classification of Primary Care second version (ICPC-2) linked to each patient contact. ICPC is formally recognised as a classification system for primary care by the WHO's Family of

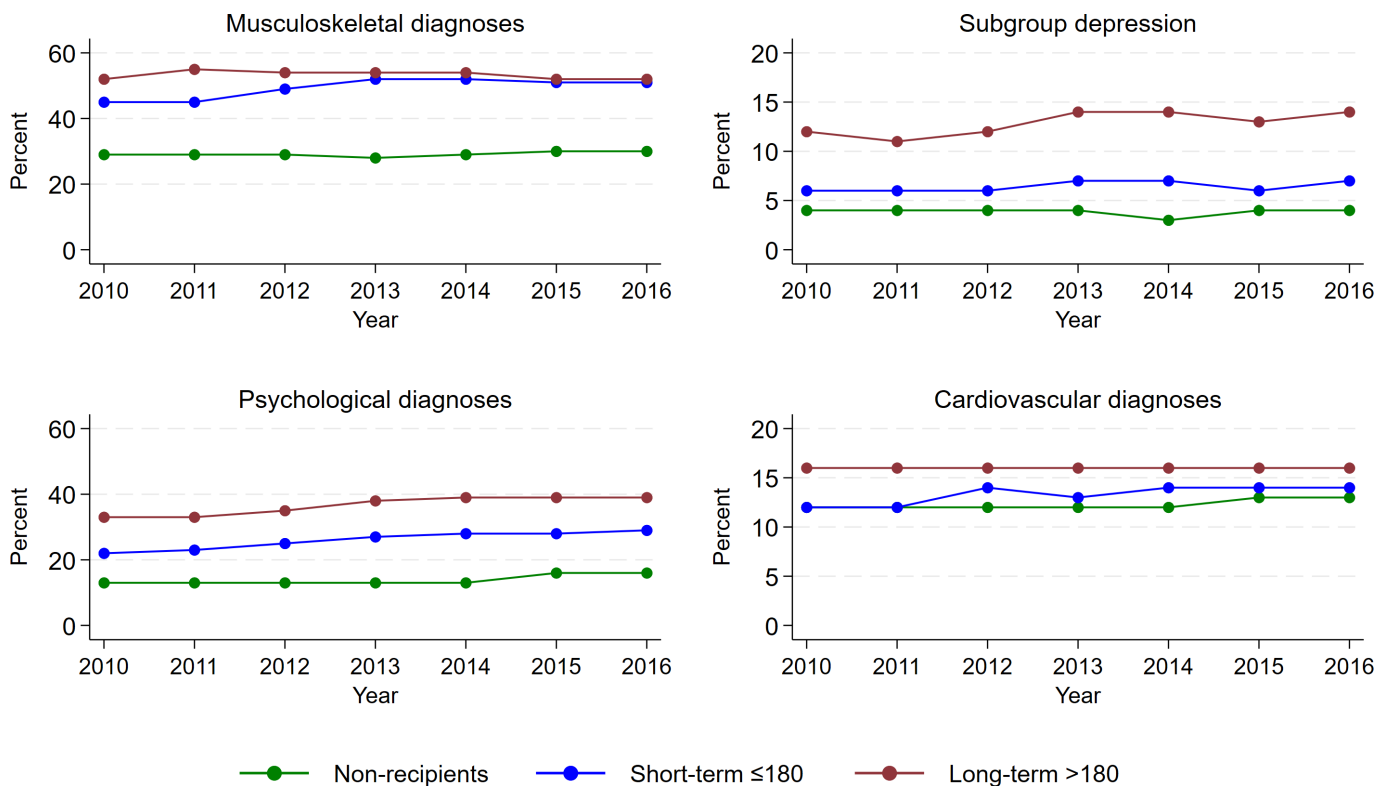
International Classifications. It is mapped to the International Classification of Diseases (ICD), allowing ICPC to be used as the primary care lens in the ICD. The level of detail in the ICD is often unnecessary for practical use in primary care.

ICPC is divided into 14 chapters representing the localisation of the health problem and additional chapters for general and unspecified problems. In this study, we collected all diagnostic codes (symptoms and disease diagnoses) from the chapters: L=musculoskeletal, p=psychological and K=cardiovascular. We also performed subgroup analyses of workers with depression (ICPC-2, code P-76) to provide specific knowledge on unemployment and depression to the Norwegian GP-DEP study.<sup>19</sup> The number of diagnoses (from GP contacts) in each chapter was recoded to a binary variable: 'zero diagnoses'=0 and ' $\geq 1$  diagnoses'=1. Thus, health problems in this study were measured as having at least one diagnosis from primary healthcare during each year.

### Statistical analyses

Analyses were performed for each year separately

Descriptive statistics: The distributions of sex, age, marital status, education, employment status and sickness absence over the study years were examined. Pensionable income (€) was presented as the median and IQR. Further, the proportion of individuals with  $\geq 1$  diagnosis within each of the selected ICPC chapters from 2010 to 2016 is provided in figure 1.



**Figure 1** The proportion of individuals with  $\geq 1$  diagnosis within musculoskeletal diagnoses, psychological diagnoses, subgroup depression and cardiovascular diagnoses across non-recipients, short-term recipients and long-term recipients of unemployment benefit, each year from 2010 to 2016.

**Analytic statistics:** We used Poisson regression with robust variance estimates to measure the association by relative risk (RR) with a 95% CI between employment status and the binary diagnosis variable ( $\geq 1$  diagnosis, zero diagnoses) within each ICD-10 chapter for the years 2010, 2012, 2014 and 2016. We investigated every second as changes from 1 year to the next were minor. The reference group was non-recipients of unemployment benefits. We present crude estimates (RR, 95% CI) and estimates adjusted for age, sex and education. Income and marital status had limited explanatory value and were not included in the regression analyses. Finally, the analyses were repeated and stratified by educational level. Data were analysed using STATA/SE V.17.0.

### Patient and public involvement

Patients and/or the public were not involved in this research's design, conduct, reporting or dissemination plans. However, the project of which this study is a part, the Norwegian GP-DEP Study, consulted a user group consisting of representatives from the patient organisation Mental Helse, relevant healthcare professions, municipal officials, and the Norwegian Labour and Welfare Administration.

### RESULTS

The proportion of the population who were short-term recipients of unemployment benefits ( $\leq 180$  cumulative days) increased from 8% in 2010 to 12% in 2016, with a concurrent decrease from 10% to 6% among those with long-term benefits ( $>180$  cumulative days) (table 1). Most

**Table 1** Characteristics of the study population during 2010, 2012, 2014 and 2016

	2010 (N=2 610 956)	2012 (N=2 613 345)	2014 (N=2 605 727)	2016 (N=2 791 103)
	%	%	%	%
Women	48	48	49	49
Age				
21–29	19	19	20	19
30–39	23	22	21	20
40–49	25	25	25	24
50–59	21	21	22	23
60–67	11	11	12	15
Marital status				
Single/not reg. partner	40	42	43	44
Married/partner	47	45	44	42
Divorced/separated/widow	13	13	13	13
Education*				
Low	30	29	27	27
Medium	34	34	35	34
High	36	37	39	38
Recipients of unemployment benefit				
Short term: $\leq 180$ days	8	10	13	12
Long term: $>180$ days	10	8	7	6
Sickness absence ( $\geq 1$ day) among:				
Non-recipients	6	5	3	†
Short-term: $\leq 180$ days	54	62	62	59
Long term: $>180$ days	56	60	60	51
	Median† (IQR)	Median (IQR)	Median (IQR)	Median (IQR)
Pensionable income € <sup>3</sup>	31 503	34 308	36 772	37 565
IQR	(20 153–41 949)	(21 810–45 857)	(23 023–49 249)	(24 663–50 468)

\*Low education (Primary school  $\leq 10$ th and high school, 1 year only), medium education (high school), high education (college/university  $<3$  years and  $>3$  years).

†NOK to €, exchange rate per 13 December 2024.

Pensionable income, All earned income for employees, personal income from self-employment, parental benefit, sickness benefit, work allowance benefit and unemployment benefits.



of the unemployed did also experience certified sick leave during the study years (>50%) vs ≤6% among non-recipients. Population characteristics across employment status are presented in online supplemental table 1a,b.

The crude and adjusted likelihood (RR) of having one or more physician-certified diagnoses (within the selected ICPC-2 chapters) in primary healthcare during 2010, 2012, 2014 and 2016 was significantly higher for recipients of unemployment benefits compared with non-recipients (table 2). The adjusted likelihood of MSD was about 70% higher among recipients of short-term and long-term unemployment benefits in 2016 compared with non-recipients (table 2). The corresponding difference in prevalence was 22 percentage points (52% vs 30%) (figure 1). The prevalence of MSD across employment status showed small changes over the study years (figure 1).

For psychological diagnoses, the adjusted likelihood in 2016 ranged from 1.8 (95% CI 1.7 to 1.8) among short-term recipients of unemployment benefits to 2.2 (95% CI 2.2 to 2.3) among long-term recipients, compared with the reference group (table 2). The corresponding prevalence was 16% among non-recipients and 39% among long-term recipients, generating a gap of 23%. Over the study years, the prevalence increased slightly in all categories of employment status (figure 1). As for depression, the adjusted likelihood was more than three times higher among long-term recipients of unemployment benefits than non-recipients in 2016 (adjusted RR 3.3, 95% CI 3.2 to 3.3). Among non-recipients, 4% had one or more depression diagnoses over the study years, whereas the prevalence among long-term recipients increased from 12% to 14% (figure 1). Finally, the adjusted likelihood of CVD was about 30% higher among recipients of unemployment than non-recipients over the study years (table 2), with a prevalence of 12%–13% among non-recipients and 16% among long-term recipients (figure 1).

When stratifying the analyses by educational level, stronger associations between unemployment and having one or more diagnoses were found among persons with high education compared with lower educational levels (table 3). For all ICPC chapters and subgroup depression, this association increased in strength over the study years (table 3 and online supplemental table 2). The most prominent increase was seen for depression. In 2010, lower-educated recipients of long-term unemployment benefits had an RR=1.8 of being registered with depression, whereas higher-educated individuals had an RR=3.1, compared with their respective reference groups. In 2016, the corresponding figures were RR=2.0 for lower educated and RR=5.2 for higher educated (table 3).

## DISCUSSION

### Main findings

In a nationwide cohort based on Norwegian health and social security registries, we examined the difference in

prevalence of health problems between non-recipients, short-term recipients (≤180 cumulative days) and long-term recipients (>180 cumulative days) of unemployment benefits. Mental health problems among unemployed individuals are well known, whereas the differences in musculoskeletal and cardiovascular health problems between employed and unemployed individuals are less known. We found that the prevalence and likelihood of having one or more diagnoses within the ICPC chapters ‘musculoskeletal,’ ‘psychological’ and ‘cardiovascular’ increased with cumulative days of unemployment benefits (from short to long term) compared with non-recipients. This trend was present for all diagnostic groups and most prominent for psychological diagnoses and depression as a specific diagnosis. Over the study years, the proportion of individuals with depression increased among recipients of long-term unemployment relative to short-term recipients and non-recipients. Higher education among recipients was more strongly associated with having a diagnosis than among recipients with middle and lower education. This trend increased over the years.

### Strengths and limitations

The main strengths of this study are the use of complete registry data comprising all days of unemployment benefits from the Norwegian Labour and Welfare Administration and all diagnoses made in the publicly subsidised primary care services in Norway. Moreover, linking data from five national registries at the individual level provides a unique source of information, with no loss to follow-up and no reporting bias. A limitation of the study is the cross-sectional design, which cannot support the conclusion of temporal relationships between recipients and non-recipients of unemployment benefits and health problems. Second, due to limitations in the dataset, we could not identify a fourth exposure category of full-time unemployed for 365 days. Although the unemployment rate in Norway is low (2.5%–3% during the study period), it would have been interesting to examine if this group stood out from the other groups with respect to health problems. Third, the measure of health problems (≥1 diagnosis) is crude and signifies only that the person has consulted their GP for a health-related reason reported as a diagnosis by the GP. In the current study, differential misclassification could appear if the unemployed had less access to healthcare than the employed. However, as Norway offers low-cost universal healthcare services and every citizen has a designated regular GP, there is less reason to believe this is the case. It is a limitation that the ICPC system does not allow grading of the severity of the diseases, meaning that severity across employment status is not available. Finally, no information was available on diagnoses made in the specialist and private healthcare services.

The registry does not provide information on grading of unemployment benefits (less than 100%). Since the rate of full-time unemployment in Norway is about 3%, the majority of the unemployed in the present study were

**Table 2** Association (RR) between employment status (non-recipients of unemployment benefits, short-term recipients  $\leq 180$  days and long-term recipients  $> 180$  days) and certification of diagnoses ( $\geq 1$ ) in primary healthcare, adjusted for age, sex and education, during the years 2010, 2012, 2014 and 2016

	2010		2012		2014		2016	
	RR (95% CI)		RR (95% CI)		RR (95% CI)		RR (95% CI)	
	Crude	Adjusted*	Crude	Adjusted*	Crude	Adjusted*	Crude	Adjusted
MSD diagnoses								
Non-recipients	1		1	1	1	1	*1	1
Short term $\leq 180$ days	1.5 (1.5 to 1.5)	1.5 (1.5 to 1.6)	1.7 (1.7 to 1.7)	1.7 (1.7 to 1.7)	1.8 (1.8 to 1.8)	1.8 (1.8 to 1.8)	1.7 (1.7 to 1.7)	1.7 (1.7 to 1.7)
Long term $> 180$ days	1.8 (1.8 to 1.8)	1.7 (1.7 to 1.8)	1.9 (1.9 to 1.9)	1.8 (1.8 to 1.8)	1.9 (1.9 to 1.9)	1.8 (1.8 to 1.8)	1.7 (1.7 to 1.7)	1.7 (1.7 to 1.7)
Psych. diagnoses								
Non-recipients	1		1	1	1	1	1	1
Short term $\leq 180$ days	1.7 (1.7 to 1.8)	1.7 (1.6 to 1.7)	1.9 (1.9 to 1.9)	1.8 (1.8 to 1.8)	2.1 (2.1 to 2.1)	2.0 (1.9 to 2.0)	1.8 (1.8 to 1.8)	1.8 (1.7 to 1.8)
Long term $> 180$ days	2.6 (2.6 to 2.6)	2.4 (2.4 to 2.4)	2.7 (2.6 to 2.7)	2.4 (2.4 to 2.4)	3.0 (2.9 to 3.0)	2.7 (2.6 to 2.7)	2.4 (2.4 to 2.4)	2.2 (2.2 to 2.3)
Subgr. depression								
Non-recipients	1		1	1	1	1	1	1
Short term $\leq 180$ days	1.7 (1.6 to 1.7)	1.6 (1.5 to 1.6)	1.8 (1.7 to 1.8)	1.6 (1.6 to 1.6)	1.9 (1.9 to 1.9)	1.8 (1.7 to 1.8)	1.9 (1.8 to 1.8)	1.7 (1.7 to 1.7)
Long term $> 180$ days	3.1 (3.0 to 3.1)	2.8 (2.7 to 2.8)	3.3 (3.2 to 3.3)	2.9 (2.9 to 2.9)	4.0 (3.9 to 4.0)	3.5 (3.4 to 3.5)	3.6 (3.5 to 3.6)	3.3 (3.2 to 3.3)
CVD diagnoses								
Non-recipients	1	1	1	1	1	1	1	1
Short term $\leq 180$ days	1.0 (1.0 to 1.0)	1.2 (1.2 to 1.2)	1.1 (1.1 to 1.2)	1.3 (1.3 to 1.3)	1.2 (1.2 to 1.2)	1.3 (1.3 to 1.3)	1.1 (1.1 to 1.1)	1.3 (1.3 to 1.3)
Long term $> 180$ days	1.3 (1.3 to 1.3)	1.3 (1.3 to 1.4)	1.3 (1.3 to 1.3)	1.4 (1.3 to 1.4)	1.4 (1.3 to 1.4)	1.4 (1.4 to 1.4)	1.2 (1.2 to 1.2)	1.3 (1.3 to 1.3)

\*Adjusted for age, sex and education.

CVD, cardiovascular disease; MSD, musculoskeletal disorder; RR, relative risk.

**Table 3** Association between employment status (non-recipients of unemployment benefits, short-term recipients  $\leq 180$  days and long-term recipients  $> 180$  days) and certification of diagnoses ( $\geq 1$ ) in primary healthcare, stratified by educational level, adjusted for age and sex, during the years 2010 and 2016

	2010		2016	
	Levels of education*		Levels of education	
	Low	Med.	High	High
	RR 95% CI	RR 95% CI	RR 95% CI	RR 95% CI
MSD diagnoses				
Non-recipients	1	1	1	1
Short term $\leq 180$ days	1.3 1.3 to 1.3	1.4 1.4 to 1.4	1.4 1.4 to 1.4	1.8 1.8 to 1.8
Long term $> 180$ days	1.4 1.4 to 1.4	1.5 1.5 to 1.6	1.5 1.5 to 1.5	1.8 1.8 to 1.8
Psych. diagnoses				
Non-recipients	1	1	1	1
Short term $\leq 180$ days	1.1 1.1 to 1.1	1.5 1.5 to 1.5	1.9 1.9 to 1.9	2.5 2.5 to 2.5
Long term $> 180$ days	1.6 1.6 to 1.6	2.1 2.1 to 2.2	2.6 2.6 to 2.6	3.4 3.4 to 3.5
Subgroup depression				
Non-recipients	1	1	1	1
Short term $\leq 180$ days	1.1 1.0 to 1.1	1.5 1.4 to 1.5	1.8 1.7 to 1.8	2.5 2.4 to 2.5
Long term $> 180$ days	1.8 1.8 to 1.9	2.6 2.5 to 2.6	3.1 3.0 to 3.2	5.2 5.1 to 5.3
CVD diagnoses				
Non-recipients	1	1	1	1
Short term $\leq 180$ days	1.0 1.0 to 1.1	1.1 1.1 to 1.1	1.1 1.1 to 1.2	1.4 1.4 to 1.4
Long term $> 180$ days	1.1 1.1 to 1.1	1.2 1.1 to 1.1	1.2 1.2 to 1.2	1.5 1.4 to 1.5

\*Levels of education: Low $\leq 10$ th grade and high school, 1 year, Medium=high school, 3 years, High=college/university, low and college/university, high. CVD, cardiovascular disease; MSD, musculoskeletal disorder.

unemployed part-time and combined unemployment benefits with work and/or health-related benefits.

The results of this study could be transferable to countries with similar universal health and welfare schemes as Norway, such as the Nordic countries, the Netherlands and the UK.

### Unemployment-related health inequalities

According to the literature, two major hypotheses explain social inequalities in health, that is, social causation and health selection.<sup>20</sup> First, upstream determinants of health, such as education, are likely to situate people in life circumstances that are more or less beneficial for health, thus pointing to social causation as the primary driver of social inequality in health. On the other hand, health may be a barrier or a facilitator for educational achievements in the first place, thus pointing to health selection as the origin of social inequality in health.<sup>20</sup> In the current study, we found a significantly higher likelihood of having a diagnosis among recipients of unemployment benefits compared with non-recipients. Both social causation and health selection may contribute to these disparities, mainly by reinforcing the social gradient in health and providing people with higher socioeconomic status with better conditions for stable employment.<sup>21</sup>

### Musculoskeletal health conditions

Studies on unemployment inequalities in MSD are limited. A Swedish survey study found a twofold RR of MSD associated with accumulated unemployment days during 12 years of follow-up compared with workers without unemployment during the same period.<sup>14</sup> These findings are comparable to the ones found in the current study, thus strengthening the evidence for a higher prevalence of MSD among the unemployed. Among lower-educated people and unskilled manual workers in Norway, MSD is the most frequent sick leave diagnosis,<sup>22</sup> which might influence the unemployment-related MSD risk found in this study.

### Mental health conditions

Our finding of a consistent difference in psychological diagnoses across recipients of unemployment benefits and non-recipients is in line with the literature demonstrating unemployment-related inequalities in mental health, particularly concerning depression.<sup>6 23 24</sup> A systematic review and meta-analysis of unemployment associated with depression in Europe found a prevalence of 16% for the subgroup major depression among the unemployed. This finding is similar to the current study and indicates that the ICPC code for depression is consistent with more serious disease. Moreover, the relative difference between employed and unemployed was lower in the above-mentioned review<sup>6</sup> compared with long-term unemployed in the current study (twofold vs threefold, respectively). Most likely, a longer duration of unemployment is stressful and increases the risk of mental health problems.<sup>25</sup> Moreover, people with more

persistent depression may be marginalised in work life and selected into this group.<sup>26</sup>

### Cardiovascular health conditions

A cross-sectional register-based study using data from the Dutch prescription database (2016) found significant differences in the prevalence of CVDs between employed and unemployed, 9% vs 20%, respectively.<sup>15</sup> Compared with the current study, the difference in prevalence of CVD between non-recipients and recipients of unemployment benefits was considerably larger, most likely because the Dutch study used drug prescriptions as a proxy for CVD,<sup>15</sup> whereas the current study included all diagnoses recorded in general practice and municipal out-of-hours service. Given that medication reflects the severity of CVD, it is likely to infer a higher severity among the unemployed compared with the employed in the Dutch study.

### The role of sickness absence

In the current study, we found that more than half of the workers receiving short-term or long-term unemployment benefits had been sick-listed the same year. In contrast, non-recipients had a considerably lower sickness absence rate. As sickness absence requires a certified diagnosis, generally from a GP, the substantially higher proportion of diagnoses among unemployment benefits recipients was probably influenced by their higher sickness absence rate. Typically, a high sick leave rate among population groups indicates poor health, but often also a demanding work situation with little tolerance for even minor health problems. There are concerns that the gap in compensation between sick pay covering 100% for 12 consecutive months and unemployment benefits covering considerably less will situate people with health problems in 'locked-in positions' where income through sick pay is more attractive than poor quality working environment, contracts with short duration or full-time unemployment benefit. Thus, sickness absence in the current study may act as a buffer towards unemployment and as a driver of diagnoses.

### Unemployment-related health inequalities by education

Surprisingly, our findings indicate that among highly educated people, the association between unemployment and health problems was much stronger than among people with medium and low education. In principle, this finding demonstrates the social gradient in health, meaning that higher-educated people generally have better health and a higher likelihood of stable employment than lower-educated people. Thus, the relative difference in health between the employed as a reference group and the unemployed is larger among the higher-educated than among the middle and lower-educated. As outlined, social causation and health selection may both contribute to the accumulation of 'healthy' people among the higher educated compared with the medium and lower educated.<sup>20</sup> A systematic review found that higher



education seemingly acted as a buffer against the negative health effects of unemployment,<sup>5</sup> thus increasing the chance of reemployment.<sup>21</sup> On the other hand, the drop in status from a higher-education job to unemployment may accelerate feelings of shame and worthlessness<sup>26</sup> and raise barriers to seeking re-employment. Unemployment-related health inequalities by higher education were also found in a study of marginalisation among young adults with depression, demonstrating a higher RR among those who had completed upper secondary school versus non-completers, whereas the absolute risk was considerably higher among non-completers.<sup>7</sup>

Finally, we found a temporal increase in the RR of diagnoses across recipients of unemployment benefits versus non-recipients among all educational strata during the study period. This finding may indicate an increased healthy-worker effect among all education groups over time, but more noticeable among those with higher education. Finally, ill health among specialist workers may increase the risk of prolonged unemployment due to less chance of reemployment within similar work. This may be the case independent of educational level.

## CONCLUSIONS

In this comprehensive register study from Norway examining health problems among recipients of short-term and long-term unemployment benefits, we found significant associations with musculoskeletal diseases, CVDs and mental health diseases compared with non-recipients. This trend was relatively stable over the years 2008–2016. A novel finding was that the difference in prevalence of health problems between recipients and non-recipients of unemployment benefits increased with higher education and over the study years. The direction of the relationship could not be determined in this study.

Healthcare personnel should be particularly aware of these health risks and follow-up carefully. As this group is likely to be 'in and out of work', transiting between unemployment benefits, sickness absences and/or part-time work, close collaboration between primary healthcare, the social security services and labour organisations is necessary to move towards sustainability in health and work participation. At the policy level, prioritising a high-quality work environment, employment conditions and follow-up in healthcare would be an important step towards fair employment.

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