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Mental Health, Work, Welfare and Vocational Rehabilitation

A Comprehensive Study of Young Adults in the Norwegian Welfare State

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Table of Contents

Preamble and Acknowledgements

My PhD is part of a larger project funded by the Research Council of Norway: IPS Bodø II (#280589), "There is strong evidence that patients with severe mental illness can be successfully employed. Is the effect sustainable long-term? " I completed my PhD at the Competence Centre for Work and Mental Health (KAPH) at Nordland Hospital Bodø and the Department of Community Medicine UiT, The Arctic University of Norway.

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Abstract

Background: Norway, well known internationally for its high living standards and comprehensive welfare system, faces a paradox regarding its young working-age adults - low unemployment but high and increasing uptake of health-related welfare benefits, mainly due to mental health problems. My study investigates this upward trend in young adults' reliance on health-related welfare benefits by delving into the complex relationship between Norway's welfare system, social health determinants, mental health, labour market engagement, and vocational rehabilitation, focusing on the evidence-based Individual Placement and Support (IPS) vocational rehabilitation approach. It reflects on three decades of economic changes, the consequences of a major welfare reform and the effects of IPS implemented as a cross-sectoral collaboration at the municipality level.

Aims: The overarching goal of my thesis is to investigate the different factors influencing young adults' transitions into health-related welfare dependency, the effect of major welfare reform on the uptake of health-related welfare benefits, and the societal impact of IPS implementation on competitive employment outcomes. I seek to generate new evidence to inform policy that better serves young adults in the Norwegian welfare state.

Method: Utilising high-quality Norwegian register data I conducted longitudinal, comparative analyses across multiple cohorts. Sequence and cluster analyses identify typical health-related benefit trajectories among young adults in Norway. A difference-in-difference method estimates the causal effect of IPS implementation on employment (work days per year) among young adults receiving a health-related rehabilitation benefit.

Findings: Most young adults receiving health-related welfare benefits are early school leavers with weak labour market attachment. After the welfare reform, this group saw a substantial rise in long-term reliance on health-related benefits. IPS had a significant positive effect on the number of days young adults receiving the WAA worked per year.

Conclusion(s): Current Norwegian policy does not adequately address the needs of young adults with low educational attainment, weak labour market attachment and mental health problems. There is a need for a shift in policy towards cross-sectoral collaboration, integrating evidenced-based individualised vocational rehabilitation approaches such as IPS.

List of Papers

Paper 1

Wittlund S, Mykletun A, Lorentzen T. Disability pension dynamics in early adulthood: A two-decade longitudinal study of educational, work and welfare-state trajectories in Norway. SSM Popul Health. 2022 Mar 13; 17:101062. doi: 10.1016/j.ssmph.2022.101062. PMID: 35313607; PMCID: PMC8933578.

Paper 2

Wittlund S, Lorentzen T. Changes in health-related rehabilitation trajectories following a major Norwegian welfare reform. BMC Public Health. 2023 Jul 28;23(1):1444. doi: 10.1186/s12889-023-16272-9. PMID: 37507675; PMCID: PMC10375644.

Paper 3

Brinchmann B*, Wittlund S*, Lorentzen T, Moe C, McDaid D, Killackey E, Rinaldi M, Mykletun A. The societal impact of Individual Placement and Support implementation on employment outcomes for young adults receiving temporary health-related welfare benefits: a difference-in-differences study. (Under second review at Psychological Medicine).

*Beate Brinchmann and Sina Wittlund are joint first authors.

Abbreviations

ACE: Adverse childhood experiences

CMHC: Community mental health centres

DID: Difference-in-differences

DiDiD: Difference-in-difference-in-differences

DPS: District Psychiatric Centres

FE: Fixed Effects

GP: General practitioner

IA-Agreement: Agreement for a More Inclusive Working Life

ICD: International Classification of Diseases

ICPC: International Classification of Primary Care

IPS: Individual Placement and Support

LCS: Longest common sequence

MSA: Multichannel sequence analysis

MSMI: Moderate and severe mental illness

NAV: Norwegian Labour and Welfare Administration

NOK: Norwegian kroner

OECD: Organisation for Economic Co-operation and Development

RHA: Regional Health Authorities

SA: Sequence analysis

SDOH: social determinants of health

SE: socio-economic

SE: Supported employment

SSB: Statistics Norway

WAA: Work Assessment Allowance

WCA: work capacity assessment

WHO: World Health Organisation

1 Introduction

Norway, renowned for its high living standards and robust welfare system, is often regarded as a successful model for social welfare programs. However, when examined from an international perspective, Norway reveals an intriguing paradox concerning its population of young working-age adults[1]. While the country boasts a relatively low proportion of unemployed young adults [1, 2], it also exhibits a high uptake of benefits due to health problems. Currently, around 7.8% of young adults aged 18-39 in Norway receive either temporary health-related rehabilitation benefits or permanent health-related disability benefits [3-5], which is substantially higher than other Organisation for Economic Co-operation and Development (OECD) countries [6, 7]. Since the mid-1990s, the proportion of young adults aged 18-39 granted permanent benefits, attributed mainly to mental health problems, has increased by 43.9% [5, 8]. In contrast, the general population of this age group has increased by only 11.3% [5]. Also noteworthy is that the proportion of this demographic in the total Norwegian population has dropped by 3.3% in the same time frame [5].

The overarching goal of my thesis is to explore the intricate relationship between the Norwegian welfare system, reliance on health-related welfare benefits[2], social determinants of health (SDOH)[3], mental health, labour market dynamics, traditional vocational rehabilitation approaches and the Individual Placement and Support (IPS) vocational rehabilitation approach among young adults in Norway. For my thesis, SDOH encompasses socioeconomic status (educational attainment, income and labour market participation), gender, country background and parental factors (educational attainment, reliance on health-related disability benefits). This inquiry encompasses a comprehensive analysis of the diverse factors that influence the progression of young adults towards a state of reliance on health-related welfare benefits.

Identifying potential turning points is pivotal in redirecting young adults from trajectories that could lead to reliance on health-related welfare benefits. By pinpointing critical junctures in

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[1] For the purposes of my thesis young adults are defined as those aged 18-40. Note that age categories used in publicly available data do not always align with this age range.

[2] Health-related welfare benefits is a collective term for temporary health-related rehabilitation benefits or permanent health-related disability benefits. It does not include benefits for sick leave from work.

[3] The social determinants of health (SDOH): "non-medical factors that influence health outcomes."[9].

the lives of these individuals, I aim to identify strategic opportunities for implementing targeted evidenced-based vocational rehabilitation interventions such as IPS that can improve competitive labour market outcomes among young adults in Norway.

Papers 1 and 2 explore the educational, work and welfare state trajectories of young Norwegian adults through health-related rehabilitation to reliance on life-long disability benefits. Paper 3 aims to test whether IPS, implemented at the municipality level through a cross-sectoral collaboration between health and welfare services, can redirect these young adults from a trajectory ending in permanent disability benefits to a trajectory leading to competitive employment.

My research not only contributes to academia but also has the potential to inform policy and practice. By shedding light on the interplay between risk factors for dependence on health-related welfare benefits among young adults in Norway, my thesis provides a foundation for designing evidence-based interventions that steer this group away from reliance on health-related welfare benefits. Ultimately, my work strives to enrich the lives of vulnerable young adults and contribute to the broader goal of fostering a resilient and self-reliant society in Norway.

1.1 Work and Health

There is strong evidence that work has a positive impact on mental and physical health, as well as overall well-being [10]. At the same time, unemployment correlates with poorer physical and mental health outcomes [11-13]. Nevertheless, it is essential to recognise that the quality and nature of work play a crucial role. Jobs of subpar quality can negatively impact mental well-being, and concerningly, individuals with mental health problems often find themselves in roles that do not align with their skills. Moreover, they are overrepresented in lower-skilled positions, such as office work, customer service, and basic labour [14]. This overrepresentation is concerning because such occupations frequently have high psychological demands with limited decision-making autonomy, resulting in work-induced stress, which is a significant contributor to deteriorating mental well-being.

That said, certain workplace factors buffer against the development of mental health problems. Foremost among these is effective leadership; specifically, a supervisor who

provides support, offers constructive feedback, and acknowledges the employee's efforts [14]. Thus, when jobs are safe, accommodating, and of good quality, they can serve as a therapeutic means to reverse the adverse health effects of unemployment [10]. Considering these factors, the benefits of work generally outweigh the risks, making it advantageous for health and well-being.

Extensive research shows that early labour market exit and social exclusion[4] have detrimental consequences at the individual and societal levels [17]. At an individual level, early labour market exit leads to adverse health and economic consequences [18, 19]. On a societal level, failing to integrate young adults into the labour market results in high socioeconomic costs, including increased social security payments, greater utilisation of health services, decreased labour productivity, reduced tax receipts and unused educational investments [6,14]. Moreover, disregarding the potential and value creation that young adults bring to society perpetuates these losses.

A combination of individual characteristics and the current economic landscape influences the success or failure of young adults in the labour market. Individual factors, such as mental and physical health, educational attainment, prior work experience, family background, and gender, significantly impact labour market outcomes [20-23]. In addition, macroeconomic conditions and labour market institutions play a crucial role. Factors such as active labour market strategies and laws safeguarding employment influence the experiences of young adults [24, 25]. Experiencing early labour market exclusion and job insecurity can set these young adults on a life course characterised by poor health and well-being and long-term reliance on welfare benefits.

1.2 The Life Course Perspective

The life course perspective is a conceptual framework that examines the various stages and transitions individuals experience throughout their lives [26]. It emphasises the importance of viewing individual lives as dynamic and interconnected trajectories that unfold over time

[4] Social exclusion is a concept with multiple definitions [15]. Burchardt et al.[16] define social exclusion as: "An individual is socially excluded if he or she does not participate in key activities of the society in which he or she lives".

rather than isolated events. This perspective recognises that a complex interplay of social, historical and cultural factors shapes people's lives by influencing their choices, opportunities, and outcomes at different stages of life [27].

Central to the life course perspective is that early experiences and events can influence individual trajectories and impact later life outcomes [28]. Researchers adopting this framework aim to uncover patterns, transitions, and turning points in people's lives while considering the cumulative effects of events and experiences. The longitudinal aspect of the life course perspective involves studying individuals over an extended period, allowing researchers to capture changes, continuity, and developmental processes over time.

A fundamental component of the life course perspective is that society has expectations about the order in which individuals should experience important life events, such as education, employment, marriage, and parenthood [28]. These societal norms guide individuals' decisions and behaviours, shaping their life courses. For instance, society expects individuals to complete their education before entering the workforce and make smooth education-to-work transitions. Adhering to these societal norms provides a feeling of stability and social inclusion, while deviating from them may lead to unique challenges in their trajectories through education, work and welfare and their life chances.

1.2.1 Mental health problems

Mental health problems, often emerging in early life [29], can profoundly impact young adults' educational attainment and labour market outcomes. Despite a gap in comprehensive long-term prevalence information [30], publicly available data illustrate a growing trend in mental health problems among Norway's youth and young adults.

Below I present information on mental health problems in Norway obtained from several public data sources (Statistics Norway, the Norwegian Labour and Welfare Administration and Norgeshelsa). While these data do not align by age range or time interval, they collectively illustrate developments in self-reporting, healthcare-seeking behaviour and treatment for mental health problems amongst youths and young adults in Norway.

Between 1998 and 2012, there was a 31.0% increase in self-reported mental health problems among Norwegian inhabitants aged 16-44[5] [31], while the proportion of this age group in the total Norwegian population only increased by 7.1% [5]. There was also a 25.5% rise in general practitioner (GP) consultations and emergency room presentations due to mental health problems among those aged 15-44 from 2010 to 2020 [31]. In contrast, the total population within this age bracket saw a 6.2% increase [5]. Moreover, there has been a marked rise in prescription medications for mental health problems[6]. From 2005 to 2021, young adults aged 18-44 witnessed a 27.1% rise in such prescriptions[7] [31], while the general population within this age category only grew 11.4% [5].

Youths and young adults experiencing mental health problems may struggle to complete their education, leading to a higher risk of high school dropout or failing to pursue higher education. Early school leaving, in turn, limits their access to well-paying and stable jobs [32, 35], increasing the likelihood of reliance on health-related welfare benefits [35-37].

The rising trend of mental health problems has been accompanied by an increased uptake of health-related welfare benefits among Norwegian young adults. As of September 2023, mental health problems accounted for 71.6% of temporary health-related rehabilitation benefits for those aged 18-29. These mental health problems are categorised into three groups [37, 38]: "Mild mental conditions" (e.g. feeling/behaving irritable/angry, phase of life problem, other psychological symptom/complaints, post-traumatic stress disorder, phobias) 23.6%; " Anxiety or depressive symptoms or conditions" 24.8%; and " Other mental/behavioural conditions" (e.g. organic disorders, schizophrenia substance abuse, personality disorders, hyperkinetic disorders and mental retardation) 23.2% [38]. Over the last decade, the proportion of this age group receiving temporary health-related rehabilitation benefits due to mental health problems has risen by 6.1% due to expansion of the "Mild mental conditions" category [37, 38].

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[5] The proportion of those aged 16-44 with significant symptoms of psychological distress measured by the Hopkins Symptoms Check List (HSCL-25) [31]

[6] Antidepressants, antipsychotics, sedatives, medications for treatment of sleep problems, medications for treatment of Attention Deficit Hyperactivity Disorder ADHD [31]

[7] Users of medicines prescribed to people in the 18-44 age group. Users are defined as people who have collected at least one prescription from a pharmacy during the year. If a user collects several prescriptions for the same medicine, that person is only counted once [31]

According to the latest publicly available data from 2017, 62.9% of permanent health-related disability benefits for those aged 18-39 were granted due to mental health problems: schizophrenia, schizotypal delusional and organic disorders (7.7%), mood disorders (4.9%), neurotic and behavioural disorders (28.6%), personality disorders (6.0%), substance use disorders (1.9%), mental retardation (13.8%) [39].

Looking back, between 2005 -and 2017, the proportion of 18-39-year-olds receiving disability benefits due to mental health problems, primarily due to the neurotic and behavioural disorders category, increased by 7.4% [39-42]. In the same timeframe, the proportion of this group receiving these benefits due to severe mental health problems (schizophrenia, schizotypal delusional and organic disorders) decreased by 3.2% [39-42]. All other diagnostic groups (personality disorders, substance use disorders, mood disorders and mental retardation) remained relatively stable [39-42].

1.2.2 Social determinants of health

As per the World Health Organisation's (WHO) definition, the social determinants of health (SDOH) are the non-medical factors, such as socioeconomic status (SES), childhood adversity, educational attainment, unemployment and job insecurity, that influence health outcomes [9].

Socioeconomic status

SES is a multifaceted concept that encapsulates an individual's living and occupational conditions, along with their material, psychological, and social assets. These elements guide people's decisions and actions, influencing their societal, environmental, and behavioural risks and stress [43]. SES is a pivotal SDOH as low SES can translate into limited access to quality education, healthcare, and employment prospects [9]. Simultaneously, the volatility of the labour market introduces a dynamic element. Factors like job insecurity, temporary contracts, and underemployment can breed stress and uncertainty, negatively impacting mental well-being [44-46]. Young adults from disadvantaged backgrounds may encounter difficulties accessing or completing education and securing stable jobs, leading to financial instability and increased reliance on welfare assistance.

Childhood disadvantage

Childhood disadvantage plays a crucial role in shaping young adults' opportunities and resources. Adverse childhood experiences [47] are potentially traumatic events during childhood, such as abuse, neglect, witnessing domestic violence, or living with substance abuse, that can have profound and lasting impacts on an individual's life course trajectory [48]. Early exposure to traumatic events can disrupt the normal development of the brain and other biological systems, leading to impairments in cognitive functions, emotional regulation, and social skills [49]. These disruptions can manifest in academic challenges, diminishing a child's potential for educational attainment. Lower education levels often translate to fewer job opportunities and reduced earning potential later in life [50].

Additionally, the chronic stress from ACEs can elevate the likelihood of health problems like cardiovascular disease, metabolic disorders, and obesity [51]. Mental health is also profoundly affected, with individuals who have experienced ACEs showing higher rates of depression, anxiety, and other psychiatric disorders. The psychological pain and coping deficits stemming from these traumas can lead to relief-seeking through substance use, elevating the risk for addiction in adolescence and adulthood [52]. Essentially, ACEs lay the groundwork for a cascade of challenges reverberating through a person's life, influencing their social, economic, physical, and mental well-being.

Disadvantages are frequently passed down from parents to their children, with parental SES being a strong predictor of their children's future circumstances [53-58]. When parents rely on disability benefits, their offspring are more likely to depend on the same financial support [59]. Moreover, young adults with parents who have not completed upper secondary education face a higher likelihood of relying on such benefits than those with parents who advanced to higher education levels [54, 60-62]. Parents with lower levels of education may face challenges in assisting their children with schoolwork, and factors like poverty or overcrowding can hinder effective learning [63-65]. Moreover, parents who are not employed often lack professional connections to assist their children in securing employment opportunities [66-68]. People from underprivileged backgrounds may also face challenges acquiring the social skills required in today's professional environments [69, 70].

While intervening early in life is preferable, specialised interventions targeting young adults from underprivileged backgrounds could also improve health, function and labour market

outcomes [7, 14]. These interventions aim to equip individuals with the necessary resources and support systems to become economically self-sufficient.

Educational attainment

Most young adults who rely on health-related welfare benefits leave school early and have limited work experience [36, 37]. Young adults with low educational attainment and lacking foundation educational skills face significant challenges in the labour market in Norway and internationally [71-73]. The limited job opportunities available to young adults with low educational attainment perpetuate their economic disadvantage; many entry-level jobs require basic literacy and numeracy skills, which they may lack [74-77]. As a result, they struggle to secure stable employment and may be limited to low-paying jobs with limited growth prospects [71, 73, 78, 79].

The skills mismatch exacerbates the problem. Employers seek candidates with diverse skill sets in the rapidly evolving job market. They are more likely to invest in training higher-skilled workers where they can expect a greater return on investment [72]. Young adults lacking educational foundations may not possess the necessary skills to meet these demands, leading to a mismatch between their skills and available job opportunities. This further hinders their chances of finding stable employment, increasing the risk of reliance on welfare benefits for economic support.

1.2.3 Interplay between risk factors

The interplay between these risk factors further compounds their impact [71, 80]. Several researchers have demonstrated that one's socioeconomic background cannot be isolated from health [17, 82-85] and receiving welfare benefits [86]. A strong socioeconomic gradient in health exemplifies how individuals' health outcomes are linked closely to their SES. Individuals with lower SES tend to encounter more health problems, leading to a cascade of effects such as increased absenteeism, reduced productivity in the workplace [87-90] and higher uptake of welfare benefits due to health-related problems. Additionally, the interplay between education and health further elucidates the complexity of this relationship.

The interplay between education and health operates bidirectionally [91]. On the one hand, poor health can impede educational attainment. Early onset mental health problems, for

example, can disrupt the educational trajectory of youths and young adults, hindering their ability to engage in learning and subsequently lowering their chances of obtaining the qualifications necessary for skilled employment [92, 93]. Lack of education and job skills perpetuates the cycle of limited opportunities and reduced socioeconomic mobility [94].

Conversely, education also influences health outcomes. Higher educational attainment correlates with better health literacy, access to healthier lifestyle choices, and a greater likelihood of seeking timely medical care [91]. Individuals with higher education levels might more effectively make informed decisions about their health and embrace preventive measures, leading to enhanced overall health and well-being.

Collectively, these risk factors can have a "scarring effect", which refers to the long-term negative impacts on individuals due to poor school-to-work transitions and unemployment [95], especially during their formative years. These scars can manifest in various ways - diminished future earnings, lower life satisfaction, decreased mental and physical health, and societal exclusion.

The intertwining relationship between SES, health, education and adults' labour market outcomes underscores the need for comprehensive policies and interventions that address these interconnected factors [92]. Thus, efforts to decrease health-related exclusion from the labour market among young adults should consider the broader context of socioeconomic disparities and prioritise initiatives that break the cycle of disadvantage, promoting equal access to education and healthcare for all individuals, regardless of their background.

1.2.4 Importance of the life course perspective for my research

Integrating a life course perspective into my research is essential for several reasons. Firstly, this approach allowed me to capture the dynamic relationships between SDOH, labour market transformations and young adults' reliance on health-related welfare benefits. Examining these factors over time allowed me to uncover how early life experiences and transitions shape the educational, work and welfare state trajectories of young Norwegian adults.

Secondly, the longitudinal perspective identifies critical junctures where vocational interventions can be most effective for young adults. Grasping the chronology of events over

an extended timeframe can guide policy and the implementation of targeted vocational interventions that address the individual's needs and foster beneficial labour market outcomes for young adults. Additionally, the longitudinal perspective allows for exploring the cumulative effects of risk factors, acknowledging that their impact often unfolds over time. This perspective can provide a more comprehensive understanding of how these factors interact and influence labour market outcomes and health-related welfare dependency among young Norwegian adults.

1.2.5 The role of the welfare state

Welfare state frameworks refer to the systems and policies governments implement to provide social protection and support to their citizens. Another relevant aspect of the life course perspective in my thesis is examining how the Norwegian welfare state framework influences young adults' life courses and their risk for health-related welfare dependency in young adulthood. This perspective recognises the influence of social policies in determining the life courses of young adults, especially regarding their labour market outcomes and reliance on financial assistance from the welfare state.

One of the key ways in which welfare state frameworks shape life courses is through their impact on social and economic opportunities [96-99]. Welfare state frameworks prioritise and allocate resources differently, leading to variations in access to education, employment, healthcare, and other essential public services. The foundation of social-democratic welfare states, frequently called the Nordic welfare states, is built upon equality, prioritising social services, such as substantial welfare benefits, public education and universal, government-funded healthcare [96, 100].

In Norway, for example, extensive social investment policies encompass the individual's entire life course [101]. Such social investments target maximising human capital productivity transforming individuals into economic contributors. These investments not only propel economic expansion but also curtail governmental expenditures. Resulting policies encompass domains such as early childhood and adolescent education, further education and training, initiatives to promote an active labour market, provisions for parental leave and universally available free health care [102]. Access to high-quality education, healthcare, and

welfare benefits can positively influence young adults' life courses by providing a solid foundation for personal and professional development, which has knock-on effects on society.

By making substantial investments in free education, the Norwegian government expects a long-term return on investment in taxes from productive and competitively employed individuals [102]. The Norwegian government recognises that providing accessible and high-quality education to citizens is a matter of social justice and a strategic economic decision [101]. In addition to their direct effects on individuals, the prioritisation of investment in free education investment is part of a larger strategy to cultivate a skilled and productive workforce that will ultimately contribute to the tax revenue needed to sustain the comprehensive welfare system [101].

Moreover, the availability of high-quality healthcare aims to ensure that individuals in Norway receive adequate medical care and support throughout their lives. This healthcare access promotes physical and mental well-being and helps individuals maintain productivity and actively participate in society [103]. Providing welfare benefits may further enhance the well-being of individuals in Norway. Comprehensive social security systems, including disability benefits, unemployment benefits, parental leave, and pensions, offer a safety net that supports individuals during challenging times and ensures a basic standard of living [104]. These benefits help alleviate financial burdens and foster social cohesion and equality.

In contrast, countries with different welfare state frameworks may face variations in the accessibility and quality of education, employment opportunities, healthcare, and other essential public services. These disparities can have significant consequences for individuals, as limited access to education and opportunities may hinder their personal development and economic mobility [105].

Critical to my thesis is the role of health-related welfare benefits in the Norwegian welfare state and how this influences at-risk young adults' educational, work and welfare state trajectories and, therefore, their risk for reliance on these benefits. Several studies suggest that the more generous the social security system, the more people rely on it [106]. In this regard, social norms and expectations influence people's transitions and trajectories [107]. For example, young adults should support themselves through competitive employment, and society may regard it inappropriate for them to depend on welfare benefits. Therefore,

evaluating whether the current system, attitudes, and practices strike the optimal balance is essential, considering the inevitable errors any system may make.

2 The Norwegian Context

Norway has gained a global reputation as a highly egalitarian nation, renowned for its robust public education, healthcare, and social security systems. The country has made significant strides in creating an equal society, ensuring all citizens have access to essential services and support. In the early 1990s, the Norwegian government adopted a work-first approach. As per the Government's 1995 Welfare Policy Report [108], this approach emphasises employment as the primary option for all capable individuals, while welfare benefits should ensure a decent standard of living and act as insurance against income loss. Policies and programs should facilitate the young, sick and disabled to engage in the workforce. While such "employment first" labour market policies have become increasingly popular in most OECD countries since the 1990s, a notable characteristic of this approach in the Norwegian context is the emphasis on human capital investment rather than labour market re-entry [109].

Based on global benchmarks, Norway has a large portion of its working-age citizens in competitive employment [72]. However, there has been a concerning rising trend of young adults on health-related welfare benefits due to mental health problems [38, 39], which challenges the government's finances as providing these benefits incurs tax revenue loss and imposes significant public expenses.

As with many other OECD countries, macroeconomics in Norway is influenced increasingly by the challenges posed by an ageing society and a declining birth rate [72, 110-112]. As the population ages and the proportion of elderly citizens grows, the country faces complex economic and social implications. A key concern revolves around sustaining the robust public services Norway is renowned for, such as health and social care [112]. These services, disproportionately utilised by the elderly, require substantial funding, primarily through the taxation of adults in competitive employment. However, with a shrinking pool of working-age individuals contributing to the tax base, maintaining the financial viability of these services becomes a significant challenge [113].

Mobilising unemployed young adults into the workforce is crucial in addressing the challenges of an ageing society and declining birth rate in Norway. The influx of young workers contributes to increased tax revenues, which can help sustain the funding required for these services, ensuring their continued accessibility and quality amidst demographic shifts [18, 103, 110-112]. To address these challenges, Norway has adopted a strategy emphasising investing in education [101, 110]. By prioritising education, Norway seeks to tackle the ageing population challenge on multiple fronts. First, a more skilled workforce can help mitigate the potential labour shortages stemming from a shrinking working-age population. Second, higher levels of education equip young adults with the skills and adaptability needed to navigate an evolving job market, promoting lifelong employability. Finally, the resulting increase in taxable income generates a sustainable revenue stream that supports the financing of public services that cater the elderly's needs.

2.1 Norwegian labour market transformations

Transformations in the Norwegian economy since the 1990s have triggered far-reaching changes in the labour market, negatively impacting young adults with low educational attainment [72, 114]. Further, predictions suggest the demand for workers with high education will increase while the demand for low education workers will decrease [115, 116]. One of the primary drivers of this transformation has been the expansion of tertiary education in Norway. As part of the human capital social investment approach, the government has invested heavily in promoting higher education, significantly increasing the number of individuals pursuing advanced degrees [117, 118]. As a result, demand in the job market has transformed, with employers increasingly seeking workers with higher levels of education and specialised skills.

Furthermore, the rapid advancement of technology and the adoption of labour-saving automation have exacerbated the challenges faced by individuals with low educational attainment [119, 120]. Automation has enabled businesses to streamline processes, increase productivity, and reduce costs. However, this shift has also decreased the demand for manual and routine jobs that less-educated workers traditionally performed. Consequently, young adults with low educational attainment find themselves disadvantaged, as their skill set may not align with the evolving demands of the labour market [72].

In addition to the changes brought about by education expansion and automation, the influx of workers from Central and Eastern Europe has significantly impacted the Norwegian labour market. Being part of the European Economic Area (EEA), Norway allows for the free movement of workers within the region, attracting immigrants who have increasingly filled positions that unskilled Norwegian workers previously occupied [121]. This competition for jobs has further marginalised young adults with limited education, as they face heightened displacement risks and a shrinking pool of employment opportunities.

2.2 Norwegian Agreement for a More Inclusive Working Life

Under the social investment strategy, Norway unveiled the tripartite Agreement for a More Inclusive Working Life (IA Agreement) in 2001, which aims to reduce sick leave and increase work participation [122]. This landmark agreement is based on collaboration between the government, employer organisations (NHO, KS, Spekter, and Virke), the state as an employer and trade unions (LO, Unio, YS, and Akademikerne). In Norway, nearly 70% of the labour force are trade union members [123].

The IA Agreement sets forth ambitious objectives to improve the Norwegian working landscape. It seeks to create a working environment that accommodates everyone and emphasises preventing sick leave and withdrawal from the workforce, ultimately promoting higher employment rates [124]. Such measures include initiatives to improve the work environment and reduce factors contributing to sick leave. A second significant aim of the IA Agreement is reducing withdrawal from work life. This withdrawal primarily affects individuals with long-term sickness absence, leading them to rely on early retirement, health-related rehabilitation benefits or disability benefits. The agreement is continuously assessed, adjusted, and developed to respond effectively to the needs of the workforce and the changing landscape of employment.

At the national level, the IA Agreement strives to reduce sick leave by 10% compared to the 2018 average and decrease withdrawal from work life [122]. In order to achieve this goal, various industries and workplaces focus on maintaining low sick leave rates through preventive measures and targeted interventions. The success of the IA Agreement is assessed based on specific efforts, activities, and results. Indicators have been developed to evaluate cooperation between parties and authorities, encompassing initiatives from the tripartite

Council for Working Life and Pension Policy, led by the Ministry of Labour and Social Inclusion.

Implementation of the IA Agreement occurs through a multi-tiered structure. The workplace serves as the main arena for IA work, with collaboration between management, employee representatives, and safety delegates being crucial. At the national level, the Council for Working Life and Pension Policy oversees the IA Agreement's progress. The coordination committee, composed of leading organisations and authorities, handles operative follow-up. An expert group ensures relevant knowledge and information for informed decision-making.

Various policy instruments are employed to support the agreement's objectives. These include the development of a new working environment program, enhanced training in working environment efforts, and creation of a coordinated working life service. The Health in Work instrument also seeks to promote health and prevent illnesses among employees at risk of leaving the workforce due to musculoskeletal problems and mental health problems. The agreement also encourages extended self-certified sick leave and offers grants for external expert assistance in cases of long-term sickness absence.

2.2.1 Effectiveness of the Agreement for a More Inclusive Working Life

Peer-reviewed articles present mixed and inconclusive findings regarding the effectiveness of the IA Agreement in reducing sick leave. While some research indicates insignificant impacts on prolonged sick leave among younger and mid-aged employees [125, 126], other studies point to possible benefits related to the length of sickness leave and the likelihood of resuming work [127, 128].

Hasting et.al.[128] indicate some positive trends associated with the IA Agreement. Their results suggest a potential reduction in sickness absence duration, particularly for musculoskeletal and psychological diagnoses, with more notable effects observed in men. However, despite these trends, statistical significance remains uncertain, possibly attributing these outcomes to chance. Gran et.al.[127] offer a slightly more optimistic perspective, finding a small yet consistent positive effect of having an IA agreement on the probability of returning to work after sickness absence [127]. Although modest, this effect remains stable over time, implying

that the IA Agreement may facilitate a smoother reintegration into the workforce for employees on sick leave.

2.3 The Norwegian Labour and Welfare Administration

Another notable result of Norway's emphasis on social investment strategy and the "work-first" approach was the unification of three entities: the Norwegian Social Security Agency (Trygdeetaten), the Labor Market Agency (Aetat) and municipal social services [129]. This consolidation began in 2006, culminating in 2011, leading to the creation of the Norwegian Labour and Welfare Administration (NAV) [130]. NAV oversees all labour and welfare-related services in Norway [131]. The reform's impetus stemmed from worries about the potential permanent or temporary side-lining of many from the job market. Additionally, there was concern that individuals facing multiple challenges found it hard to manoeuvre between various agencies [129]. The central premise of the NAV reform was to dismantle bureaucratic hurdles and tailor services to meet the unique needs of each user, ultimately assisting them to gain competitive employment. NAV's main objectives include more employed and fewer on benefits, simplification and tailoring of services to individual needs, and providing comprehensive and efficient labour and welfare support [129].

2.3.1 The Norwegian National Strategic Plans for Work and Mental Health

Norway's National Strategic Plan for Work and Mental Health (2007-2012) [132] outlines strategies to enable individuals with mental health problems to leverage their capabilities more effectively. The strategy builds on The Norwegian Escalation Plan for Mental Health (1998 – 2006) [133], targeting the employment sector. Additionally, it backs NAV's efforts focusing on individuals with mental health problems and promotes a more inclusive work environment (IA Agreement). This plan originated from NAV and the Norwegian Directorate of Health's proposed plan for work and mental health in 2006 and has five strategic focus areas:

1. Service cooperation and coordination

Enhancing collaboration and coordination among agencies and relevant parties to ensure that individuals with mental disorders receive timely and appropriate assistance, focusing on improved interaction between the NAV and the health sector.

2. User participation and self-help

Promoting user participation and self-help by empowering individuals to manage their situations, as they are considered the experts in their lives.

3. Measures and services

Ensuring the provision of a wide spectrum of quality services and treatments that align with the diverse needs of individuals, aiming for increased inclusion of people with mental health problems in the workplace.

4. Competence, networks and information and attitudes

This strategic focus area emphasises enhancing organisational resilience towards mental health problems by improving leaders' competence and investing in mental health initiatives. It aims to nurture essential mental health management competencies and promote strong network building among organisations, ensuring a collaborative ecosystem that fosters mental well-being in the workplace.

5. Knowledge, research and development

Focuses on gathering, systematising, and disseminating relevant knowledge and promoting research to enhance understanding and strategies in work and mental health.

The National Strategic Plan for Work and Mental Health (2007-2012) highlighted the need for a prolonged, systematic dedication to integrating work and mental health initiatives, thus leading to the Government's National Strategic Follow-up Plan for Work and Mental Health (2013-2016) [134], aiming to strategically invest in preventing sickness absence and mitigating the exclusion of individuals with mental health problems, including substance abuse. The objective was to enhance opportunities for these individuals, enabling them to lead active, dignified lives, pursue education, and utilise their skills in the workforce.

In 2021, the plan underwent a revision to cultivate the work and health sectors into a specialised professional field. The Directorate of Health and NAV are tasked with collaboratively advancing the occupational health sector, focusing on developing impactful services. These services aim to foster improved employment prospects and overall health by catering to the needs of employees, employers, those on sick leave, and recipients of work assessment allowances.

2.3.2 The Work Assessment Allowance

In March 2010, a notable transformation occurred due to the NAV reform, where three distinct benefits—temporary disability, vocational rehabilitation, and medical rehabilitation—were consolidated into one unified temporary health-related rehabilitation benefit, the Work Assessment Allowance (WAA) [135]. The WAA offers more flexible eligibility criteria than the three previous benefits, allowing people to access NAV's vocational rehabilitation services irrespective of their work history.

The WAA holds particular significance in my thesis as, after its launch, there was a marked rise in the share of young Norwegian adults granted permanent disability benefits, predominantly attributed to mental health problems [136]. While the proportion of WAA recipients aged 18-39 increased by 2.1% between 2010-2023 [4, 137], the share of disability benefit recipients in this age group nearly doubled [3] - the majority of those granted disability benefits transitioned from WAA [136].

In order to qualify for the WAA, applicants must satisfy specific criteria [138]:

1. They must be at least 18 years old.
2. They must have a medical diagnosis.
3. They must be evaluated as having at least a 50% reduction in work capacity due to sickness, injury, or functional impairment.
4. They must demonstrate a need for work-related assistance, rehabilitation, or other services that can help improve their work capacity.

2.3.3 NAV counsellors

NAV counsellors are the frontline staff responsible for guidance and follow-up service users [139]. The role is multifaceted, encompassing a diverse range of responsibilities to support users towards competitive employment. These counsellors aid in crafting resumes and completing applications aimed at enhancing users' prospects in the competitive job market. They are also responsible for assessing the work capacity of service users and their needs for work-related assistance or vocational rehabilitation. NAV counsellors are also decision-

makers regarding the types of benefits people receive, and they are responsible for recommending which individuals are eligible for the WAA and disability benefits.

2.3.4 Work Capacity Assessment

NAV's work capacity assessment (WCA) [140], also introduced in 2010, aims to determine individuals' labour market capabilities, follow-up needs, and WAA eligibility. The evaluation involves 1) a holistic individual assessment of follow-up needs [141] and 2) a more rule-based approach to evaluating their medical condition [142]. The first part of the evaluation is a user-led assessment with the individual's NAV counsellor, while the individual's GP or specialist doctor is responsible for the medical assessment.

The medical report provides information on four aspects: diagnosis, prognosis, functional ability, and work capacity. Doctors encounter difficulties when evaluating these cases as initially, they may not have had adequate time to do a thorough diagnostic work-up, and there may be uncertainty about whether the individual has a medical condition. During the investigative phase, the suspicion of illness and subjective symptoms, without objective evidence, is considered sufficient to meet WAA's eligibility criteria [140]. Suppose doctors have not determined a formal International Classification of Diseases (ICD) diagnosis [143]. In that case, NAV can accept a symptom diagnosis from the International Classification of Primary Care (ICPC-2) [144], such as feeling anxious/nervous/tense or feeling/behaving irritable/angry. In such circumstances, the description of functional limitations concerning work assumes greater significance. However, many doctors struggle to assess function and work capacity because they lack field expertise and clarity on NAV's specific requirements in these areas [140].

NAV counsellors find that diagnoses are typically well-described in the medical reports. However, the other three aspects (prognosis, functional ability or work capacity) often need to be more adequately explained [140]. Furthermore, a study by the National Audit Office in 2014 revealed that 85% of the medical reports failed to provide insight into the individual's capacity to perform specific types of work [145]. Consequently, NAV counsellors often have limited information to determine the impact of illness on work capability. Additionally, they

have observed discrepancies between the doctor's assessment of work capacity and the individual's perception of their capabilities [146, 147].

While the National Insurance Act (1997) highlights the importance of a doctor's medical report in determining the "causal connection" between illness and work capacity [142], NAV's guidelines for the WCA do not explicitly mention the medical report or provide specific rules for weighting health-related information. NAV counsellors, therefore, have considerable freedom when evaluating individuals' work capacity, and, in some cases, subjective information rather than objective diagnostic evidence determines WAA eligibility [140].

Once NAV decides that an individual's work capacity is sufficiently impaired, they are eligible for the WAA. WAA recipients must engage in a return-to-work activity plan for up to 37.5 hours per week to facilitate (re)gaining competitive employment [148]. This plan aims to provide individuals with support and services tailored to their needs. For instance, recipients may gain access to medical treatments, therapy sessions, vocational rehabilitation, or job placement assistance. These additional services aim to facilitate the individual's recovery, enhance their employability, or enable them to explore alternative employment options.

2.3.5 The Work Assessment Allowance – criticisms

The WAA has faced criticism due to its lack of activity [149], in particular, the scheme's inefficiency in facilitating timely engagement in work-oriented measures for young adults. According to data from 2020, it took an average of 334 days from awarding the WAA to the commencement of work-oriented measures [150]; this is almost one-third of the WAA's total duration, which spans three years. Further, Bragstad[150] reported that many return-to-work activity plans lack clarity and, therefore, become less binding [150]. The follow-up frequency varies, with many WAA recipients going over a year without interacting with the NAV office/counsellors [145]. Many recipients did not receive adequate follow-up during their WAA rehabilitation period. Moreover, the National Audit Office, 2015 reported a lack of labour market orientation in both the WCA and activity plans [150, 151]

One of the reasons young adults were deemed unready for work-related measures was their poor health condition and ongoing medical treatment. However, Galaasen et al.[151] discovered

that more than half of those receiving medical treatment had infrequent contact with health professionals, occurring monthly or less. Seeing a health professional monthly suggests that these young adults are not acutely unwell, and the intervention is more for monitoring rather than active treatment. This finding suggests that the follow-up provided by the healthcare system should not pose a barrier to initiating work-oriented activities earlier. Combining treatment and work-oriented activity could, in fact, prove advantageous. The principle of prompt intervention is crucial in vocational rehabilitation. The longer young adults are unemployed, the greater the barrier to (re)join the workforce, making the rehabilitation process more difficult [152].

2.3.6 The NAV reform, the Work Assessment Allowance and changes in benefit usage

The NAV reform and the consolidation of benefits under the WAA in March 2010 were associated with changes in welfare benefit usage. The increasing proportion of young adults utilising health-related rehabilitation benefits since WAA's introduction [4] was accompanied by a decreased use of earned sick leave benefits [153, 154]. Between the fourth quarter of 2009 and the second quarter of 2010, the proportion of young adults using sick leave benefits decreased by 3.1% [154]. Several factors influenced this shift, including conditionality of sick leave benefits, compensation rates and income maximisation.

Eligibility Requirements

One crucial distinction between the various types of NAV benefits lies in the eligibility criteria. Benefits for sick leave and unemployment benefits depend on previous labour market participation, excluding young adults who have not yet entered the workforce [155, 156]. Conversely the WAA does not impose the same labour market participation criterion [138] and is consequently the most attractive financial support option for those not participating in the labour market. Disability benefits are available to all those aged 18-67 with ≥50% permanently reduced work capacity due (primarily) to a medical condition [157].

Young adults without prior work experience have only one non-medical benefit option, which is the far less lucrative social assistance benefit [158]. Social assistance is the final safety measure within the Norwegian welfare system. Generally, this means-tested benefit is available to individuals or families with insufficient income or resources to meet their basic needs [158].

Benefit durations

Another significant disparity arises from the duration of the benefits offered. Unemployment benefits typically have a limited time frame, ranging from six months to two years, depending on an individual's work history [155]. Sick leave benefits are granted for up to one year, and if the recipient's health and function do not improve after this time, they may be eligible for a WAA. Social assistance does not have a specific time limit. While it is considered a temporary benefit, it can be provided on an ongoing basis as long as the individual continues to meet the eligibility criteria and demonstrates a need for financial support [158]. The WAA lasts three years, but NAV counsellors can grant a two-year extension under certain circumstances [138]. If a WAA recipient's health and functionality do not improve and NAV assesses their work inability as permanent, they qualify for disability benefits.

Reliance on disability benefits is (for most) a lifelong state in Norway, as transitions (back) into the labour market are rare [6]. After granting an individual a disability benefit, NAV counsellors have little incentive to help them if they decide they would like to (re)gain competitive employment.

Compensation

Welfare benefits in Norway are not a flat rate for all, and the compensation level diverges across various benefits. Unemployment benefits provide a replacement rate of 62.4% for previous earnings up to six times the National Insurance Scheme basic amount (G), currently corresponding to 711,720 Norwegian kroner (NOK) [155]. Hence, the maximum pay-out of unemployment benefits is 444,113 NOK per year. Sickness benefits compensate 100% of the recipient's salary up to 6G [156].

The municipality sets the amount of social assistance depending on the individual's circumstances. It is typically provided at a subsistence level, aiming to cover basic needs such as food and clothing [158]. Living costs, including expenses for housing and electricity, are added. Some municipalities utilise their indicative rates, while others adhere to the suggested rates set by the state. The state's indicative rate lies between 6,350 - 12,600 NOK per month, depending on an individual's relationship status or living situation. People with children under 18 can receive up to 3,700 - 4,950 NOK per month per child [158].

In contrast, both the WAA and disability benefits are designed to provide substantial financial assistance to all individuals facing health problems that impede their work capacity. Consequently, these benefits often offer a higher level of financial support, ensuring individuals can maintain an adequate standard of living despite their health problems. Currently, the WAA compensates the recipient's previous income up to 66% of 6G, corresponding to 469,735 NOK per year [138]. WAA recipients with insufficient previous income receive a minimum, age-dependent rate - ⅔ of 2G for those aged ≤ 25 and 2G for those aged ≥25 [138].

Disability benefits cover 66% of previous earnings up to 6G [157]. Disability benefit recipients with insufficient previous income receive a minimum rate between 2.28 and 2.91 G, depending on their age and relationship status.

Income maximisation

Following the NAV reform and WAA's introduction in 2010, young adults experienced reduced reliance on earned sick leave benefits [153]. A legal provision allowing individuals to receive the benefit providing the highest compensation [159] is partly responsible for this shift, as when choosing between sick leave benefits earned through employment and the WAA, the latter typically provides better compensation for those with income below 2G [153].

Combing disability benefits with work

"Permanently Adapted Work" is a provision tailored for disability benefit recipients [160]. Such employment offers the opportunity to work in sheltered workshops or join a regular company. For the latter, this initiative guarantees participants an employment contract, safeguarding their rights under the Working Environment Act. However, the employer does not pay the individual for their work as the disability benefit is considered their salary. While the employer can pay a bonus salary up to 1G, in addition to the disability benefit, it is not a requirement.

It is also possible to combine disability benefits with competitive employment; however, there are income thresholds [157]. If an individual earns more than 80% of their pre-disability income in a given year, they do not receive disability benefits for that year. The benefits will be adjusted upward if their income falls below this threshold again. Moreover, income limits

are in place, and exceeding these limits will result in reduced disability benefits. Individuals can earn up to 0.4 G annually without affecting their disability benefits.

Nevertheless, from a financial perspective, it is often beneficial for disability benefit recipients to work, as the combination of disability benefits and income from work can result in a higher overall income than relying solely on disability benefits. If their employer has increased their salary, individuals with partial disability benefits can request a change in income limits, allowing them to earn more before facing a reduction in their disability benefits. This limit change is only possible if 1) the increased salary is not due to an increased percentage of work or overtime (their employer must document this), and 2) the increase in income is higher than 1G.

NAV annually evaluates the individual's tax settlement to ascertain whether they received the correct disability benefit pay-out for the previous year. NAV undertakes a new calculation if the tax settlement reveals a discrepancy between the recorded income and the income NAV utilised to calculate the disability benefit. Underpaid individuals will receive a supplementary payment, while overpaid individuals are required to return the excess amount.

2.3.7 Administrative relabelling and medicalisation of unemployment

Although the NAV reform intended to decrease dependency on welfare benefits among young adults facing long-term job market exclusion, it seems to have produced the contrary result [37]. One key observation that underscores the reform's limitations was the absence of discernible improvements in health, work function, or employment prospects among young adults undergoing health-related rehabilitation. Even though these young adults have access to all of NAV's vocational rehabilitation measures and up to five years of health-related rehabilitation under the WAA, there has been a considerable rise in the share of young adults granted lifelong, health-related disability benefits [36, 37]. In addition, fewer combine disability benefits with competitive employment [36]. Thus, the reform has not successfully fostered the intended life course changes for this group despite the considerable investment of time and resources.

The NAV reform was associated with the administrative relabelling of some unemployed young adults from a status associated with the absence of work (occupational handicap

unemployment) to a status associated with ill health (health-related rehabilitation) [37]. The re-categorisation took place simultaneously with the rollout of the WAA in March 2010 and correlated with a marked rise in the proportion of young adults accessing permanent disability benefits [36, 37]. This approach could have been a way to broaden the scope of support provided by the benefits system and acknowledge that unemployment can have various underlying causes, such as mental health problems that may affect these young adults' work capacity. Overall, the shift reflects an effort to tailor benefits to the diverse circumstances of young adults grappling with joblessness.

However, it is essential to note that relabelling can have both positive and negative implications. On the one hand, it can lead to increased access to appropriate resources and support for young adults with health-related barriers to work. By recognising the impact of health on employability, the benefits system can better address the diverse needs of the unemployed population. From an individual perspective, it could also be less stigmatising. Research on the social acceptability of welfare benefits revealed that society tends to view individuals who are ill as more deserving of support than those who are unemployed [161]. Additionally, studies from the field of medicalisation, i.e. "the process by which nonmedical problems become defined and treated as medical problems" [162], propose that illness can relieve individuals from social responsibilities, thereby providing a rationale for their inactivity and receipt of benefits [163].

On the other hand, relabelling may lead to the medicalisation of unemployment. The medicalisation of unemployment refers to the tendency to view unemployment primarily through a medical or psychiatric lens, framing it as a medical problem rather than a socio-economic issue [164]. However, an unfortunate consequence for young adults on the WAA could be that, by excessively focusing on health-related limitations, unemployment becomes inextricably linked to health considerations [110]. Disproportionately attributing unemployment to health problems and pathologising joblessness can inadvertently create narratives discouraging young adults from actively pursuing competitive employment opportunities. This narrative shift might influence their decisions and actions, potentially deterring them from engaging in activities that could contribute to their overall well-being and long-term employability, unintentionally directing them towards a life course trajectory dominated by poor health, social exclusion and reliance on welfare benefits.

Critics contend that this medicalised view of unemployment might overlook the broader structural causes of job loss, including systemic inequalities, limited job opportunities, and economic policies [165]. Narrowing the focus primarily to health-related factors side-lines the social and economic dimensions of unemployment, in turn, restricting the potential for targeted strategies that address both the personal and systemic aspects of unemployment, which are critical for redirecting these young adults towards a life course trajectory characterised by economic self-sufficiency and social inclusion.

2.3.8 NAVs vocational rehabilitation programs

NAV offers an extensive repertoire of vocational rehabilitation programs to WAA recipients (Appendix Table 1). However, there are concerns that these initiatives are primarily appropriate for those already possessing desirable skills while failing to reach more disadvantaged groups, such as young adults with limited work experience [166, 167] . For example, national and international studies suggest that job placement measures such as temporary wage subsidies are particularly effective, with consistently positive results across various target groups and without associated lock-in effects[8] [166]. However, wage subsidies primarily benefit individuals with good job prospects [166].

Work training programs (Appendix Table 1), such as sheltered workshops, yield discouraging results. For youth, the primary target group, these programs have either no effect or adverse outcomes [166]. Sveinsdottir et.al.[168] propose that engagement in sheltered workshops among young Norwegian adults on temporary health-related benefits could hinder their sense of agency and foster the notion that their actions might not positively influence their circumstances or could worsen their situation.

Train-then place versus place-then-train vocational rehabilitation approaches

Train-and-place and place-then-train are two distinct vocational rehabilitation approaches aimed at facilitating the (re)integration of individuals with health problems into the workforce. The train-then-place approach involves first providing participants with

[8] Lock-in effects occur when temporary wage subsidies create a situation where employers become reliant on the subsidies to support their workforce and discourage them from hiring new employees without subsidies

comprehensive training and skill development tailored to their abilities [169]. "After completing vocational preparation services, the client is ready for appropriate job placement assistance" [170].

Conversely, place-then-train approaches place individuals with health problems directly into competitive employment, often through job placement services or partnerships with employers willing to hire inclusively [169]. Once employed, participants receive on-the-job training and support to develop necessary skills and adapt to the work environment. This approach emphasises the immediate inclusion of individuals with health problems in the workforce, fostering a sense of belonging and independence.

Research suggests that place-then-train approaches are more effective in helping individuals with health problems secure competitive employment [169]. By immersing participants directly into work environments, they learn quickly through practical experiences, adapting to job requirements while receiving targeted support. These positive experiences of competitive employment can expedite their integration into the workforce and provide a platform for building self-confidence and independence. NAV's vocational measures primarily focus on train-and-place programs [171] and temporary wage subsidies [166, 172] (Appendix Table 1); both fall short of addressing the needs of disadvantaged groups, such as young adults on the WAA with limited work experience.

Supported Employment

Supported Employment (SE) is a place-and-train approach to help individuals with disabilities or health problems find and retain competitive employment [173, 174]. This approach fosters individualised job placements based on an individual's strengths, preferences, and skills.

SE programs collaborate closely with potential employers to identify suitable positions and facilitate smooth workplace integration. Job coaches or employment specialists are typically assigned to provide ongoing support, aiding the individual in adapting to their work environment and assisting with tasks such as skill reinforcement, workplace communication, and problem-solving. This approach promotes the independence and self-sufficiency of individuals with health problems and contributes to building a more inclusive society by breaking down barriers and misconceptions about their capabilities. Through its train-and-

place philosophy, SE exemplifies a holistic and person-centred approach to vocational rehabilitation that maximises individual potential and enhances workforce diversity.

Individual Placement and Support

While conventional vocational rehabilitation in Norway involves train-then-place approaches [171], policies have expanded to include SE and, more recently, Individual Placement and Support (IPS) [175]. IPS is an evidence-based SE approach tailored for those with moderate and severe mental illness (MSMI) [176, 177]. IPS aims to help these individuals find and keep competitive jobs that align with their preferences. IPS distinguishes itself from conventional vocational approaches by prioritising an expedited job search and not requiring participants to undergo extensive pre-employment training or to achieve clinical stability before starting work [178]. IPS has eight evidence-based principles, and IPS "fidelity" refers to the degree to which an IPS program adheres to these principles [179]. The core principles of IPS are:

1. **Zero Exclusion (Eligibility Based on Choice)**: IPS services are open to any individual with MSMI who desires to work, regardless of job readiness, disability severity, or other factors. There are no prerequisites for readiness, diagnosis, or symptom severity.

2. **Focus on Competitive Employment**: IPS prioritises helping individuals obtain competitive jobs in the open labour market, with market wages instead of sheltered or set-aside jobs.

3. **Integration of Mental Health and Employment Services**: Employment specialists collaborate closely with mental health professionals to deliver integrated support. They are part of the clinical team, attending team meetings and collaborating closely to provide integrated services for the individual

4. **Attention to Client Preferences**: Services prioritise the individual's choices over the assessments of the provider. If a person wants to pursue a particular job, the IPS team will support that goal.

5. **Personalised Benefits Counselling**: Given that concerns about losing benefits (like disability benefits) can be a barrier to seeking employment, IPS emphasises the importance of providing accurate information about how employment might affect an individual's benefits.

6. **Rapid Job Search**: Instead of long pre-employment training or assessments, IPS promotes beginning the job search soon after a client desires to work. The belief is that many job skills can be learned best on the job itself.

7. **Time-Unlimited and Individualised Support**: Employment specialists provide ongoing support to ensure the individual remains successfully employed after job placement. This support can be less intensive over time but is available as long as they need it.

8. **Systematic Job Development**: Employment specialists build relationships with employers based on the job seeker's interests. They understand the needs of local businesses and regularly meet with employers to learn about job opportunities that might be a good fit for participants.

Good fidelity to the IPS model is associated with better participant employment outcomes. Specific criteria and scales to measure IPS fidelity and fidelity assessments involve external reviews where trained assessors evaluate how well a program implements these principles [180, 181].

Noteworthy directives from The Norwegian Directorate of Health in 2016 and the Norwegian Ministry of Labour and Social Affairs in 2017 [182] have both advocated for and supported expanding IPS services nationwide. In Norway, the delivery of IPS services is a collaboration between two state agencies: NAV and mental health services. Mental health services include primary mental services at the municipality level for mild-moderate mental health problems and specialist hospital inpatient or outpatient psychiatric services for more severe disorders [183]. The municipalities and the specialist health service are jointly responsible for facilitating interaction and cooperation [183]; however, the boundary between the

municipalities' responsibility and the specialist health service's responsibility for follow-up and treatment is sometimes unclear.

Municipalities are obligated to deliver primary mental health care services to everyone within their boundaries. Following the Health and Care Services Act [183], primary mental health care services offer preventive interventions for mental health problems, investigation and treatment, psychosocial support (e.g. help to obtain housing), coordination of services (i.e. social care, nursing) and referrals to the specialist mental health service. The service organisation can vary significantly between municipalities but generally includes GPs based in primary mental health care teams and substance abuse services. Some municipalities consolidate various services under one umbrella, while others might opt for cross-municipality collaborations.

In Norway, five regional health authorities (RHA) oversee specialised mental health services within their respective areas [184]. Specialist mental health care in Norway encompasses several services, hospitals, community mental health centres (CMHC), referred to in Norway as the District Psychiatric Centres (DPS) and clinics for mental health and substance abuse problems (TSB) [184]. In conjunction with the TSB and DPS, there are outpatient mental health clinics. These clinics are decentralised specialist health services that cover the need for assessment and treatment of more serious mental disorders [184]. Lastly, hospitals (often referred to as tertiary care) provide highly specialised treatment covering acute and secure mental health services, psychosis and geriatric psychiatry [184].

An essential component of the IPS approach is integrating employment support as part of treatment in these mental health services to provide comprehensive multidisciplinary support. Work is considered a therapeutic factor contributing to improved mental health and well-being. By providing individually tailored assistance and close follow-up, both before and after starting a job, IPS can support a successful transition to and maintenance of employment [185]. Substantial research supports IPS, showing that the approach positively affects the employment participation and functioning of individuals with MSMI [186], and Norway's first IPS randomised controlled trial (RCT) showed that the IPS approach outperformed high-standard usual care in terms of both job-related and non-vocational outcomes for individuals with MSMI [187].

Bond et al.[188], conducted the first systematic review of the impacts of IPS on "populations with conditions and disorders other than serious mental illness". They report predominantly favourable outcomes in terms of competitive employment for diverse groups, encompassing those with depression, anxiety, substance use disorders, veterans with PTSD and spinal cord injury. These results indicate that the IPS approach can be successful for patient groups other than those with serious mental illness.

In the Norwegian context, a recent RCT found that IPS outperformed conventional vocational rehabilitation (such as sheltered workshops) for young adults receiving temporary welfare benefits for any diagnosis or social problem [168]. The findings suggest that providing IPS services could help increase employment rates within this population. Further, Rødevand et al.[189] conducted a pilot interview study involving eight chronic pain patients at an outpatient pain clinic to explore integrating IPS into a multidisciplinary pain rehabilitation program, and their results suggest that programs like these can successfully incorporate IPS [189]. Currently, several RCTs in Norway are investigating IPS for new patient groups: substance use disorders [190], chronic pain patients [191], traumatic brain injury [192] and refugees [193].

3 Aims

3.1 Overarching aim of the thesis

The overarching aim of my thesis is to explore the interconnection between the Norwegian welfare system, reliance on health-related welfare benefits, SDOH, mental health, labour market dynamics, traditional vocational rehabilitation approaches and the IPS approach among young adults in Norway. My investigation involves an analysis of the various factors that might impact the transition of young adults into a state of health-related welfare dependency. Furthermore, I estimate the causal effect of implementing IPS for young adults on the WAA to understand the effectiveness of this approach on the employment outcome "contractual man-days"[9] and to see if IPS implementation can alter the life course trajectory of this cohort.

[9] Defined as the number of days a person has agreed to work for his employer in a given period, adjusted for fraction of employment, weekends and public holidays [194]. Henceforth "contractual man-days" will be referred to as "work days"

3.2 Aims Paper 1

Paper 1 [36] primarily aimed to identify:

1. The most common trajectories leading to disability benefit receipt for two cohorts of young Norwegian inhabitants aged 18-28 between 1993 and 2014
2. Changes in trajectory patterns and the composition of this population over time

3.3 Aims Paper 2

Paper 2 [37] had three main aims, to:

1. Investigate the trajectories of young Norwegians aged 23-27 through health-related rehabilitation between 2004 and 2019.
2. Examine changes in trajectory patterns and the composition of this population over time.
3. Assess the potential changes in labour market outcomes for this population in parallel with the NAV reform.

3.4 Aims Paper 3

Paper 3 investigated whether IPS implementation in Bodø municipality had a causal effect on the number of "work days per year" for all WAA recipients aged 18-40.

4 Data Source and Methods

4.1 Data Source

My thesis utilises longitudinal administrative register data gathered and linked by Statistics Norway (SSB) and NAV, leveraging its comprehensive coverage of the entire Norwegian population from 1993 to 2019 (Appendix Table 2). These datasets provide extensive details on demographics, health-related welfare benefits and associated diagnoses, social assistance, unemployment benefits, sick leave benefits, employment, income, and educational participation. The administrative register records utilised for the analysis undergo rigorous control measures to ensure their quality and consistency before being released for research endeavours.

I accessed the data for Papers 1 and 2 through my PhD co-supervisor, Professor Thomas Lorentzen, at the University of Bergen (UiB). The IPS Bodø II research project (#280589) at the Competence Centre for Work and Mental Health (KAPH), Nordland Hospital Trust, provided the data for Paper 3. Appendix Table 2 gives a complete overview of the data sources, data, approvals and software used for each paper.

4.2 Methods

I employed well-established methods from the social sciences and economic sciences, specifically sequence analysis (SA) and a Difference-in-Differences (DID) regression with fixed effects (FE), within the field of health sciences. While these methods have been applied extensively in their respective disciplines, health sciences researchers have not yet adopted them widely.

SA is an exploratory approach concerned with analysing sets of sequences that typically describe longitudinal data [195, 196]. In contrast, the DID method is a quasi-experimental approach that allows causal inference [197]. For my thesis, combining exploratory and causal analyses is necessary to understand the interconnections between labour market dynamics, SDOH, mental health, uptake of health-related welfare benefits and vocational rehabilitation among young Norwegian adults. These methods, combined, offer insights into patterns, relationships, and causal effects that contribute to a well-rounded research study.

My research aims to understand how factors like educational attainment, previous work experience and intergenerational welfare transmission influence young adults' reliance on health-related welfare benefits. An exploratory approach is crucial here to provide a holistic view of the complex relationships between these variables. In addition, by analysing the factors impacting the transition of young adults into a state of reliance on health-related welfare benefits, I was able to identify potential drivers of this transition. Exploration through SA helped identify patterns and trends contributing to health-related welfare dependency among young adults and delved deeper into the underlying dynamics.

The causal analysis component of my research was critical to investigate the impact of the IPS implementation on young adults receiving the WAA. The DID methodology allowed me

to isolate the effect of the intervention from other confounding factors, helping me determine whether the exposure to IPS implementation has a causal effect on work days per year for this group, potentially altering the life course trajectory of the cohort.

4.2.1 Papers 1 and 2

Paper 1 [36] explored two cohorts of young adults in Norway, aged between 18 and 28 years, from the years 1993 (cohort one) and 2004 (cohort two). Initially, none of these young adults relied on disability benefits, but by the end of their respective cohort periods, all were disability benefit recipients. I followed each cohort for eleven years. The notable increase in disability benefit receipt among young Norwegian adults aged 18-29 following the WAA's introduction influenced my selection of the study population. Primarily, young adults aged 25-29 with mental health problems drove the increased uptake in disability benefits [136]. To examine the evolution of trajectories up to the disability benefit receipt, I employed SA and cluster analyses. Additionally, I used descriptive statistics and multinomial logistic regression to examine the correlation between trajectory types, SDOH, and cohort membership.

For Paper 2 [37], I created four cohorts of Norwegian inhabitants in receipt of health-related rehabilitation benefits, aged between 23 and 27 years old in 2004 (cohort one), 2008 (cohort two), 2011 (cohort three), and 2014 (cohort four). I observed each cohort for six years. My choice of the study population was based on the increased uptake of long-term health-related disability benefits among 25–29-year-olds due to mental health problems after WAA's introduction. This demographic would have commenced the WAA between the ages of 23–27 and utilised the maximum duration of their health-related rehabilitation approximately between the ages of 25–29 [37]. Multichannel sequence analysis (MSA) and cluster analyses identified the most common trajectories through health-related rehabilitation. I used descriptive and multinomial logistic regression in the same manner as Paper 1.

Sequence analysis

Researchers have regarded the life course perspective as the most helpful framework for SA in the past two decades [195, 196]. SA aligns well with the goals of my thesis by offering a comprehensive framework to explore the complex interplay between labour market dynamics,

SDOH and uptake of health-related welfare benefits among young adults in Norway. SA offers a distinct advantage by simplifying life course complexity and heterogeneity [198].

SA enables the identification of sequence typologies, such as the order and timing of educational achievements, transitions into employment or further education, and the uptake of welfare benefits [199]. By adopting a SA approach, researchers can unravel the patterns characterising young adults' educational and welfare experiences. Such insights are crucial for understanding the factors influencing life course trajectories leading to successful or unsuccessful outcomes in the competitive job market, thus leading to more effective strategies to enhance young adults' success in obtaining competitive employment.

Definition of a sequence

In SA of life courses, an individual sequence refers to the unique pattern or trajectory of events, transitions, and statuses experienced by a particular individual over time. It captures the sequence of statuses experienced by an individual throughout their life. In the context of my thesis, the statuses lie within the educational, work and welfare-state domains (see Paper 1, Table 1 and Paper 2, Table 1).

Analyses, clusters and visualisations

Papers 1 and 2 explain the two steps involved in performing SA in depth. In SA, the first step is to compare each pair of sequences and determine their differences. This step involves calculating the "pairwise distances," which measure the similarity or dissimilarity between two sequences [199]. Determining the distance between two sequences requires counting the modifications, insertions and deletions (indels) and substitutions, to make them identical [200]. As the similarity between the sequences increases, the distance decreases, allowing researchers to identify broadly similar sequences. The result is a dissimilarity matrix that contains numerical values representing the dissimilarity between each pair of sequences. Various methods exist for calculating pairwise distances. Some methods prioritise the order of events over their timing, while others emphasise timing over order.

In Paper 1, I defined substitution costs from state attributes, using the Gower distance [201]. I derived the Gower dissimilarity coefficient from a qualitatively based evaluation of the proximity of employment to each of the other states. This assessment also included

information on whether the state was employment-related, connected to health benefits, other types of social welfare benefits, or education-related. The scale for this measure was set from 0 to 1, with 1 indicating the highest possible difference between states. As per usual practices, the cost of indels was set at 0.5, representing half of the highest cost for substitutions [201].

Paper 2 adopted an MSA approach to investigate the potential of health-related rehabilitation in facilitating work activity. The objective was to examine the coexistence and interplay between work and welfare-state benefits rather than treating them as separate and unrelated phenomena. In order to facilitate these analyses, I established two distinct status channels. Each channel comprises mutually exclusive states (see Table 1, Paper 2). This approach enabled me to observe the development and interaction of work and welfare processes over time and across different cohorts. The focus in Paper 2 is not so much on the precise timing of the states but rather on the specific states themselves and their sequential order. Therefore, I calculated the longest common sequence (LCS), prioritising the order of states over their timing.

In the second step of SA, I performed a cluster algorithm on the dissimilarity matrix to identify different types of trajectories. Dendrograms and silhouette plots determine the cluster solution that best represents the data and define the distinct attributes of each cluster [202].

The SA method stands out because it focuses on sequences rather than individual events or transitions. Unlike traditional event history approaches that examine single transitions in isolation, SA recognises the importance of considering how these transitions form part of longer sequences. SA provides a more comprehensive and holistic perspective by understanding the interconnectedness of events and transitions within an individual's life course.

While regression-based approaches more commonly found in health science research, such as the multi-state framework, have attempted to incorporate sequence data, they operate on the statistical premise that social sequences occur randomly. In contrast, SA, rooted in the life course perspective, acknowledges and embraces the interdependencies and relational dynamics among various life events.

4.2.2 Paper 3

IPS implementation

An implementation team, from the mental health sector and NAV, implemented IPS in Bodø municipality through cross-sectoral collaboration. Training sessions brought together clinicians, NAV staff, and leaders to counteract service silos. The implementation team used two frameworks: the NH-Dartmouth Toolkit and the EPIS framework. IPS implementation had three stages: preparation (2010-2012), implementation (2013-2016), and sustainability (2017-2019). The target population included young adults with MSMI receiving treatment in mental health services and the WAA [203].

Based on the IPS target demographic in Bodø, the study population was all WAA recipients aged 18-40 in either Bodø or ten comparable control municipalities without IPS implementation (Appendix Table 2) [203].

Fixed Effects Difference-in-Differences method

Using longitudinal register data from NAV (Appendix Table 2), I exploited a DID method in conjunction with FE. DiD is a quasi-experimental approach to estimate the causal effect of an intervention (such as IPS). It is often used in observational studies where randomised controlled trials are not feasible [204]. The method involves two groups: an intervention group (which receives the intervention) and a control group (which does not receive the intervention). Ideally, these groups should be similar in all aspects except for the intervention. The key idea is to calculate the difference in outcomes between the two groups before the intervention and then do the same after the intervention. The "difference in differences" is the change in the outcome in the intervention group minus the change in the outcome in the control group [205]. This calculation aims to isolate the effect of the intervention by controlling for other factors that might influence the outcome. By comparing the changes over time between the two groups, the DiD method attempts to account for external factors that are not related to the intervention but might influence the outcomes. This approach assumes that, in the absence of the intervention, the difference between the groups would have remained constant over time - known as the "parallel trends assumption" [205].

When DiD is used in conjunction with FE in panel data, it is often referred to as "FE DiD". This method allows for the estimation of intervention effects while controlling for both

unobserved individual heterogeneity and common external shocks, under the assumption that the intervention is exogenous [205]. In my study, the intervention group consists of young adults exposed to IPS implementation through receipt of WAA benefits. In contrast, the control group comprises young WAA recipients not exposed to IPS implementation. Analysing the differences in outcomes over time allowed me to isolate the effect of IPS implementation on how many days they worked per year.

In addition, I used a Difference-in-Differences-in-Differences (DiDiD) method, also known as the triple-difference estimator [206]. DiDiD is an extension of the DiD method and is applied when researchers have three dimensions of data: time (before and after the intervention), group (intervention and control groups), and an additional categorical variable (such as subgroups or regions). In my case, the additional categorical variable was diagnostic subgroups: all non-organic mental disorders, severe mental illness (SMI), non-severe non-organic mental disorders, and somatic disorders.

By comparing the differences within each diagnostic subgroup before the intervention and measuring the outcome changes over time, the DiDiD method can help to isolate the causal effects of IPS implementation on each subgroup. DiDiD does not require the parallel trend assumptions for a causal interpretation [205].

FE DID mitigates selection bias, which arises when the intervention and control groups differ systematically [205]. By using each individual as their own control, the method compares changes in outcomes within the intervention group and the control group, effectively accounting for pre-existing differences between them. Incorporating these individual FE's into the model minimises the impact of selection bias. It improves the study's internal validity, providing more accurate estimates of the true effect of exposure to IPS implementation on work days per year.

Alternative methods for DID include pre-post analyses and cross-sectional studies. However, DID possesses distinct advantages that make it a better approach for testing the causal effect of IPS implementation on work days per year at the societal level for young adults receiving WAA.

Pre-post analyses involve comparing outcomes before and after the implementation of an intervention within the same group. For instance, researchers might examine the employment outcomes of young adults receiving the WAA before and after IPS implementation. However, this method does not provide a counterfactual comparison group, which is crucial for estimating causal effects. It fails to account for potential confounding factors, such as changes in the labour market or individual characteristics (e.g. gender, marital status), that may independently influence employment outcomes. On the other hand, DID includes a control group and compares changes between groups, controlling for time-varying confounders and providing a more robust causal inference.

Cross-sectional studies involve comparing different groups at a single point in time. In the context of the aim mentioned, researchers might compare young adults receiving the WAA with those not and examine their employment outcomes. However, this approach does not account for any changes over time. It cannot disentangle the effects of IPS implementation from other confounding factors or account for pre-existing differences between the groups. In contrast, DID utilises within-group changes over time, making it a more robust method for causal inference.

Thus, while alternative methods like cross-sectional studies and pre-post analyses have their merits, the DID method stands out as a superior approach for testing the causal effect of exposure to IPS implementation on work days per year. DID's inclusion of a control group, its ability to control for time-varying confounders and unobserved factors, and its focus on within-group changes over time make it a robust method for drawing causal inferences and enhancing the validity of the findings.

4.2.3 Ethical considerations

Papers 1 and 2

Papers 1 and 2 used administrative datasets compiled and connected by SSB, a governmental organisation in charge of distributing statistical data related to the Norwegian population. These datasets encompass a range of information, including demographics, welfare benefits, income, and education. Under the Statistics Act (1989), SSB produces official statistics, working with various governmental entities such as the Directorate of Taxes and NAV to

compile data. SSB also has the jurisdiction to compel participation in surveys from individuals without necessitating their consent.

Section 15 of the Statistics Act (1989) empowers SSB to furnish anonymised or de-identified data to researchers and governmental bodies. They adhere to the regulations stipulated by the European Statistical System (ESS) and the European "Statistics Act" (Regulation No. 223/2009). Due to Norway's stringent data protection laws, the datasets used in my thesis are not accessible to the public. However, researchers can request access to pertinent data housed in the public administrative records of Norway by applying to SSB. These papers did not utilise data from the Norwegian Health registries, and therefore, obtaining approval from The Norwegian Regional Committee for Medical and Health Research Ethics (REC) was deemed unnecessary.

The authors had no conflict of interest.

Paper 3

Paper 3 used longitudinal registry data from NAV. The dataset contained demographic information, contractual man-days, the WAA start and stop dates, and corresponding WAA diagnoses. Approval for this study, with reference number 2012/2239, was obtained from the Regional Committee for Medical and Health Research Ethics (REC) Region North, Norway.

Disclosure Paper 3

The authors (SW, BB, TL, MR, DMD, and AM) received funding from the Research Council of Norway through IPS Bodø I (# 227097), IPS Bodø II (# 280589), and IPSNOR (#273665). BB, MR, EK, and AM were actively involved in IPS implementation in Northern Norway, including Bodø. We have clearly stated his potential conflict of interest in the submitted manuscript for transparency. Conversely, author SW, under the supervision of author TL (neither was involved in IPS implementation), designed and conducted the statistical analysis.

5 Results

5.1 Paper 1

Young adults on disability benefits predominantly followed trajectories marked by minimal labour market participation. The trajectories and demographic makeup of the study population evolved. Between the two cohorts, there was 1) a two-fold increase in the probability of following "precarious income trajectories", 2) the probability of following "work and/or education trajectories" diminished and 3) the proportion of early school leavers increased [36]. Around 50% in both cohorts had at least one parent who relied on disability benefits.

5.2 Paper 2

Young adults on health-related rehabilitation benefits predominantly followed trajectories of welfare reliance, joblessness, and insecure, low-income employment. The trajectories and demographic makeup of the study population evolved across cohorts: 1) a tripling in the portion concluding their trajectories in reliance on disability benefits, 2) a nine-fold augmentation in the proportion on trajectories marked by extended durations of health-related rehabilitation, 3) a quintuple reduction in the proportion on trajectories dominated by the status "occupational handicap unemployment", 4) a 6.9% increase in the share of early school leavers and 5) a nearly 8.9% diminution in the proportion with parents who were reliant on permanent disability benefits. However, despite parental disability benefit reliance generally decreasing for this group over time, there was a substantial correlation between ending up on permanent disability benefits and having both parents in receipt of such benefits [37].

5.3 Paper 3

IPS implementation had a significant, positive effect of 5.6 increased workdays per year per individual, equivalent to 12.7 years of increased work in Bodø municipality where IPS was implemented compared to control municipalities without IPS. Three years after initial exposure to IPS implementation, individuals in Bodø had, on average, around 10.5 contractual workdays per year. All results from diagnostic subgroup analyses results were statistically insignificant [203].

6 Discussion

The findings presented in my thesis offer insights into the interconnection between labour market dynamics, educational attainment, uptake of health-related welfare benefits, traditional vocational rehabilitation and IPS among young Norwegian adults. The initial two papers of my thesis delve into the "why" of the problem by dissecting the evolving patterns of educational, work, and welfare-state trajectories leading to the uptake of health-related welfare benefits among at-risk young Norwegian adults [36, 37]. Paper 1 revealed the significance of low educational attainment, limited work experience and intergenerational welfare transmission in permanent health-related labour market exclusion [36]. Consequently, workplace prevention strategies like the IA agreement [122] would have minimal influence on this group, indicating that interventions solely focused on the workplace do not sufficiently address their needs.

Paper 2 highlighted the significance of low educational attainment, unemployment, and insecure, poorly paid jobs among young adults on health-related rehabilitation benefits [37]. Similar to Paper 1, intergenerational welfare transmission influenced those on the trajectory leading to life-long disability benefits, signifying that the younger generation can inherit family patterns of welfare reliance. Further, the proportion following trajectories leading to permanent disability benefits increased three-fold over the observation period. However, there is also evidence that, for young adults on health-related rehabilitation benefits, intergenerational welfare transmission generally seems to play less of a role over time [37]. Also notable is that parental level of education increased over time [37]. These two findings imply diversification of welfare reliance and that social adversity is not driving health-related exclusion from the labour market to the extent it did previously.

We know from the background literature that after the WAA's introduction, the share of young adults receiving disability benefits for SMI (e.g. schizophrenia) decreased. In contrast, health-related welfare reliance due to less severe mental health problems such as neurotic and behavioural disorders (which can be prevented and treated to a greater extent) increased substantially. Background literature also shows that over the study's observation period, there was a notable increase in self-reporting, health-seeking behaviour and use of prescription medications for mental health problems among youths and young adults in Norway [31].

These factors combined could indicate that regardless of socioeconomic background, mental well-being among young Norwegian inhabitants is deteriorating, resulting in reduced work capacity and increased receipt of health-related welfare benefits due to less severe mental health problems. Possible explanations for deteriorating trends in mental health status among these youths and young adults could be poor self-confidence due to school-related struggles (in both Papers 1 and 2, early school leaving increased over time) [36, 37], body appearance pressure, and the negative impacts of constant social media exposure [207]. Mental illness may have also become less stigmatising, thereby lowering the threshold of seeking care and receiving treatment for mental health problems [208].

Another potential explanation is that modern diagnostic assessments have significantly increased the recognition and understanding of young adults who experience reduced work capacity due to mental health problems [209]. Thus, these assessments may have paved the way for granting such individuals access to various health-related welfare benefits. The advancement of diagnostic tools and techniques, coupled with a growing understanding of mental and behavioural disorders, has allowed healthcare professionals to conduct more thorough evaluations and assessments. This increased precision may help identify individuals previously overlooked or misdiagnosed, particularly when it comes to conditions that impact work capacity. By employing rigorous diagnostic assessments, healthcare providers can more accurately identify individuals with mental health problems that impede their ability to engage in competitive employment.

Medicalisation may also play a role. Several Norwegian studies provide evidence for the medicalisation of young adult's educational and employment challenges [210, 211]. Factors contributing to the uptake of health-related welfare benefits among Norway's young adults predominantly pertain to non-medical socioeconomic factors. These include limited educational attainment or financial resources, challenging familial and social situations, and a tenuous link to the labour market. Additionally, qualitative studies focusing on young adults receiving disability benefits in Norway have emphasised the significance of non-medical determinants. Such determinants encompass challenging early life experiences, adaptation issues, and negative social experiences like bullying [212, 213].

Conditionality of welfare benefits, income maximisation and benefit duration may also encourage the medicalisation of social problems such as unemployment. Several studies

indicate a correlation between the inability to secure employment or fulfil socially acceptable behavioural standards and a rise in the claims or acquisition of health-related disability benefits [164, 214]. Further, as per Norway's National Insurance Act (1997), individuals receive the benefit that offers the highest compensation (Ftrl. §8-48, §11-27) [159]. The WAA provides greater compensation than earned sick leave benefits for those with income below 2G [153] and given that young adults often have lower incomes, they may find themselves in a situation where the minimum rate on the WAA is more financially advantageous than earned sick leave benefits. Further, the maximum duration of sick leave is one year. The WAA, in contrast, lasts for three years, and NAV counsellors can grant a two-year extension under certain circumstances [138]. Thus, the WAA provides young adults with greater financial stability for a longer time.

There is also concern that social investment strategies can lead to the medicalisation of social problems, including mental health problems and unemployment [165]. The Norwegian welfare state faces macroeconomic challenges posed by an ageing society and a declining birth rate, which has driven the adoption of the "work first approach" [109]. Human capital investment strategies, starting early childhood, have served Norway well by creating a well-educated society with high equality, good living standards and low unemployment rates among young adults. However, Norway has been less successful in achieving the part of the "work first approach", which maintains that those with significant disabilities and health problems are capable of labour market participation. Despite substantial investment in the NAV reform, the initiative has failed to achieve its objective of "more in work, fewer in benefits" for marginalised groups such as young adults with limited education or work experience. Instead, the reform seems to have produced the contrary result by directing more young adults to permanent disability benefits [37].

The social investment strategies initially centred on education and family have increasingly underscored good mental health as an essential component for a productive existence [215-217]. However, Reibling[165] suggests that the emphasis on health in early childhood education, workplace health initiatives, and the heightened awareness towards mental well-being across various sectors [215] has paved the way for the medicalisation of the welfare state [165, 215]. Similarly, Foulkes and Andrews[208] introduce their prevalence inflation hypothesis. They propose that the intense focus on mental health through public awareness campaigns in

Western nations, designed to decrease and prevent such problems, may cause some individuals to overinterpret and label milder forms of distress as mental health problems.

Stakeholders (e.g. employers, legislators and educators) may embrace a medical perspective, especially when it aligns with their goals. For example, social investment initiatives, such as the IA-agreement, may result in employers supporting health-focused programs that address workplace stress at the individual level (e.g. stress management training) without addressing broader workplace issues [218]. Welfare sector representatives, such as NAV counsellors, might also lean towards a medical interpretation of unemployment when it is challenging to integrate an individual into the workforce [164]. Educators also play a pivotal role in emphasising medical evaluations, particularly for youth, by referring them for medical and psychological assessments [219].

It is also worth noting the media's influential role in emphasising the medical angles of social problems, given their capacity to distribute and emphasise new insights on the medical aspects of societal problems [220, 221]. For instance, since the 1990s, science reporting has shown a preference for medical-related news compared to insights from other fields [222].

In line with the broader contextual factors described above, findings from Paper 2 indicate that reclassifying young adults from an unemployment-related status to a status focused on poor health may have directed a larger share into life-long disability benefits [37]. The study also points out that the NAV reform has not achieved its goals of increasing employment and reducing welfare reliance among this group. Considering that the NAV reform has not realised the anticipated life course changes for these young adults, this study unveils the complexities authorities face in steering life course trajectories towards a particular goal - competitive employment. These findings indicate that simply reforming welfare systems and workplace policies is not enough to overcome the complex challenges these demographic faces and suggests a need for more targeted support systems that go beyond welfare reform to address the underlying issues.

In contrast, Paper 3 introduces a potential evidence-based solution to the challenges presented in Papers 1 and 2. IPS implementation scaled at a municipality level led to WAA recipients working more days per year than those in the control municipalities, with the effect growing over time. This finding suggests that IPS, implemented as a cross-sectoral partnership between the health sector and NAV at the municipality level, can redirect young adults' life

courses in the direction the NAV reform intended. Paper 3 provides evidence that in the short-term, trajectories can be altered in a specific, positive direction and suggests that if young adults on the WAA receive evidenced-based, individualised interventions, they might, in the longer-term transition away from a disrupted life course trajectory and achieve economic self-sufficiency through competitive employment.

Paper 3's findings raise intriguing implications for the life course perspective. They suggest that by implementing IPS, the disrupted life course trajectory for young adults on the WAA may become a temporary blip rather than a permanent detour. This redirection towards a more conventional life course path, facilitated by IPS implementation, could lead to better economic outcomes for society and the individual, with fewer harmful scarring effects than traditional vocational rehabilitation approaches.

Redirecting the life course trajectories of these young adults towards economic self-sufficiency and competitive employment could also have knock-on effects for their children, grandchildren and beyond. Findings from Papers 1 and 2 support previous research demonstrating that when parents rely on disability benefits, their offspring are more likely to rely on them [59, 223]. "Contagion effects" in the welfare system underscore the significance of engaging beneficiaries in employment. Contagion effects refer to situations where one person's absence from the workforce might influence others in their social network to exit the labour market [110]. Conversely, if an evidence-based intervention such as IPS results in an individual returning to work, it could cascade, promoting job participation among friends and family members. Could redirecting the life course trajectory of one young adult away from health-related welfare dependency and into competitive employment through IPS implementation help break the cycle of intergenerational welfare transmission? This intriguing question warrants further investigation.

6.1 Vocational rehabilitation approaches and the life course perspective

With traditional vocational approaches, young adults' life course disruptions might become a long-term setback. They could remain trapped in cycles of training and placement without any real progress, leading to feelings of stagnation and hopelessness [168]. However, with individualised approaches such as IPS, this disruption may become a more transient blip. The adaptability and responsiveness of individualised approaches mean that individuals are more

likely to find competitive employment [224], aligning them back onto a more conventional life course. Over time, this could mean the difference between long-term unemployment and a fulfilling career.

By not addressing each individual's unique needs and aspirations, traditional vocational approaches, with their one-size-fits-all methodology, might inadvertently perpetuate the scarring effects these individuals experience due to poor school-to-work transitions and unemployment during their formative years. In contrast, by tailoring its approach, individualised approaches such as IPS could minimise the emotional, psychological, and economic scars of poor school-to-work transitions and unemployment by helping young adults find competitive employment faster in roles suited to their aspirations.

6.2 Assessment of Traditional Vocational Rehabilitation Approaches

The exploration of Norway's traditional vocational rehabilitation approaches, as discussed in my thesis, highlights their limitations and lack of evidence base. Approaches such as work training and sheltered workshops often revolve around prescriptive actions by support providers and policy-driven designs. While these methods have been standard for a long time, they often only offer superficial engagement with individuals, relying on extrinsic motivators to achieve their goals [225]. This surface-level engagement can be particularly insufficient for groups facing complex challenges, like young adults on WAA with minimal work experience. On the contrary, the success of the IPS exposure for this group underscores a fundamental need for a shift towards more individual-centric methods, where those seeking support become active and equal partners in rehabilitation.

This innovative shift towards a more person-centred strategy allows for adapting services informed by individuals' lived experiences and preferences. Rather than a top-down prescription, this approach brings individuals' unique perspectives, ideas, and preferences to the forefront, ensuring tailored support to their needs and aspirations [225]. Incorporating individuals with real-life experiences in the design, consultation, and even delivery of these services builds trust, which is instrumental in ensuring successful employment support outcomes.

6.3 The role of mental health services

The implications of this thesis extend beyond vocational rehabilitation. Analogously, in sectors like mental health care, a shift from coercive engagement tactics to more relational support has proven not only to be more ethical but also more effective [225]. Collaborative efforts, where the service users and providers work hand-in-hand towards shared goals, ensure a more balanced power dynamic, fostering mutual trust. The value of lived experiences is instrumental in shaping the direction and delivery of support, emphasising the need for NAV and similar agencies to continually assess their methods for alignment with the unique needs and aspirations of every individual they serve.

My thesis also raises a broader question about the role of mental health services for young adults beyond medical treatment and symptom reduction. Given that mental health problems are the primary cause of health-related welfare dependency among Norway's young adults, it underscores the pivotal role of mental health services in providing employment support for young adults facing health-related barriers to work [226]. The intertwined nature of mental health and labour market participation emphasises the need for holistic, multidisciplinary support systems that address both dimensions.

6.4 The Disability Benefit Trap

Despite the potential financial advantage, Paper 1 shows that only a small proportion of young adults on disability benefits combine their benefits with competitive employment [36]. Several administrative and systemic barriers in Norway disincentivize disability benefit beneficiaries from seeking competitive employment despite the potential financial advantage [157]. Firstly, a strict income threshold system is in place, which means that if an individual earns more than 80% of their pre-disability income in a given year, they lose their disability benefits. This potential total loss of disability benefits creates uncertainty and financial risk for these individuals and is a barrier to engaging in competitive employment.

Moreover, requiring individuals to request an income limit change in the case of increased salary adds complexity to the process. This change is only possible under specific conditions, such as when the increase is not due to an increase in work percentage or overtime. Such administrative hurdles can deter individuals on disability benefits from pursuing competitive employment, as they may hesitate to navigate the system's intricacies or fear their efforts will

not be rewarded. The annual review of income information by NAV and potential discrepancies in calculations further add administrative burden and uncertainty for disability benefit recipients. They may worry about receiving incorrect benefit amounts or having to return overpaid amounts, creating a disincentive to engage in competitive employment.

Overall, these administrative and systemic barriers can discourage young adults on disability benefits from seeking competitive employment when they want to work and when it could result in a higher overall income. These disincentives counter Norway's "work first" approach, which maintains that work should be the primary choice for all capable individuals, while welfare benefits should act as insurance against income loss.

6.5 Future research

Future research should investigate the long-term employment outcomes of young adults on WAA in Bodø who have successfully transitioned from WAA to competitive employment through exposure to IPS implementation. In order to facilitate policy and funding decisions, it is crucial to know if the intervention effects improve, deteriorate or stabilise over time. The research should also be followed up with larger-scale studies with bigger populations, both nationally and internationally, to see if the findings hold in other contexts. The other side of the coin also warrants investigation - does exposure to IPS implementation impact the uptake of disability benefits among young adults on the WAA?

More generally, researchers should conduct follow-up studies on NAV's vocational programs to assess the societal impact and cost-effectiveness of the interventions. These evaluations are beneficial for guiding policy decisions and will help determine the appropriateness of program implementation and the need for discontinuing ineffective or harmful existing interventions. Currently, NAV counsellors have few evidence-based vocational rehabilitation interventions to offer service users, hindering their capacity to guide young adults on WAA towards life course trajectories characterised by competitive employment and social inclusion.

Regarding life course trajectories, it would be valuable to explore if different mental disorders influence young adults' transitions through health-related rehabilitation and into disability benefit reliance. Additionally, further investigation into the impact of administrative

relabelling of welfare statuses, medicalisation and the potentially diminishing role of intergenerational welfare transmission (for receipt of health-related rehabilitation benefits) could provide deeper insights into developing targeted vocational interventions.

6.6 Strengths of the thesis

Integrating SA and DID methods from other academic disciplines, particularly the social- and economic sciences, into health sciences presents a significant strength of my thesis. This strategic borrowing of methods allows the research to tap into well-established analytical tools refined and validated in their respective fields over time. By transplanting these methods into the health sciences context, the study introduces fresh perspectives and techniques to yield new insights and expand the field's knowledge horizons.

This interdisciplinary approach fosters a valuable synergy between health, social, and economic sciences. It serves as a bridge that connects these distinct domains, allowing for the cross-fertilisation of ideas, methodologies, and insights. This cross-pollination contributes to advancing knowledge in all the disciplines involved.

Using SA and DID methods brings rigour and comprehensiveness to the data analysis that may not have been achievable using conventional approaches within the health sciences. SA, for instance, enables examining patterns and trajectories in health-related phenomena over time, unveiling hidden trends, transitions, and dependencies that more traditional methods might obscure. On the other hand, the DID approach offers a powerful way to isolate causal effects by comparing changes before and after an intervention, leveraging a control group for comparison. This methodological amalgamation enhances the robustness and credibility of the research findings, as the methods have already undergone extensive scrutiny and validation in their original fields.

My thesis also derives a significant strength from its reliance on high-quality administrative register data. Such data sources are widely acknowledged for their reliability and objectivity, as they are collected for administrative or regulatory purposes. This type of data brings forth several attributes that bolster the research's validity. Administrative registers encompass comprehensive datasets spanning a broad population. This inclusivity grants researchers a holistic perspective on the study subjects, enabling the formulation of conclusions that

accurately reflect the targeted population. Additionally, the longitudinal nature of administrative datasets permits the examination of trends and shifts over extended time frames. This temporal dimension enriches the analysis by delving into the evolving dynamics of health-related phenomena.

The inherent advantage of minimal recall bias is a notable characteristic of administrative data. Unlike survey-based research that relies on participants' memory, administrative data mitigate the susceptibility to recall bias, a common limitation in such studies. Furthermore, administrative data's capacity for linkage and integration with other datasets is significant. This feature empowers researchers to explore intricate relationships and correlations among variables. The resultant integration enriches the depth of the analysis, affording a more holistic understanding.

Another strength is that such research is generally only possible in Scandinavian countries, such as Norway, where administrative register data are readily available. Register data are often not as easily accessible or comprehensive in many other countries. This lack of comprehensive data in other nations can pose significant challenges for researchers conducting similar studies on the interconnection between labour market dynamics, SDOH, traditional vocational rehabilitation, IPS and reliance on health-related welfare benefits among young adults.

6.7 Limitations of the thesis

However, the thesis also has some limitations that must be acknowledged. While using administrative registers is a significant strength, these data may lack detailed information on certain individual characteristics and contextual factors obtainable through surveys or qualitative interviews. In addition, for Papers 1 and 2, I did not have access to diagnostic data or data on ACEs. Not having these data leaves unanswered questions regarding the impact of specific diagnoses and ACEs in shaping young adults' educational, work and welfare trajectories.

Another limitation is my focus on a narrow success criterion, i.e. the effect of the NAV reform, the WAA and IPS implementation on competitive labour market outcomes for young adults. I have not explored the effects on other factors; for example, participating in health-

related rehabilitation or being granted a disability benefit might improve recipients' quality of life without necessarily improving prospects for competitive employment. Additionally, the study focuses on the Norwegian context, and the findings may not be directly applicable to other countries with different welfare systems and labour market dynamics.

6.8 Conclusion

My thesis contributes new insights into the complex relationship between the Norwegian welfare system, social policy, SDOH, mental health, reliance on health-related welfare benefits and vocational rehabilitation approaches among young adults in Norway. The findings demonstrate that individualised interventions like IPS can catalyse disrupted life course trajectories towards competitive employment and economic self-sufficiency. The implications of these findings for the life course trajectories of young adults at risk of permanent labour market exclusion due to mental health problems call for a comprehensive re-evaluation of existing policies and practices to better facilitate their successful transition into the labour market.

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Papers 1-3

Paper 1

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Disability pension dynamics in early adulthood: A two-decade longitudinal study of educational, work and welfare-state trajectories in Norway

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ABSTRACT

Background: Since the 1990's, structural transformations in the Norwegian economy have decreased employment opportunities for low-skilled young people lacking formal education credentials. In parallel with these economic changes, there has been a strong increase in the proportion of young disability pensioners. Preventing labour market exit requires a thorough understanding of the disability process. We aim to 1) identify the most typical trajectories into disability pension for young Norwegian inhabitants between 1993 and 2014 and 2) investigate if the trajectories and composition of young disability pensioners changed over time.

Methods: Using high-quality Norwegian registry data, we established two population-based cohorts of Norwegian inhabitants aged 29–39 years in either 2003 (cohort 1) or 2014 (cohort 2) who were not disability pensioners during the first month of their cohort period but had been granted a disability pension by the cohort end-date. Cohort 1 was followed from the beginning of 1993 through 2003, cohort 2 from 2004 through 2014. We used sequence and cluster analyses to identify typical disability pension trajectories and investigate how they changed overtime.

Results: The majority follow trajectories characterised by little or no previous work participation. Both the trajectories and composition of young disability pensioners changed overtime. Between the two cohorts there was 1) a doubling in the probability of following 'precarious income trajectories', 2) a decrease in the probability of following 'work and/or education trajectories' and 3) an increase in the proportion of early school leavers.

Conclusion: Current initiatives such as the Norwegian Inclusive Workplace Agreement (IA) focus on preventing transitions from employment to disability benefits. However, such initiatives have little relevance for young disability pensioners as the majority have weak labour market attachment. Policymakers should therefore consider placing more emphasis on non-workplace interventions.

1. Introduction

1.1. Background

For decades there has been a slow, but steady increase in the proportion of young disability pensioners both in Norway (Brage & Thune, 2015) and in other OECD countries (OECD, 2013). In Norway more than 10.5% of working age adults receive disability benefits (Statistics Norway, 2021) which is the highest proportion of disability pension beneficiaries in the OECD (Hemmings & Prinz, 2020). In recent years there has been a sharp increase in the proportion of people aged 18–29 on disability benefits (Ellingsen, 2017). This is a significant economic burden for Norwegian society and a very poor outcome for the individual as the majority will be dependent on disability pension for up to 45 years (OECD, 2013).

Abbreviations: WHO, World Health Organisation; OECD, Organisation for Economic Co-operation and Development; NAV, Norwegian Labour and Welfare Administration (orignially an Norwegian abbreviation of Nye arbeids- og velferdsetaten); NIPH, Norwegian Institute of Public Health; ICPC, International Classification of Primary Care; ICD, International Classification of Diseases; IA, Norwegian Inclusive Workplace Agreement (Norwegian abbreviation of Inkluderende arbeidsliv-avtalen); NOK, Norwegian Kroner.

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1.2. Young disability pension and mental disorders

In Norway, more than 65 percent of young disability pensions are granted due to mental disorders (Ellingsen, 2017) which is a far greater proportion than for older age groups (OECD, 2013). Between 2010 and 2016 there was a sharp spike in disability pension incidence among young Norwegian inhabitants aged 18–29, primarily due to escalating numbers of 25-29-year-olds granted disability benefits due personality and behavioural disorders (Ellingsen, 2019). This has been accompanied simultaneously by a substantial increase in self-reported mental health ailments among Norwegian adolescents and young adults (NIPH, 2019), as well as significant rise in proportion of young people registered with an International Classification of Primary Care (ICPC-2-R) diagnostic code (WONCA, 2005) for mental symptoms from primary care (NIPH, 2019). However, currently there is not sufficient background data available to determine secular trends in the prevalence of mental disorders in Norway (NIPH, 2016).

1.3. Risk factors for young disability pension

Previous studies show that psychiatric diagnosis, non-completion of secondary education, low socioeconomic status and disadvantaged social background are strong independent predictors of young disability pension (De Ridder et al., 2013; Krokstad et al., 2002; Myhr et al., 2018). There is also evidence that immigrants from low-income countries, especially males from North Africa and the Middle East, have higher risks of disability pension receipt in young adulthood than ethnic Norwegians (Claussen et al., 2012). Intergenerational transmission of welfare is another disturbing phenomenon in modern welfare states. Dahl et al. (2014) find that when parents are granted disability pension, the likelihood that one of their adult offspring also becomes dependent on disability benefits rises significantly over the next decade.

2. Contextual background for the study

2.1. Societal context

Since the early 1990's, structural transformations in the Norwegian economy have led to a decline in labour market participation for adults with low educational attainment. First, there was a tremendous expansion in tertiary education accompanied simultaneously by labour market automation due to new information and communication technologies (ICTs), including innovations such as machine learning and digitalisation of production (Frey & Osborne, 2013; Nedelkoska & Quintini, 2018). This created a knowledge-intensive, skill-biased labour market where technological advances favoured groups with higher educational attainment and reduced the employability of other groups, particularly low-wage earners, working in unskilled positions (Hansen & Lorentzen, 2019). Their risk of job displacement was higher, and the number of workforce positions requiring only low qualification decreased dramatically until as few as 5% of available jobs required no formal education (OECD, 2010). Second, unskilled Norwegian workers with a low level of education were largely displaced by workers from Central and Eastern Europe who immigrated to Norway in 2006-09 (Bratsberg et al., 2014; Jean & Jimenez, 2007).

2.2. The Norwegian labour and welfare administration

Prior to 2006 the labour and welfare administration in Norway was based on three different public service institutions (Employment Services, Social Insurance Administration, and Municipal Social Services) with limited collaboration between institutions. From 2006 to 2011, the Norwegian Labour and Welfare Administration (NAV) reform was implemented by merging these three institutions into a "one-stop-centre" called NAV that is responsible for all employment and welfare services in Norway. A paramount objective of the reform was to improve labour market integration for vulnerable groups by providing access to a greater range of rehabilitation services and job training programmes (Dahl & Lorentzen, 2017).

Norwegian disability pensions are administered by NAV and can be granted to inhabitants with at least 50% reduced earning capacity due to illness or injury (NAV, 2019a). Disability benefits compensate 66 percent of the recipients average income, up to a salary cap of 6 times the National insurance basic amount (G) (NAV, 2019a). If a recipient has low or no previous income, they are entitled to a minimum benefit between NOK 242 590 - 309 621, which varies depending on the recipient's age and relationship status (NAV, 2019a; NAV, 2020). Outflow from disability pension to self-supporting employment is negligible, Norway has one of the lowest disability benefit claim rejection rates and there are no systematic assessments once a disability benefit has been granted (Hemmings & Prinz, 2020). Disability pension is therefore considered a permanent state within the Norwegian benefit system.

A particularly relevant innovation of the aforementioned NAV reform was the introduction of a generous new benefit, the Work Assessment Allowance (WAA) in 2010. Compared to its predecessors, WAA has relatively liberal qualification criteria and provides individuals without prior labour force participation access to the full range of NAVs work-oriented measures. Previously, these benefits were only available to people with labour-market experience.

To be entitled to WAA, an individual's work capacity must be reduced by at least 50%, primarily due to illness or injury (Folketrygdloven, 2017). NAV evaluates the individual's health and functionality in addition to their ability to meet work performance requirements of normal income-generating employment (NAV, 2019b). This work capacity assessment is based on information provided by the applicant. Eligibility for WAA also requires a diagnosis. Significantly however, ICPC-2 symptom diagnosis can be approved if a formal International Classification of Diseases (ICD) diagnosis (WHO, 2016; WHO, 2019) has not been established.

Physicians who are both members of Norwegian Social Insurance Medical Association[1] as well as expert advisors to NAV are concerned that eligibility criteria for WAA may increase medicalisation of young people's social needs (Ministry of Labour and Social Affairs, 2016). They report that the utilisation of symptom diagnoses, coupled with the absence of non-medical based benefit alternatives, results in many individuals (especially young people) being granted a health-related benefit (WAA) even though the primary cause of their reduced function is social problems (Ministry of Labour and Social Affairs, 2016). Physician concerns regarding medicalisation of young people's social problems are backed-up by recent research from both Norwegian economists (Markussen & Røed, 2020) and social scientists (Bakken, 2020).

WAA was expected to improve the rates of young people re-entering the workforce. However, it has not reaped the intended benefits as the possibility of transforming this temporary entitlement into a permanent disability pension after several years undermines the seriousness of vocational integration efforts (OECD, 2013). In fact, critics have coined WAA "a waiting ground for disability pension" (Kann & Kristoffersen, 2014).

2.3. The Norwegian Inclusive Workplace Agreement

In 2001, The Norwegian Inclusive Workplace Agreement (IA-avtalen) was initiated through collaboration between the government, business organisations and labour unions (The Norwegian Government, 2018; Ministry of Labour and Social Affairs, 2021). An overarching goal of the IA is to prevent transitions from work life to disability benefits through initiatives aimed at reducing sickness absence and improving

[1] The Norwegian Social Insurance Medical Association (Ntmf) is a specialist association within the Norwegian Medical Association.

work environments (Ministry of Labour and Social Affairs, 2021). However, without in-depth knowledge of typical trajectories into disability pension, we cannot know if such initiatives were appropriate for our study population.

2.4. Aims and expectations

Developing policies and interventions to prevent young disability pension requires a thorough understanding of the disability process based on knowledge of common trajectories. We therefore aim to 1) identify the most typical educational, work and welfare-state trajectories into disability pension for two cohorts of young Norwegian inhabitants between 1993 and 2014 and 2) investigate if the trajectories and composition of young disability pensioners changed overtime.

Given large-scale economic and institutional transformations that took place during the study period, we expect to see changes in the background composition of the two study cohorts. We anticipate that there will be a greater proportion of early school leavers in the later cohort as there are simply fewer opportunities for them in the modern Norwegian labour market. For the same reasons we predict that young people in the second cohort are more likely to follow trajectories characterised by a precarious income situation with low or no previous labour market experience.

We also expect to see inter-cohort differences related to changes in social welfare policy. Our assumption is that the disability process takes longer for the latest cohort as a result of a longer period spent in health-related rehabilitation after the introduction of WAA in 2010. In regard to gender, we expect women to be overrepresented in both cohorts as there is evidence that women have a higher likelihood of disability pension than their male counterparts (Haukenes et al., 2012).

3. Methods

3.1. Data source

For this study, we used administrative data collected by Statistics Norway. The dataset contained longitudinal and detailed individual information on demography, education, income, work, and social welfare benefits for the complete Norwegian population starting in the early 1990s. The extensive information allowed the longitudinal reconstruction of life courses over a long-time span. In the original data most time-varying variables were recorded with exact start and stop dates, although some variables, such as those collected from tax-registers and educational registers were recorded annually. The quality and consistency of the administrative records used for the analyses is in general very high and undergo strict quality control from Statistics Norway before being made available for research purposes.

3.2. Analytical sample and cohorts

The study population was Norwegian inhabitants aged 29–39 years in either 2003 (cohort 1) or 2014 (cohort 2) who were not disability pensioners during the first month of their cohort period but had been granted a disability pension sometime between the second and last month of the respective follow-up periods. Cohort 1 was followed from the beginning of 1993 through 2003, cohort 2 from 2004 through 2014. The age restriction provided us with a homogenous population with regards to life-phase stages, such as schooling, labour market experience, and family phase. In total this gave us a population of 19 300 from cohort 1 and 15 964 from cohort 2.

3.3. Study design

We used Sequence analysis (SA) to identify typical trajectories leading into disability pension. SA has been used extensively over the last few years within the social sciences to identify holistic life course trajectories, but less so within the medical sciences. Utilising SA allows the study of how transitions are interconnected and constitute complex life courses, while at the same time reducing some of the complexity and heterogeneity found over the full range of individual sequences. This can be seen as a contrast to the focus on single transitions found in more traditional regression-based approaches (Aisenbrey & Fasang, 2010). Our analytical approach followed a three-step procedure. Each step was performed separately for the two cohorts.

The first step involved the calculation of distances between sequences (Gabadinho & Ritschard, 2013). In more practical terms, the distance is the result of the number of changes that need to be done to make two sequences similar (Brzinsky-Fay, 2007). The more similar they are, the less is the distance between them. The distance calculation is based on two types of changes, insertions/deletions (indels), and substitutions. Substitution costs were here user defined and derived from state attributes using the Gower distance (Studer & Ritschard, 2014). The Gower dissimilarity coefficient was based on the qualitatively assessed distance from work for each of the states, as well as information of whether the status type was a job, a health-related benefit, other welfare state benefits, or education. This resulted in a measure ranging from 0 to 1, where 1 is the maximum defined distance between states. Following common procedure, the indels cost were defined at 0.5, which is half the maximum cost of substitutions.

The second step followed the clustering procedure to identify typical trajectory types into disability. The clusters were identified using a clustering approach, where hierarchical clustering (Ward) was used as starting values for partitioning around medoids (PAM) clustering (Studer, 2013). Clustering quality was assessed using a range of cluster quality measures found in the Weighted cluster package in R (Studer, 2013). The best cluster solutions produced 6 distinct trajectory types for the 2003 cohort, and 7 for the 2014 cohort.

In the last step, we ran multinomial logistic regressions on the relationship between explanatory variables (presented below), and the trajectory types identified in the clustering procedure. The regression framework allowed us to consider compositional differences within and between cohorts. For ease of presentation, the regression analyses were presented as average marginal effects, thereby avoiding well known methodological problems when comparing logits or odds ratios (Breen et al., 2018; Mood, 2010).

4. Variables and measures

4.1. Statuses

Nine mutually exclusive monthly statuses covering school, work, and social welfare were defined (Table 1). In the instance of overlapping states, such as, e.g., part-time work and disability, the highest placed status in the status alphabet (Table 1) determines the overall monthly status. The system of preference was based on the conception that more permanent and/or disadvantaged states overrules states that are less permanent and/or disadvantaged.

4.2. Explanatory variables

In the regression analyses, we entered several demographic and socioeconomic variables motivated by previous research on the transition into disability. Country background was categorised into three broad groups consisting of Norway, which served as reference category, Western Europe/North America/Oceania, and Non-western countries. For the gender variable, men served as a reference group. Furthermore, due to the instrumental importance of education, we have separated between those who have finished upper secondary education and those who have not. Persons who had finished upper secondary education by the age of 30 served as reference category.

Socioeconomic background was analysed using parental education and parental disability pension. Parental education was measured for

Table 1
Monthly statuses.

Status	Description	
Disability pension	Registered with disability pension current month	● Destination state for the whole study-population ● Presupposes at least 50% reduced work capacity ● Considered a permanent state within the Norwegian benefit system.
Health-related rehabilitation	Registered with either: temporary disability benefit, vocational rehabilitation benefit or medical rehabilitation benefit current month (prior to 2010), or the work assessment allowance current month (from 2010)	● Collective term used for uptake of one of four temporary health-related rehabilitation benefits. ● The three health-related rehabilitation benefits that were avalaible prior to 2010 (temporary disability benefit, vocational rehabilitation benefit, medical rehabilitation benefit) were merged into one category for the statistical-analysis. ● The aim of collapsing these three benefits into one category was to avoid unnecessary complexity as well as to achieve comparability across cohorts and over the full observation period.
Social assistance	Registered with means tested social assistance benefits current month	● A means tested benefit which is considered to be the last safety net in the Norwegian social welfare system. ● Considered meagre from both from a Norwegian and an international perspective (Lorentzen & Dahl, 2020).
Sickness benefit	Registered with sickness allowance current month	● Regarded as extremely generous by compensating sickness at a 100% of current income. ● Only available to those who have earned the right through work. ● Maximum duration of one year ● Possibility to transfer to less generoushealth-related rehabilitation benefits after one year.
Unemployed O. H.	Registered as unemployed and occupational handicapped/reduced working capacity current month	● Status given to unemployed people waiting for rehabilitation ● Assessed by NAV as having reduced working capacity.
Unemployed	Registered as ordinary unemployed current month	● Status assigned to those who have registered as ordinary unemployed at their local NAV office. ● The category includes both those with earned rights to unemployment benefit and those without.
Education	Registered under education current month if month is in a year with a valid educational record and none of the above statuses apply current month	● Status assigned if educational activity was registered the current month. ● In cases where education was combined with statuses in the social security system, the latter was given preference.
Work	Registered with a spell of work current month	● Status designated to those registered as participating normal, income-generating employment.
Other	If none of the above statuses apply	● Status containing those with unknown alternative income sources who were not registered as employed, in education or receiving any welfare benefits.

the parent with the longest education in years using the Norwegian Standard Classification of Education (NUS2000) normalised from 0 to 1 for the presentation of average marginal effects. Thus, for the interpretation of the effect of parental education, a one-unit-change is interpreted as the distance between the lowest and the highest parental education observed. Parental disability benefit dependency is measured for both parents when I/O were 29 years old. No parents on disability pension serves at the reference category for the multivariate analyses. A dummy-variable indicating whether one lived in an urban or a rural community at t0 served as a proxy for the prevailing labour market conditions.[2]

5. Results

In Table 2, we present and compare status durations in months. We find that the disability pension process changed over time. People in the first cohort spent more time on disability pension, 57.6 months in cohort 1 vs 43.5 months in cohort 2 ($t < 0.01$) (Table 2), which signifies that the disability pension process took longer in the later cohort. While the duration of health-related rehabilitation is more or less the same for both cohorts, the average number of months spent unemployed increased considerably in the later cohort. This is solely due to a 12% ($t < 0.01$) increase in the use of the unemployment category "occupational handicapped" (Table 2). The average duration of work participation decreased from 10.2 months in cohort 1 to 5.8 months in cohort 2 ($t < 0.01$) (Table 2), while the average number of months where young people were supported economically through alternative income sources (alternative maintenance) increased 67.9% ($t < 0.01$) (Table 2).

Over the observation period, the proportion of early school leavers increased from 50.1% to 62.3% ($t < 0.01$) (Table 3) and fewer people in the later cohort combined disability pension with some form of work, 26.1% in cohort 1 vs 20.3% in cohort 2 ($t < 0.01$) (Table 3). Women are overrepresented in both cohorts, although the gender gap decreased by 1.6% ($t < 0.01$) between cohorts (Table 3). The proportion of disability pensioners with a country background outside Norway increased 6.1%

Table 2
Cohort-specific status duration in months.

Cohort-specific status duration in months:	2003-cohort	2014-cohort	Sig. a
Disability pension	57.6	43.5	**
Health-related benefits	31.3	32.6	**
Social assistance	8.7	9.6	**
Sickness allowance	6.5	5.3	**
Unemployed, occupational handicapped	1.8	15.0	**
Unemployed, ordinary	5.5	5.8	**
Education	3.0	3.5	**
Work	10.2	5.8	**
Other	7.4	10.9	**
Total (N)	132 (19 300)	132 (15 964)	

a Two-sample t-tests on differences in means between cohorts. *$t < 0.05$ **$t < 0.01$.

[2] Based on Statistics Norway's classification standard.

Table 3
Cohort-specific descriptive statistics.

Cohort-specific descriptive statistics (%)	2003-cohort	2014-cohort	Sig.
Turbulence (mean)[c]	10.8	12.0	**a
Country background			**b
Norway	86.6	80.5	
Western Europe, North-America, Oceania	7.0	8.8	
Non-Western	6.4	10.7	
Gender			**b
Male	46.5	48.1	
Female	53.5	51.9	
Education			**b
Finished upper secondary education	49.9	37.7	
Early school leaver	50.1	62.3	
Parental education NUS level (mean)	3.0	3.3	
Region			**b
Urban	76.3	77.9	
Rural	23.7	22.1	
Parental disability status			**b
No parental disability pension	50.3	52.0	
One parent disabled	36.8	33.9	
Two parents disabled	12.9	14.1	
Parental ISEI (mean)[d]	39.6	NA	a
Work activity last month of observation			
No work activity	73.9	79.7	**b
Work 1–19 h a week	17.8	15.9	
Work 20–29 h a week	2.3	1.9	
Work 30+ hours a week	6.0	2.4	

a Two-sample t-tests on differences in means between cohorts. *t < 0.05 **t < 0.01.
b Pearson chi-square test on cohorts and non-metric variables. *t < 0.05 **t < 0.01.
[c] Turbulence is a composite measure reflecting the number of distinctive sequences and the time in each state (Elzinga & Liefbroer, 2007). Higher turbulence implied shorter spells and more shifts between statuses.
[d] The ISEI-scale translates occupational income and education into a continuous prestige-scale ranging from 10 to 90 (Ganzeboom, 2010; Ganzeboom et al., 1992).

(t < 0.01) between cohorts (Table 3), mainly due to a 4.3% (t < 0.01) increase in disability pensioners from Non-western countries. In both cohorts approximately 50% of the study population had at least one parent who was also a disability pension recipient (Table 3).

5.1. Trajectories

Next, we present the most typical trajectory types resulting from the optimal matching and clustering procedures along with the trajectory-specific risk factors depicted with average marginal effects (AME). The description of trajectories is based on a combination of information sequence index plots (Supplementary Appendix Figures A1, A2), plots depicting mean time in each state by cluster (Supplementary Appendix Figures A3, A4) and plots depicting average marginal effects (Figs. 1 and 2). For those interested in obtaining an in-depth understanding of the trajectory types and their followers, we have included a set of cluster-specific background variables in Appendix Table 1.

Optimal matching and PAM clustering identified six distinct clusters for cohort 1 (Figure A1, Table 4) and seven distinct clusters for cohort 2 (Figure A2, Table 4). To simplify cohort comparison, trajectory types have been distributed into three broad categories, characterised as 'Trajectories via work and/or education', 'Health related benefits trajectories' and 'Precarious income trajectories'. Trajectory types and their defining characteristics are summarised in Table 4.

6. Cohorts

6.1. Cohort 1 (1993-2003) trajectories

6.1.1. Trajectories via work and/or education (23.4%)

6.1.1.1. Short work/education → sickness → rehabilitation (C5) - 11.3%. This cluster includes predominantly subjects with sequences that included a short-medium spell of labour market participation (Table 4). The average marginal effects (AME) depicted in Fig. 1 show that the trajectory probability increased with upper-secondary school completion, being female or having parents with a relatively high level of education. Parental disability pension decreased the chance of following this trajectory.

6.1.1.2. Long work/education → sickness → rehabilitation (C6) - 12.1%. Here we find those who had a relatively long spell (6–7 years) of labour market participation prior to disability pension (Table 4). Regression analysis (Fig. 1) found that the trajectory-probability increased with upper secondary school completion and being female. Again, parental disability pension decreased the risk for this trajectory type.

6.1.2. Health-related rehabilitation trajectories (54.1%)

6.1.2.1. Long term rehabilitation (C1) - 54.1%. This trajectory represents the most common path to disability pension for cohort 1 (Table 4) and is characterised by a very high proportion of early school leavers. On average, being an early school-leaver increased the trajectory probability by 13.5% (Fig. 1). Being male and having parents with a relatively high level of education also somewhat increased the risk of following this trajectory (Fig. 1).

6.1.3. Precarious income trajectories (22.5%)

6.1.3.1. Alternative maintenance → rehabilitation (C2) - 6.8%. The heterogeneous 'Other' category is prominent here (Table 4). On average, women had a 5.8% higher chance of following this trajectory compared to men (Fig. 1). Other trajectory predictors were parental disability pension and having parents with a low-level of educational attainment.

6.1.3.2. Long term social assistance/unemployment (C3) – 5%. This trajectory consists of long-term labour market exclusion leading to disability pension (Table 4). Being male or an early school leaver increased the trajectory probability by 4.5% and 1.1% respectively (Fig. 1). In addition, parental disability pension, low parental level of education and urbanicity inferred slightly increased risk.

6.1.3.3. Social assistance/unemployment –> rehabilitation (C4) - 11%. The typical sequence here is: labour market exclusion → short spell of health-related rehabilitation → disability pension. Regression analysis found that men had a 2.7% higher risk of following this trajectory compared with women (Fig. 1). Other risk factors were parental disability pension or having parents with a low level of educational attainment (Fig. 1).

6.2. Cohort 2 (2004-2014) trajectories

In cohort 2, a striking phenomenon occurs after 7 years when the majority abruptly transfer into health-related rehabilitation (Figure A2). This corresponds with the introduction of the Work Assessment Allowance (WAA) in March 2010. WAA is very dominant in six of the seven trajectories (Figure A2).

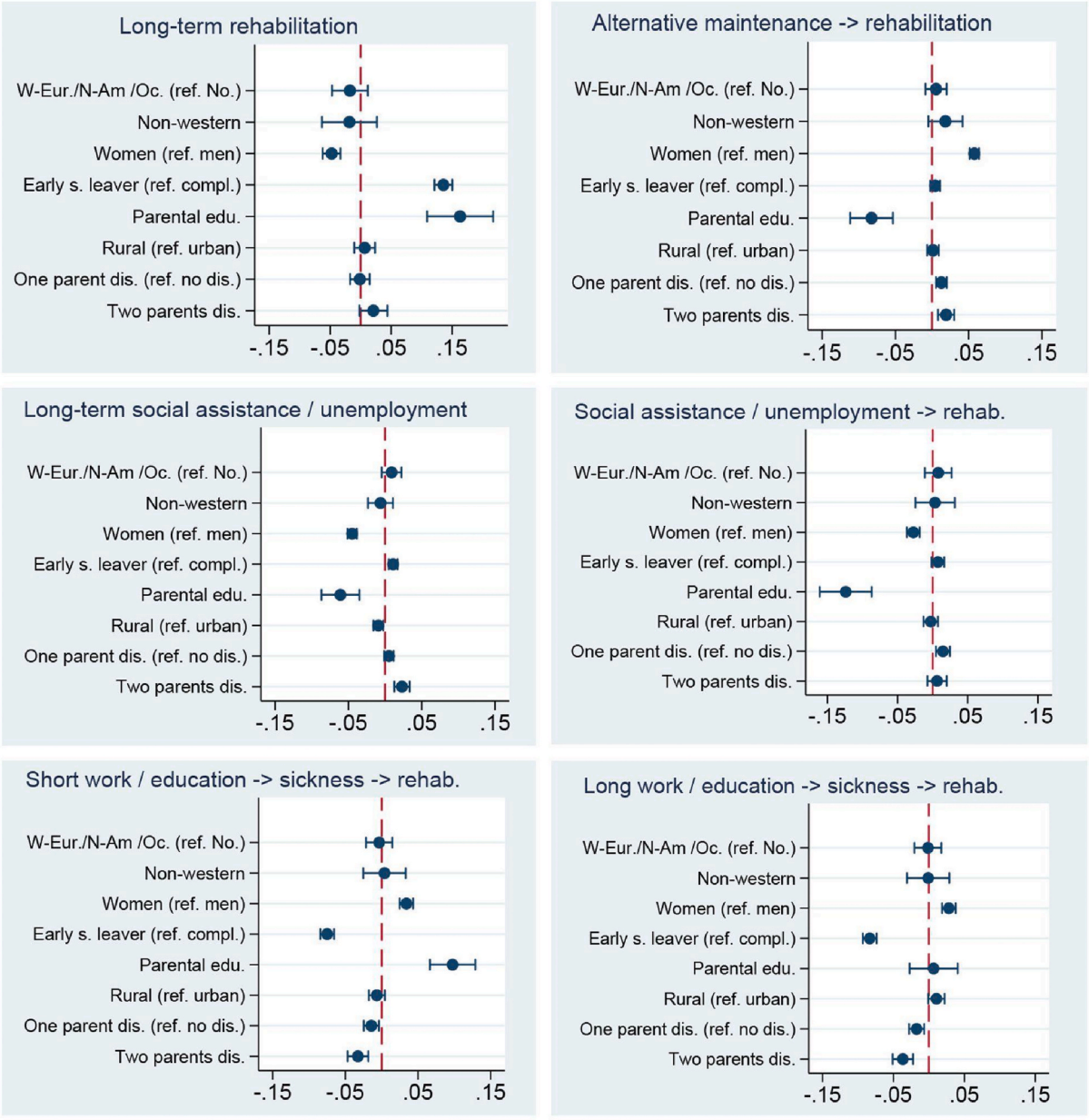

Fig. 1. Cohort 1: Average marginal effects (AME).

6.2.1. Trajectories via workVia work and/or education (14.3%)

6.2.1.1. Education −> unemployed (O.H) −> rehabilitation (C6) - 7.6%. This trajectory is composed of subjects who were studying at baseline. AMEs depicted in Fig. 2 show that the strongest trajectory predictors were upper secondary school completion and having parents with a relatively high level of education. Being female, a non-western immigrant or a rural dweller were also trajectory risk factors. Parental disability pension decreased the trajectory probability.

6.2.1.2. Work −> sickness −> rehabilitation (C7) - 6.7%. Individuals following this trajectory participated in stable competitive employment prior to disability pension (Table 4). Those who completed upper secondary school had, on average, a 6.3% greater chance of following this trajectory compared to early school leavers (Fig. 2). Interestingly, having parents with a relatively low level of educational attainment inferred increased risk for this trajectory type while having two parents on disability benefits inferred slightly decreased risk.

6.2.2. Health-related rehabilitation trajectories (42.9%)

6.2.2.1. Short−term unemployed (O.H.) (C1) - 17%. Here we find those who transited into disability pension after a short spell of occupational handicapped unemployment (Table 4). The trajectory probability was higher for early school leavers (11.7%) and men (6.4%) (Fig. 2). Having parents with a relatively high level of education was also a predictive factor. The risk of following this trajectory decreased with parental disability pension.

6.2.2.2. Long−term unemployed (O.H.) −> rehabilitation (C2) - 26%. The dominant feature here is a long spell of occupational handicapped unemployment (Table 4). Predictors of this trajectory type were almost the exact opposite of the previous trajectory (Fig. 2). Thus, upper secondary school completion or being female substantially increased the trajectory probability. Ethnic Norwegians and rural dwellers also faced a somewhat elevated risk of following this trajectory.

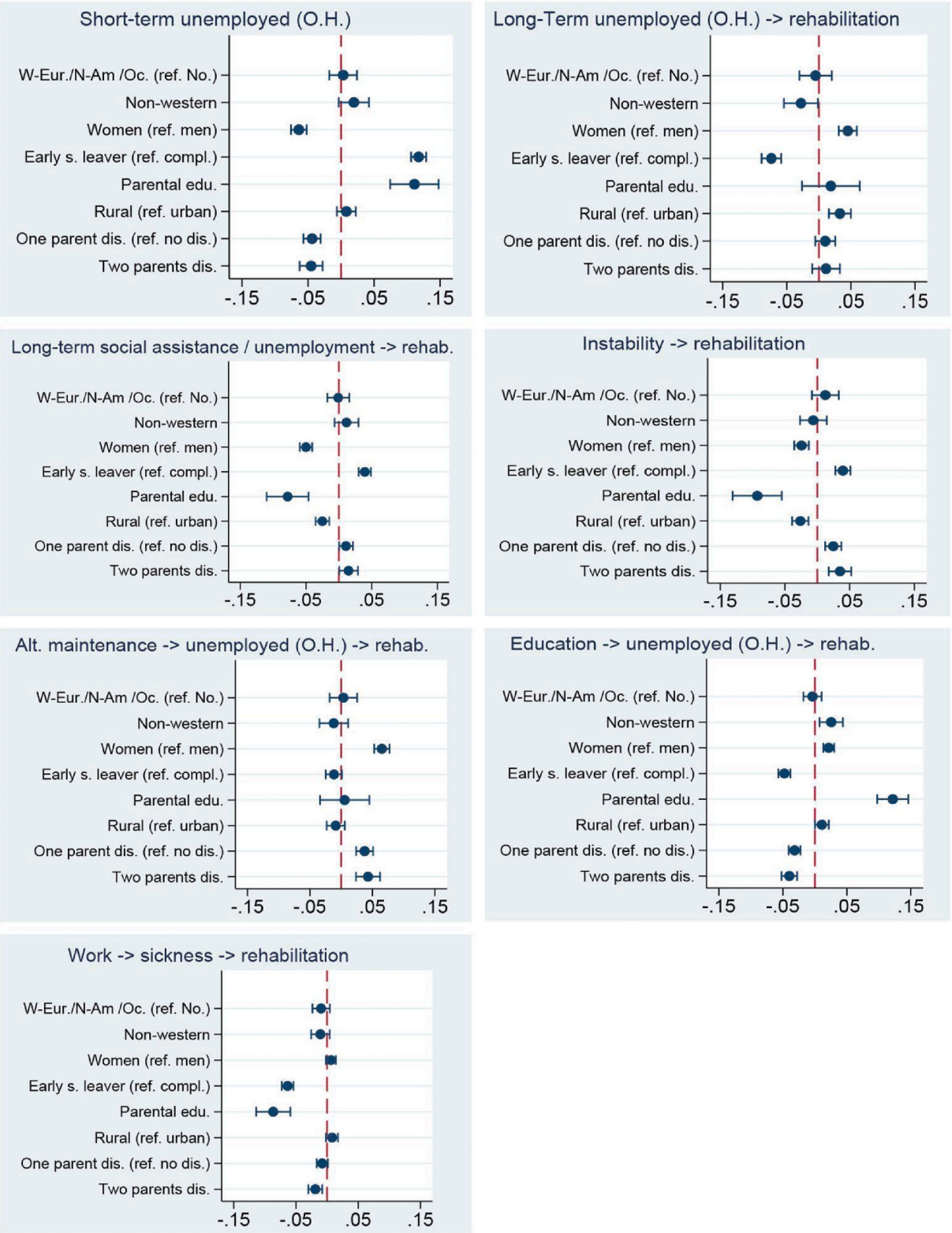

Fig. 2. Cohort 2: Average marginal effects.

6.2.3. Precarious income trajectories (42.9%)

6.2.3.1. Long−term social assistance/unemployment → rehabilitation (C3) - 10.0%. This trajectory is characterised by intervals of unemployment or social assistance (Table 4). Being male or an early school leaver were important trajectory predictors (Fig. 2). Additional risk factors were parental disability pension, having parents with a relatively low level of educational attainment and urbanicity.

6.2.3.2. Instability −> rehabilitation (C4) - 14.3%. Here we have a heterogenous trajectory consisting of general instability (Table 4). AME's (Fig. 2) show that the trajectory-probability was greater for men

Table 4
Trajectory types and characteristics.

Type	Trajectories			
	2003-cohort	%	2014-cohort	%
Via work and/or education	(C5) Short work/ education - > sickness - > rehab.: Characterised by a short spell of work/ education leading into a period of sickness benefits followed by rehabilitation. After seven years, most followers have transitioned into disability pension.	11.3	(C6) Education - > unemployed (O.H) - > rehab.: Characterised by education at baseline followed by unemployment registered as occupational handicapped leading into rehabilitation followed by disability pension.	7.6
	(C6) Long work/ education - > sickness - > rehab.: Long period of work and/or education leading into a period of sickness benefits followed by rehabilitation. After ten years, most followers have made the transition into disability pension.	12.1	(C7) Work - > sickness - > rehabilitation: Here we find persons who participated in stable competitive employment before entering sickness benefits followed by rehabilitation and disability pension.	6.7
Health-related benefits trajectories'	(C1) Long term rehabilitation: A typical sequence is characterised by regular unemployment leading into unemployment registered as occupational handicapped. This is followed by a long and uninterrupted period of health-related rehabilitation finally leading into disability pension.	54.1	(C1) Short-term unemployed (O.H): This trajectory is characterised by short-term, occupational handicapped unemployment transiting into disability pension after a very brief rehabilitation spell.	17.0
	-		(C2) Long-term unemployed (O.H.): The most typical sequence here is a long spell of occupational handicapped unemployment, then an abrupt transit into four years of health-related rehabilitation leading into disability pension.	26.0
Precarious income trajectories	(C2) Alternative maintenance - > rehabilitation: The most typical sequence starts with a long spell of alternative maintenance leading into rehabilitation followed by disability pension.	6.8	(C3) Long-term socass./unemp. - > rehab.: This trajectory is characterised by intervals of unemployment or social assistance leading into rehabilitation followed by disability pension.	10.0
	(C3) Long term social assistance/ unemployment: This trajectory type is characterised by long-term labour market exclusion leading to disability pension.	5.0	(C4) Instability - > rehabilitation: This is a heterogenous trajectory consisting of general instability. Individuals following this trajectory type experienced frequent shifts between different states leading into rehabilitation and disability pension.	14.3
	(C4) Social assistance/ unemployment - > rehab.: A typical sequence for this trajectory type is labour market exclusion leading into a short spell of rehabilitation followed by social assistance.	11.0	(C5) Alt. maintenance - > unemp. (O.H.) - > rehab.: The most typical sequence here is health-related rehabilitation (including O.H.) leading into an extended period of alternative maintenance followed by another period of health-related rehabilitation (including O.H.) before transferring to disability pension.	18.6

and early school-leavers. Likewise, low parental education, parental disability and urbanicity inferred an elevated risk.

6.2.3.3. Alternative maintenance → unemployed (O.H.) → rehabilitation (C5) - 18.6%. This trajectory is distinguished by a combination of the 'occupational unemployment' category and the heterogeneous 'Other' category (Table 4). According to the AME analysis (Fig. 2) women had, on average, a 6.5% higher chance of following this trajectory compared to men. Having one parent with a disability pension was associated with 3.8% increased risk while having two parents receiving disability benefits elevated the risk slightly further to 4.3%.

7. Discussion

Developing policies and interventions to prevent young disability pension requires a thorough understanding of the disability process based on knowledge of common trajectories. In line with this, our study has two main aims: 1) identify the most typical educational, work and welfare-state trajectories into disability pension for two cohorts of young Norwegian inhabitants between 1993 and 2014 and 2) investigate if the trajectories and composition of young disability pensioners changed overtime.

7.1. Aim 1

In both cohorts, the majority of young disability pensioners are early school leavers, following trajectories characterised by little or no previous labour force participation. Current initiatives, such as the Norwegian Inclusive Workplace Agreement (IA), are primarily focused on preventing transitions from employment to disability pension. However, workplace prevention initiatives will have little impact on young disability pensioners as the bulk of this population have weak labour market attachment.

7.2. Aim 2

Differences in status duration between the two cohorts suggests that disability pension serves a slightly different clientele for the latest cohort. The average duration of work participation decreased 57% between cohort 1 and cohort 2, which implies different background characteristics as well as a different pathway into disability pension.

Cohort-specific descriptive statistics support this by showing that the share of early school leavers was higher for the latest cohort, with high school dropout increasing by 12% between cohort 1 and cohort 2. Lack of work experience combined with lower completion rates of upper secondary education indicates that young people in the second cohort were less equipped to deal with the demands of a knowledge-intensive labour market compared to their predecessors. Both findings could reflect that formal education is increasingly important and might have changed the functional requirements for the labour market (OECD, 2010). Our findings build on previous research indicating that higher education may be protective against disability pension in the Norwegian context (Østby, Ørstavik, Knudsen, Reichborn-Kjennerud, & Mykletun, 2011).

This general decline in the ability to meet job performance requirements of normal income-generating employment may also explain why fewer people in the later cohort combined disability pension with some form of work. Polvinen et al., (2018) provide further support for our results. Firstly, they present evidence that disability pensioners with higher education are more likely to partake in some form of part-time work compared to those with low education attainment. Secondly, they find that previous labour market attachment is associated with working after disability retirement (Polvinen et al., 2018). In addition, their results indicate that disability pensioners due to mental disorders are less likely to work than disability pensioners due to other conditions (Polvinen et al., 2018).

The overall increase in the proportion of early school leavers; the near doubling in the share following "precarious income trajectories"; as well as the concurrent decrease in the probability of following "work and education trajectories", indicates that the function of disability pension may be changing. In the later cohort, it appears that disability pensions cater for people with primarily social (rather than medical) needs to a greater extent than the first cohort. Our observation is reinforced by previous Norwegian research demonstrating that disability benefits may function as an economic safety net for individuals with low education attainment who struggle with employment (Østby, Ørstavik, Knudsen, Reichborn-Kjennerud, & Mykletun, 2011).

There are concerns that the WAA (a health-related benefit introduced in 2010), increases medicalisation of young people's labour market struggles (Ministry of Labour and Social Affairs, 2016; Bakken, 2020; Hansen & Lorentzen, 2019). Eligibility for WAA requires a diagnosis; however, ICPC-2 symptom diagnosis can be approved if a formal ICD diagnosis has not been established. Utilisation of symptom diagnoses, coupled with the absence of non-medical based benefit alternatives, may result in young people being granted a health-related benefit (WAA) even though their reduced function can primarily be attributed to social factors (Ministry of Labour and Social Affairs, 2016). From WAA, the majority do not enter the labour market as intended but rather transition to permanent disability benefits (Kann & Kristoffersen, 2014). It is, however, beyond the scope of our paper to explore if medicalisation contributed to the sharp increase in young disability pensioners due to mental disorders after WAA was introduced.

7.3. Other important findings

Our analysis also provides evidence that gender plays a role in low-skilled young people's transitions from school to disability pension. In both cohorts, young men are more likely to follow trajectories characterised by labour market exclusion while women have higher probability of following alternative maintenance trajectories or trajectories via work and/or education. Women are overrepresented in both cohorts, although the gender gap decreased slightly over the study period. Cohort 2 is more ethnically diverse than cohort 1, which is likely due to the influx of adult immigrants to Norway from Non-western countries over the study's observation period (Jakobsen & Lorentzen, 2019).

Finally, our findings support previous research demonstrating that parental disability pension is associated with both low educational attainment and disability in their offspring (Dahl et al., 2014; Myhr et al., 2018). In both cohorts, approximately 50% of young disability pensioners had at least one parent who was also a disability pension beneficiary. Furthermore, low parental educational achievement is identified as a significant risk factor for following precarious income trajectories. Even though our research does not provide causal evidence, family vulnerability appears to be a key element in explaining this association.

7.4. Strengths

Using high-quality population-level registry data enables us to avoid typical problems associated with longitudinal surveys such as low response rates and high dropout rates. Furthermore, in contrast with more conventional methods such as cross-sectional and event history analyses, we are able to investigate how transitions are interconnected and how trajectories develop over time through complex, extended life courses.

7.5. Limitations

Future studies should include detailed health information so that one can assess how different diagnostic groups influence young people's educational, work and welfare-state trajectories into disability pension. We plan to repeat the analyses on data updated to 2020 and include detailed health information. Another limitation concerns extrapolation. The context of this study makes it primarily relevant for countries with extensive welfare states and knowledge-intensive labour markets. Finally, our analysis does not provide causal evidence. We have identified some important developments that should be further scrutinised by means of causal identification strategies.

8. Conclusion

8.1. Practical implications

Investigating young disability pension trajectories using sequence analysis has provided us with some valuable new insights. The majority of our study population are early school leavers with little or no previous labour market attachment. As such, workplace prevention strategies, such as the Norwegian Inclusive Worklife Agreement (IA) would have had limited impact on this group. Policymakers should therefore consider placing more emphasis on non-workplace interventions.

8.2. Future research

Given the strong intergenerational correlation in disability pension dependency, further research on causal mechanisms underlying intergenerational transmission of welfare could help prevent future disability pension within at-risk families. In addition, considering the sharp increase in young disability pensioners due to mental disorders, it would be interesting to investigate how different mental disorders influence young people's transitions from school to disability pension. It would also be interesting to investigate the role medicalisation may play in increasing the number of young Norwegian inhabitants on permanent disability benefits.

CRediT authorship contribution statement

Sina Wittlund: Conceptualization, Study design, Methodology, Formal analysis, Literature Review, Visualization, Writing – original draft, Writing – review & editing. **Arnstein Mykletun:** Supervision, Conceptualization, Study design, Funding acquisition, Resources, Writing – review & editing. **Thomas Lorentzen:** Supervision, Conceptualization, Study design, Methodology, Formal analysis, Project administration, Resources, Software, Validation, Visualization, Writing

– review & editing.

Declaration of competing interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2022.101062.

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Paper 2

BMC Public Health

RESEARCH

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Changes in health-related rehabilitation trajectories following a major Norwegian welfare reform

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Abstract

Background In this study we investigated the health-related rehabilitation trajectories of young Norwegian adults between 2004–2019. The study period is interesting because it overlaps with an extensive welfare system reform that occurred in Norway between 2006–2011. In parallel with the reform there was a substantial increase in health-related welfare dependency among young people due to mental health conditions.

To better understand this group, we addressed three questions: 1) what were the most typical health-related rehabilitation trajectories for young Norwegians aged 23–27 between 2004–2019, 2) did the trajectories and composition of health-related benefit recipients change overtime and 3) in parallel with the welfare reform, do we see improved labour market outcomes in our study population?

Methods Using high-quality Norwegian registry data, we established four cohorts of Norwegian health-related rehabilitation benefit recipients aged 23–27 in either 2004 (cohort 1), 2008 (cohort 2), 2011 (cohort 3) or 2014 (cohort 4). The follow-up period for each cohort was six years. We used sequence and cluster analyses to identify typical health-related rehabilitation trajectories. In addition, descriptive statistics and multinomial logistic regression were used to scrutinise the relationship between trajectory types, sociodemographic characteristics and cohort membership.

Results The majority follow trajectories consisting of welfare dependency, unemployment and unstable, low-income work. Both the trajectories and composition of the study population changed across cohorts. Over the observation period there was a 1) three-fold increase in the proportion following a trajectory ending in permanent disability benefits, 2) nine-fold increase in the proportion following trajectories characterised by long periods of health-related rehabilitation, 3) five-fold decrease in the share following unemployment occupational handicap trajectories 4) 6.9% increase in the proportion of early school leavers and 5) 8.9% decrease in the share with disabled parents.

Conclusion Our study population is a vulnerable group with suboptimal mental health, functioning and employment outcomes. In conjunction with the welfare reform, we witnessed a significant drop in use of work-related benefits, accompanied by a substantial increase in uptake of health-related rehabilitation- and disability benefits. Thus, it appears that rather than improving employment outcomes, welfare policy changes have created a new problem by steering a greater proportion into disability benefits.

Keywords Mental disorders, Mental health, Health-related rehabilitation, Work Assessment allowance, Social policy, Welfare reform, Educational, work and welfare trajectories, Medicalisation, Disability benefits, Young adults

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Introduction

Background

Preventing early labour market exclusion is a global priority [1]. Increasing unemployment and reliance on health-related welfare benefits among young adults from Western countries has led to social exclusion, negatively affecting their health, well-being, and overall quality of life [2]. When young individuals are denied the opportunity to develop their life skills and pursue their aspirations, society loses out on their valuable contributions, resulting in a loss of value creation. A premature departure from the labour market by potentially productive individuals also imposes a considerable economic burden on the public, leading to prolonged social security payments for many years [3].

A concerning trend in several European countries, including Norway, is the growing dependence of young adults on health-related welfare benefits [3, 4]. Various socioeconomic factors, such as lower education or income, limited connection to the workforce, immigrant status, weak social relationships, and family background factors like parental limited education or unemployment, contribute to this risk [5, 6]. Qualitative research in Norway highlights the significance of challenging childhoods, adjustment difficulties, and adverse social experiences like abuse and bullying for young individuals receiving disability benefits [7].

Mental and behavioural disorders significantly contribute to the disability burden experienced by young people in high-income countries [8]. The OECD recognizes mental ill-health as a problem for social and labour market policies, as it results in high costs for individuals, employers, and society due to reduced employment, increased unemployment, and productivity losses [3].

Although the overall unemployment rate remains low in Norway, there is a significant concern about the proportion of young adults relying on social benefits due to health issues [9]. In Norway, approximately 5.2 per cent of young people aged 18–29 receive either temporary health-related rehabilitation benefits or permanent health-related disability pensions [10], considerably higher than in other OECD countries. Young adults aged 25–29 constitute more than half of this group. Of particular concern is the nearly doubled dependency on health-related welfare benefits among young people in the past two decades, especially for those granted benefits due to mental health conditions [10].

The Norwegian Labour and Welfare administration

Over the past 20 years, changes have taken place in the Norwegian welfare system. Before 2006, three separate agencies provided labour and welfare services in Norway: Employment Services, Social Insurance Administration, and Municipal Social Services. However, between 2006 and 2011, the Norwegian government implemented a major reform by merging these agencies into a new organisation called the Norwegian Labour and Welfare Service (NAV) [11]. This reform aimed to address the challenges caused by the fragmented structure of the previous system [12]. The main goal was to break down administrative barriers and customise services for individual users to help them find employment. The motivation for these changes was concerns about high rates of labour market exclusion and the frequent passing of individuals with multiple problems between different agencies. The overarching objectives of NAV were to increase employment rates and reduce dependence on benefits.

NAV represents what the literature calls a "one-stop shop" [13]. Many OECD countries, including the Netherlands, Austria, and Finland, have also adopted similar approaches of establishing one-stop shops or single gateways for welfare, employment, and social assistance since the late 1990s [14–16]. These reforms aimed to provide comprehensive and user-centred services, simplifying the process for individuals seeking assistance. Despite national differences, the common objective across all countries was to increase workforce participation, particularly for individuals facing significant barriers to (re) entering the labour market [13].

The work assessment allowance

An important innovation of the NAV reform occurred in 2010 when three separate benefits (temporary disability, vocational rehabilitation and medical rehabilitation) were amalgamated into a health-related benefit, the Work Assessment Allowance (WAA) [17]. WAA is distinguished from its predecessors by a relatively liberal eligibility criteria that gives individuals both with and without prior labour market attachment access to the entirety of NAVs vocational rehabilitation services. Previously, access to these benefits required labour market experience.

WAA is available to individuals with at least 50% reduced work capacity, who possess the potential to regain work function after a period of rehabilitation [17]. Eligibility also requires a medical diagnosis in accordance with either International Classification of Diseases (ICD 10 or 11) [18, 19] or International Classification of Primary Care (ICPC-2) [20]. WAA covers 66 percent of the client's average income, up to a salary cap of 6 times the National Insurance Scheme basic amount (G).[1] If an individual has no or insufficient previous

[1] National Insurance scheme basic amount (G): A standard amount that is used to calculate benefits and pensions, and which is set on 1 May each year. As of 1 May, 2022, the basic amount is NOK 111,477 per year and NOK 9,290 per month.

income, they receive a minimum, age-dependent sum between Norwegian Kroner (NOK) 242 590—309 621. Clients can combine WWA with up to 22.5 h (60 percent) normal work and the benefit amount is adjusted in accordance with how many hours one works.

As a general rule, one can now receive WAA for up to three years, with the possibility of extension to five years if deemed appropriate by NAV [17]. Prior to January 2018, the maximum benefit period was four years. During this period, recipients must be engaged in an individualised vocational rehabilitation and treatment ("return-to-work") plan for 37.5 h per week. The return-to-work plan is based on medical information from the recipient's general practitioner (GP), NAV-client interviews and a work capacity assessment. WAA can be revoked if recipients fail to fulfil the conditions outlined in their return-to-work plan. If rehabilitation and treatment measures do not improve the clients work functioning and their work incapacity is deemed permanent, they can then be granted a disability benefit.

Mental and behavioural disorders constitute over 70% percent of all WAA diagnoses for recipients aged 18–29 [21]. NAV divides WAA mental diagnoses into three broad categories:

1. Mild mental conditions (e.g. mental symptoms, stress, sleep problems)—21.6 percent
2. Anxiety or depressive symptoms or conditions—27.0 percent
3. Other mental/behavioural conditions (e.g. psychotic or organic disorders)—22.0 percent

The proportion of young WAA benefits granted due to mental and behavioural disorders has been increasing steadily, foremost due to expansion of the "mild mental conditions" category [21].

Disability benefits follow a similar pattern. Since WAA was introduced, there has been a strong increase in young disability pension incidence, primarily due to rising numbers of 25–29-year-olds being granted disability pensions for behavioural, anxiety and depressive disorders [22]. The majority of this group (85.9%) transition to disability benefits from WAA [23]. The influx into disability benefits among people with severe mental disorders, such as schizophrenia, organic disorders or drug-related disorders, has been relatively stable [22]. In Norway, transitions from disability pension dependency (back) into the labour market are rare and it is therefore considered a permanent state [3].

Controversy and conflicting claims

WAA was expected to improve labour market outcomes for vulnerable individuals at risk of permanent labour market exclusion. However, the media soon labelled WAA "a waiting room for disability pension" and predicted that there would be a "disability pension bomb" after several years, when the first round of WWA recipients maximised their allotted period of health-related rehabilitation [24]. The OECD backs up these sentiments, claiming that the possibility of transferring from WAA into permanent disability benefits after several years' compromises rehabilitation efforts [3].

On the contrary, WAA proponents refute the "waiting room" and "disability pension bomb" analogies and provide evidence that WAA has generally improved labour market outcomes for all recipients of health-related rehabilitation benefits, regardless of how long they are in the scheme and irrespective of age [24]. They report that 1) the "new" WAA recipients have a lower probability of transitioning to a disability pension, compared with those who transferred into WAA from older benefits (temporary disability, vocational rehabilitation and medical rehabilitation); and 2) the later an individual entered the WAA scheme, the lower the probability that they would transition to disability pension.

However, WAA may not have improved labour market outcomes in our study population. As mentioned previously, data from NAV shows a sharp spike in disability pension incidence among those aged 25–29 after WAA was introduced, primarily due to behavioural, anxiety and depressive disorders [22].

Study aims

Preventing early labour market exclusion is top priority both in Norway and internationally [1]. However, there is a knowledge gap regarding the work and welfare trajectories of high-risk young people who have not yet transitioned to permanent disability pension. In order to understand young welfare dependency, we need to further investigate this vulnerable group. Thus, our study addresses three main empirical questions:

1. What were the most typical health-related rehabilitation trajectories for young Norwegians aged 23–27 between 2004–2019?
2. Did the trajectories and composition of health-related benefit recipients change overtime?
3. In parallel with the welfare reform, do we see improved labour market outcomes in our study population?

The basis for our study population is the increasing numbers of 25–29-year olds on permanent health-related disability benefits after WAA was introduced. This group would have started WAA at age 23–27 and then maximised their allotted period of health-related rehabilitation

around age 25–29. At this point, if deemed to have permanently decreased work capacity, they would have been eligible for a disability pension.

Contextual background for the study

Economic transformations

Since the 1990's, structural transformations in the Norwegian economy have had negative consequences for adults with low educational attainment. Increased uptake of tertiary education, technological advances and automation have raised the demand for non-routine, high-skilled labour [25] and dramatically reduced the number of jobs that do not require formal academic qualifications [9]. In addition, opening up of the common European labour market has put a pressure on employment opportunities, particularly for Norwegians working in low-wage, unskilled positions [26].

Young welfare dependency and mental health conditions

While our study does not include diagnostic information, we place an emphasis on mental health problems because, in Norway, most health-related welfare dependency among young people is due to these conditions [27]. There is limited data regarding secular trends in the prevalence of mental disorders in Norway [28]. However, in parallel with increasing welfare dependency due to mental and behavioural disorders there has been a considerable rise in self-reported mental health problems among Norwegian adolescents and young adults [29], as well as a concurrent rise in the proportion of young people receiving treatment for mental health problems from primary care [29].

Medicalisation

Throughout Europe, policymakers in Europe are increasingly concerned about the medicalisation of unemployment, as it significantly burdens society [30]. This is also the case within the Norwegian context, where the combination of economic transformations, welfare system reforms and healthcare seeking behaviours may have created a paradigm shift towards medicalisation of young people's labour market struggles. Policy makers, analysts and professionals with field expertise provide different (but complimentary) explanations for this phenomenon [6].

NAV advisors from the Norwegian Social Insurance Medical Association maintain that WWAs medical eligibility criteria may be a culprit. Utilising mild diagnoses, combined with a lack of non-medical-based benefit options, may result in many young people receiving a health-related benefit (WAA) even though the source of their work incapacity is primarily non-medical related problems [31]. Along the same lines, sociologists provide evidence that health-related selection out of the labour market is especially prominent for people with disadvantaged social backgrounds, particularly in Western societies [32]. Economic research provides further evidence for medicalisation of young people's social challenges [33] and, economic theory suggests that people tend to take on a "disability identity" when the advantages of that role outweigh those gained from employment [34].

Expectations

Given the large-scale welfare reform and economic transformations, welfare system reforms and changes in health-seeking behaviours that occurred throughout the study period; we expect to see transformations in the background characteristics of our study population across cohorts related to formal academic qualifications. More specifically we predict an increasing proportion of early school leavers over the observation period, as Norway's labour market becomes progressively skills-biased and trends in young people's mental health deteriorate.

We also anticipate that there will be inter-cohort differences related to the NAV reform. In accordance with evidence from previous research, we expect to see progressively fewer transitioning into disability benefits across cohorts [24]. Regarding gender, we expect a greater proportion of women across all cohorts as women generally have a higher uptake of health-related rehabilitation benefits than males [35].

Methods

Data source

We used comprehensive longitudinal register data collected and linked by Statistics Norway. These data encompass the entire Norwegian population and contains extensive information on demography, welfare benefits, income and educational activity. The rich and detailed information, stretching over a long time-span makes these data well suited for sequence analysis and depiction of life courses.

Analytical sample and cohorts

The study population was Norwegian inhabitants aged 23–27 years in either 2004 (cohort 1), 2008 (cohort 2), 2011 (cohort 3) or 2014 (cohort 4), who were granted health-related rehabilitation benefits during a three-month period prior to their cohort start-date. We followed each cohort for six consecutive years. The age restriction provided us with a total population of 3,384 individuals: 638 from cohort 1; 761 (cohort 2); 780 (cohort 3); and 1,205 (cohort 4).

The rationale behind the time periods for our cohorts are based on findings from previous WAA research [12] that: 1) the "new" WAA recipients have a lower probability of transitioning to a disability pension compared

to those who transferred into WAA from older benefits (temporary disability, vocational rehabilitation and medical rehabilitation); and 2) the later an individual entered the WAA scheme, the lower the probability that they would transition to disability pension.

Thus, cohort 1 (01.2004—12.2009) represents the pre-NAV reform group, who received temporary disability, vocational rehabilitation or medical rehabilitation benefits. Cohort 2 (01.2008—12.2013) consists of those who transferred from the old benefit scheme into WAA in 2010. Cohort 3 (01.2011—12.2016) are the "new" WAA recipients, who are purported to have a lower probability of transitioning to a disability pension, compared to cohort 2. Finally, based on the claim that, the later an individual entered the WAA scheme, the lower the probability that one would transition to disability pension [12], cohort 4 (01.2014—12.2019) should have the lowest probability of transitioning to disability pension.

Study design

Typical work and welfare trajectories were identified using multichannel sequence analysis and cluster analysis. Multichannel sequence analysis was performed utilising the approach of Pollock, 2007 [31] adapted and made available in TraMineR by Gabadinho et.al. 2011 [36].

Much of the research on transitions within education, work and welfare state benefits has focused exclusively on single transitions or outcomes [37]. These approaches have some limitations as they focus on single transitions without taking into consideration how these transitions are interconnected and constitute longer parts of the life course. In contrast, here we have utilised a holistic explorative approach, thereby placing our study within a less widespread, but fast growing, field of research – sequence analysis.

This perspective has two main advantages that separates it from conventional methodological approaches within this field of research. Firstly, it adopts a holistic perspective, thus seeing transition between social statuses as interconnected and forming part of a longer life course. Consequently, the dependent variable is not a single state or transition, but a sequence of events. This allows us to shed light on how statuses and transitions are interconnected and combined. Secondly, sequence analysis is an explorative approach that allows the identification of patterns and regularities in data where the analyst has little or no previous knowledge. Regarding the latter, we have extensive knowledge on the use of welfare state benefits, but little knowledge of how they are combined and interconnected.

An important motivation for the multi-channel approach was the question of whether rehabilitation and training allow and facilitate work activity, both in parallel and independent from welfare-state benefits. To enable such analyses, we defined two separate status channels, where each channel consists of mutually exclusive states (Table 1). Thus, instead of observing work and welfare as separate and mutually excluding processes, the current approach allows us to observe how such processes develop and interact over time and cohorts.

The distances between the sequences were calculated using the longest common subsequence (LCS). Our interest here, when studying work and welfare trajectories, lies less with the exact timing of the states than with the actual states and the order of the distinct states experienced. In consequence, our research interest guides us in the direction of a cost-setting scheme that emphasises the number of common attributes between sequences and puts less emphasis on the exact timing of states. In accordance with this, we have chosen to calculate LCS, which emphasises order over timing. Cluster analysis was performed using a two-step approach suggested by Studer 2013 [38],where hierarchical clustering (Ward) was used to provide starting values for partitioning around medoids (PAM) clustering. Clustering quality was assessed using the average Silhouette coefficient repeated over a various number of clusters. The best cluster solution produced six distinct trajectory types. In the last step, we ran multinomial logistic regression on the relationship between sociodemographic variables and the six trajectory types identified by the cluster analysis. For ease of comparison, the regression-based results were presented as average marginal effects (AME). The AME-coefficient provides the effect on the probability of an outcome. Thus, it depicts the average change in probability of a certain outcome when the independent variable increases by one unit.

Status alphabet

Monthly statuses were specified for a total of six years for each of the four cohorts. At the top of Table 1 under the caption "Channel 1", we have placed *disability pension.* This is considered a permanent state within the Norwegian benefit system. It presupposes at least 50% reduced work capacity. In the current analysis, *disability pension* takes precedence over all other simultaneous statuses. *Health-related rehabilitation* is a collective term for all public health-related benefits and schemes meant to bring people with impaired health back into work. Over the period of this study, several schemes were introduced, some of which were subsequently replaced. To ensure comparability over the relevant period, these were combined into one broad category. *Social assistance* is the last-resort safety net of the Norwegian welfare state. The benefit

is means tested and is intended to be a short-term solution. The *sickness allowance* is a contributory state benefit for individuals who have worked for at least four weeks. To qualify for the sickness benefit, documentation from a medical doctor is required. *Unemployed and occupational handicapped* is a status given to unemployed people waiting for rehabilitation or who had been assessed as having reduced working capacity by NAV. After the introduction of work assessment allowance in 2010, most persons in this group were transferred to WAA and unemployment was no longer considered their main status. The category *Unemployed* has been assigned to those who have registered as ordinary unemployed at their local NAV office. The category includes both those with earned rights to unemployment benefit and those without. *No benefits* is a status assigned to persons with no registered social welfare benefit.

Complementing the statuses in Channel 1 are statuses related to earnings and education. These can be found under the caption "Channel 2" in Table 1. Earnings were drawn from Norwegian tax registers. Four earnings-based quartiles were generated using records for the full workforce aged 16–66 as a starting point for the division into earnings-based groups. In addition to the four earnings-based quartiles, we recorded educational activity. For the status alphabet, educational activity was registered if the current month was in a year with a valid educational record. In cases where both work and positive earnings were recorded at the same time, the current earnings-status is given preference. Months with no registered earnings or education has been labelled "*No work or education*".

Results

Descriptives

In Table 2, we present and compare status durations in months. In channel one, we find that people in the first cohort spent around half the amount of time on health-related rehabilitation benefits compared to later cohorts (Table 2). In addition, the average amount of time spent on disability pension increased by almost 6 months between the first and last cohorts (Table 2). Increased time on health-related rehabilitation benefits and disability pension was accompanied by a simultaneous decrease in the average number of months spent occupational handicapped unemployed or without any registered welfare benefits (Table 2).

Descriptive results for channel two are more stable across cohorts compared to channel one (which runs on a parallel time-line). Participation in education and normal employment (Q1 level income) increased by 0.4 months and 3.8 months respectively. The average number of months spent as normal unemployed also rose by 1.3%, while normal employment (income levels Q2-Q4) and the "no work or education" status decreased slightly overtime (Table 2).

In Table 3, we look at distribution and changes in distribution of socioeconomic characteristics. Over the observation period, the proportion of early school leavers increased 6.9% from 55.0% to 61.9% (Table 3). The study population also became steadily more ethnically diverse across cohorts, mainly due to a 4.5% increase in individuals from Non-western countries (Table 3). Women are overrepresented in all cohorts, however the proportional difference between genders remained fairly stable over

Table 1 Status alphabet

Status	Description
Channel 1	
Disability pension	Registered with disability pension current month
Health-related rehabilitation benefits	Registered with either temporary disability benefit, vocational or medical rehabilitation, or work assessment allowance current month
Social assistance	Registered with means tested social assistance benefits current month
Sickness allowance	Registered with sickness allowance current month
Unemployed, occupational handicapped	Registered as unemployed and occupational handicapped / reduced working capacity current month
Unemployed, ordinary	Registered as ordinary unemployed current month
No benefits	No benefits registered current month
Channel 2	
Income Q1	Monthly status is based on annual earnings in the 1st quartile (age 16–66)
Income Q2	Monthly status is based on annual earnings in the 2nd quartile (age 16–66)
Income Q3	Monthly status is based on annual earnings in the 3rd quartile (age 16–66)
Income Q4	Monthly status is based on annual earnings in the 4th quartile (age 16–66)
Education	Registered under education current month if month is in a year with a valid educational record and none of the above monthly statuses apply
Not in work or education	Registered if none of the other statuses in Channel 2 apply current month

Table 2 Cohort-specific status duration in months

Cohort-specific status duration in months:	2004-cohort	2008-cohort	2011-cohort	2014-cohort
Channel 1				
Disability pension	3.1	3.7	4.6	8.8
Health-related benefits	17.7	32.8	41.1	37.5
Social assistance	6.8	4.5	3.2	3.4
Sickness allowance	3.6	3.2	2.6	2.0
Unemployed, occupational handicapped	24.7	12.0	8.2	7.8
Unemployed, ordinary	11.2	15.7	12.3	12.5
No benefits	5.1	0.5	0	0
Total (N)	72 (638)	72 (761)	72 (780)	72 (1,205)
Channel 2				
Income Q1	21.3	21.3	24.0	25.1
Income Q2	11.3	11.3	11.2	10.3
Income Q3	3.9	3.8	3.6	2.6
Income Q4	1.2	1.6	1.3	0.7
Education	4.0	4.1	4.9	4.4
No work or education	30.4	29.9	27.0	28.9
Total (N)	72 (638)	72 (761)	72 (780)	72 (1,205)

Table 3 Descriptives

Cohort-specific descriptive statistics (%)	2004-cohort	2008-cohort	2011-cohort	2014 cohort
Turbulence (mean) [a]	8.8	7.9	6.4	6.7
Country background				
Norway	80.9	80.2	78.9	74.3
Western Europe, North-America,	10.2	8.7	8.3	12.3
Oceania				
Non-western	8.9	11.2	12.8	13.4
Gender				
Male	45.9	46.4	51.5	47.6
Female	54.1	53.6	48.5	53.3
Education				
Finished upper secondary education	45.0	39.8	39.2	38.1
Early school leaver	55.0	60.1	60.2	61.9
Region				
Urban	78.7	81.4	80.1	82.8
Rural	21.3	18.6	20.0	17.2
Parental disability pension status				
No parental disability pension	48.0	48.0	50.0	56.9
One disabled parent[b]	38.4	39.2	38.1	29.5
Two disabled parents	13.6	12.9	12.1	13.6
Parental education NUS level (mean)c	3.2	3.2	3.3	3.5

a Turbulence is a composite measure reflecting the number of distinctive sequences and the time in each state [34]. Higher turbulence implied shorter spells and more shifts between statuses

b For the purposes of the operational definition of "disabled parent" is having a parent who is dependent on health-related disability benefits

c Parental education was measured for the parent with the longest education in years using the Norwegian Standard Classification of Education (NUS2000) [39] normalised from 0 to 1 for the presentation of average marginal effects

time (Table 3). Further, turbulence (Table 3) i.e. the number of distinctive sequences and the time in each state, dropped from 8.8 to 6.7 between the first and last cohort.

Between the first and last cohorts, the share of WAA recipients with parents who were not dependent on disability benefits increased 8.9% from 48.0% to 56.9%, accompanied by an equivalent percentage decrease in those with one disabled parent (Table 3). The proportion with two disabled parents remained stable overtime. On average parents had completed compulsory primary and lower secondary education as well as some basic upper secondary education. Over the observation period the duration of parental upper secondary education increased from 3.2 (7 to 12 months) to 3.5 (>25 months).

Trajectories

Next, we present the most typical trajectory types resulting from LCS matching and clustering procedures along with the trajectory-specific risk factors depicted with average marginal effects (AME) (Appendix Fig. 7 and Table 1). Table 4 provides an overview of trajectory types and their defining characteristics. Our analyses identified six distinct clusters.

Chronograms and sequence index plots

In Appendix Figs. 1, 2, 3, 4, 5 and 6, we present summary graphs called chronograms (right) and individual sequences (left) of the two channels under study for each of the six trajectory types. Importantly, both channels unfold simultaneously over the same time axis, allowing us to scrutinise how work and welfare trajectories interact and develop over time. In the sequence index plots to the left, individual sequences are horizontal stacked bars across the x-axis [40]. The x-axis represents time, and each stacked bar along the y-axis represents one person-sequence. Colours indicate different states depicted by the labels between each plot pair.

We have sorted the sequence index plots using multidimensional scaling (MDS) to facilitate interpretation. To the right, the state distribution plots (chronograms) represent the aggregate distribution of states at any month of the observation time and provide summary information for the entire sample of sequences [40]. Notably, the latter does not allow the extraction of information about individual sequences as the sequence index plots do.

Table 4 Trajectory types and their risk factors

Type	Trajectory	Trajectory risk factors
Health-related rehabilitation + No work or education—C1 (n = 783)	Channel 1: long period of health-related rehabilitation Channel 2: no work or education activity	Early school leavers ↑ 4.0% (p < 0.005) Parental education below average ↑ 10.4% (p < 0.05) 2008-cohort membership ↑ 24.8% (p < 0.001) 2011-cohort membership ↑ 17.1% (p < 0.001) 2014-cohort membership ↑ 10.4% (p < 0.001) i
Unemployed O.H, low income work (Q1, Q2) + sickness absence—C 2 (n = 416)	Channel 1: short spell of health-related rehabilitation → occupational-handicapped unemployment + sick leave Channel 2: Q1-level income employment → Q2 income-level work	2008-cohort membership ↓ 9.6% p(< 0.001) 2011-cohort membership ↓ 9.4% p(< 0.001) 2014-cohort membership↓ 10.4% p(< 0.001)
Normal unemployment, unstable income + sickness absence—C 3 (n = 648)	Channel 1: short-spell of health-related rehabilitation → sickness absence Channel 2: normal unemployment + low income work (Q1, Q2)	Female ↓ 3.0% (p < 0.05) Early school leaver ↓ 9.2% (p < 0.001) Two disabled parents ↓ 9.4% (p < 0.001)
Health-related rehabilitation + low income work (Q1)—C4 (n = 673)	Channel 1: long period of health-related rehabilitation Channel 2: low income (Q1) work	Female ↑ 9.0% (p < 0.001) Parent education above average ↑ 8.6% (p < 0.05) 2008-cohort membership ↑ 8.4% (p < 0.001) 2011-cohort membership ↑ 14.6% (p < 0.001) 2014-cohort membership ↑ 14.8% (p < 0.001)
Unemployment O.H, social assistance + No work or education—C 5 (n = 280)	Channel 1: short health-related rehabilitation → long occupational unemployment Channel 2: no work or education	Male ↑ 2.3% (p < 0.05) Early school leaver ↑ 2.3% (p < 0.05) Urbanicity ↑ 2.7% (p < 0.005) 2008-cohort membership ↓ 2.3% (p < 0.001) 2011-cohort membership ↓ 2.6% (p < 0.001) 2014-cohort membership ↓ 2.6% (p < 0.001)
Disability pension + No work or education—C 6 (n = 584)	Channel 1: long health-related rehabilitation → disability pension Channel 2: no work or education	Early school leaver ↑ 4.0% (p < 0.005) Two disabled parents ↑ 9.2% (p < 0.001) 2014-cohort membership ↑10.3% p (< 0.001)

Trajectory types and risk factors

Health-related rehabilitation + No work or education—C1 (n = 783, 23.1%)

Here we find a trajectory dominated by a long period of health-related rehabilitation without any simultaneous work or education activity. The proportion following this trajectory jumped 25.4% between the first and second cohorts from 8.2% to 33.6%, then decreased slightly in the later cohorts, 27.1% (2011) and 31.2% (2014). This phenomenon is reflected in the corresponding chronogram (Appendix Fig. 1) where we see a sharp spike in health-related rehabilitation after approximately 2.5 years, coinciding with the introduction of WAA in March 2010.

Regression analyses (Appendix Fig. 7) found that early school leavers had a 4.0% ($p < 0.005$) increased chance of following the trajectory compared with those who completed upper secondary school. In addition, the trajectory-probability decreased 10.4% ($p < 0.05$) if one's parents had a relatively low level of education. Compared to the 2004-cohort, the 2008-cohort had a 24.8% ($p < 0.001$) increased chance of following this trajectory, while 2011-cohort membership inferred 17.1% ($p < 0.001$) increased risk and the 2014-cohort had 10.4% ($p < 0.001$) increased risk.

Unemployed O.H, low income work (Q1, Q2) + sickness absence—C 2 (*n* = 416)

This cluster includes predominantly subjects with sequences that included a short spell of health-related rehabilitation before transitioning into occupational-handicapped unemployment, interspersed with periods of sick leave (Appendix Fig. 2). This trajectory also included a fair amount of work activity. Initially Q1-level income employment dominated but over time was surpassed by Q2 income-level work, and even some Q3-Q4 level employment. AMEs depicted in Appendix Fig. 7 that individuals in the 2004-cohort had around a 10.0% higher trajectory chance of following this trajectory than those in the later cohorts.

Normal unemployment, unstable income + sickness absence—C 3 (*n* = 648)

Here we have a trajectory consisting of general instability (Appendix Fig. 3). After short-spell of health-related rehabilitation, individuals in this cluster mainly transitioned into alternating periods of normal unemployment, low income work (Q1, Q2) and sickness absence.

The proportion following this trajectory increased steadily over the observation period, from 17.3% in the first cohort to 33.6% in the last cohort. Being female or an early school leaver (reference upper secondary school completion) decreased the trajectory probability by 3.0% ($p < 0.05$) and 9.2% ($p < 0.001$) respectively (Appendix Fig. 7). Having two disabled parents decreased the risk of following this trajectory by 9.4% ($p < 0.001$) compared to those with parents who were not dependent on disability benefits.

Health-related rehabilitation + low income work (Q1)—C4 (*n* = 673)

This trajectory, made up predominantly of subjects who participated in a long period of health-related rehabilitation punctuated by intervals of normal unemployment, occupational handicapped unemployment and/or low income (Q1) work (Appendix Fig. 4). Similar to the ¨Health-related rehabilitation + No work or education trajectory we see a sharp spike in health-related rehabilitation participation (Appendix Fig. 4), corresponding to the initiation of WAA in 2010.

Over the observation period there was a fivefold increase in the proportion following this trajectory, 8.9% in the 2004-cohort vs 43.8% in the 2014-cohort. AMEs (Appendix Fig. 7) also show that the risk of following this trajectory increased overtime. Compared to the 2004-cohort, belonging to the 2008-cohort inferred 8.4% ($p < 0.001$) increased risk, followed by 14.6% ($p < 0.001$) and 14.8% ($p < 0.001$) in the 2011- and 2014-cohorts respectively. In addition, being female increased the trajectory probability by 9.0% ($p < 0.001$), while having parents with a relatively high level of education inferred 8.6% increased risk ($p < 0.05$).

Unemployment O.H, social assistance + No work or education—C 5 (*n* = 280)

Individuals in cluster 5 generally had sequences involving a short stint of health-related rehabilitation, followed by long periods of occupational unemployment and no work or education (Appendix Fig. 5).

The proportion following this trajectory decreased almost fivefold over the observation period: 64.3% (2004), 13.2% (2008), 8.9% (2011) and 13.6% (2014). Urbanicity (reference rural dweller) and being male (reference female), each increased the trajectory probability by 2.7% ($p < 0.005$). In addition, being an early school leaver inferred 2.3% ($p < 0.05$) increased risk compared to those who completed upper secondary school (Appendix Fig. 7). Compared to the 2004-chort, belonging to the 2008- cohort was associated with a 2.3% ($p < 0.001$) decreased chance of following this trajectory, while cohort 2011 or 2014 membership each entailed 2.6% decreased risk ($p < 0.001$) (Appendix Fig. 7).

Disability pension + No work or education—C 6 (*n* = 584)

Here we find those who transitioned, for the most part, onto disability pension dependency and no work

or education after a long spell of health-related rehabilitation (Appendix Fig. 6). The proportion following this trajectory increased more than threefold over the observation period, 15.9% in the 2004-cohort; 14.6% (2008-cohort); 19.5% (2011-cohort) and 50.0% (2014 cohort-cohort). In addition, having two disabled parents (reference no disabled parents) increased the trajectory probability 9.2% ($p < 0.001$) while high-school dropout (reference upper secondary school completion) inferred 4.0% ($p < 0.005$) increased risk (Appendix Fig. 7).

Discussion

Our study addressed three main empirical questions:

1. What were the most typical health-related rehabilitation trajectories for young Norwegian inhabitants aged 23–27 between 2004–2019?
2. Did trajectories and composition of health-related benefit recipients change over the observation period?
3. In parallel with the welfare reform, do we see improved labour market outcomes in our study population?

Preventing early labour market exclusion is top priority in Norway and internationally, however little is known about the health-related rehabilitation trajectories of high-risk young people who have not yet transitioned into permanent disability pension. An important priority for our research is to help close this knowledge gap.

Our study population is, in general, a vulnerable group with poor labour market outcomes. The majority are early school leavers, following disadvantaged trajectories consisting of welfare dependency, unemployment, minimal educational activity and unstable, low-income work. We identified six broad trajectory types, and while some could be considered less "problematic" than others, almost no-one in the study population ended up self-sufficient through work.

Reclassification of welfare statuses and medicalisation

Over the study period we witnessed considerable increase in the proportion following trajectories dominated by long periods of health-related rehabilitation (Clusters 1, 4), accompanied by a substantial decline in the share following the unemployment O.H trajectory (Cluster 5). Furthermore, the average time spent in health-related rehabilitation increased by nearly twenty months while the average duration of "occupational handicapped unemployment" decreased by nearly seventeen months.

What we could be observing here is an administrative re-categorisation of unemployed people waiting for rehabilitation. After WAA was introduced, many individuals categorised as "Occupational handicapped unemployed" were instead provided with a primarily health-related status. It is possible that the increased disability pension incidence over the observation period can partly be attributed to this reclassification of welfare statuses. Giving people a dominant label of poor health, rather than a status related to absence of work, may have the unfortunate effect of steering people into permanent disability benefits (which are also primarily focused on poor health).

Societal perspective

Policymakers in Europe have expressed growing concerns about the medicalisation of unemployment, as it significantly burdens society [30]. In Norway, the combination of economic transformations, welfare system reforms and healthcare seeking behaviours may have created a paradigm shift towards medicalisation of young people's labour market struggles [6]. Particularly troubling is the high incidence of young individuals receiving disability pensions, with historical data indicating low success rates for reintegration into the workforce [3]. This situation not only imposes substantial financial obligations on the government regarding social security payments but also deprives society of the valuable contributions these young individuals could have made.

Recent research in this field indicates that the medicalisation of unemployment has become more prevalent [41–43]. This trend can be partly attributed to better understanding the unemployed people's health challenges. However, there is evidence that strict eligibility requirements for non-medical benefits [44] increases the emphasis on illness or disability as justifications for accessing benefits or being exempted from certain obligations [45–47] This could be a contributing factor in Norway where unemployment benefits are only available to those who have earned the right through work. The only non-medical benefit option available to individuals without previous work experience is a meagre, means-tested social assistance benefit, considered the last safety net in the Norwegian welfare system.

As welfare reforms worldwide move towards consolidated, one-stop-shop services and eligibility criteria for non-medical benefits become stricter, there is a concerning possibility that a growing number of marginalised young adults could be reclassified as ill and receive

health-related benefits. Such a trend could increase permanent welfare dependency and labour market exclusion among this group internationally.

Individual perspective

While increasing health-related welfare dependency impacts society negatively, individuals reliant on health-related welfare may perceive it more favourably. This perception could be due, in part, to the reduced stigma associated with being categorised as sick rather than unemployed. Social legitimacy research on welfare benefits has shown that society perceives sick persons as more deserving than unemployed individuals [48]. Moreover, the medicalisation literature suggests that sickness relieves individuals from social role obligations, which helps justify inactivity and benefit receipt [30].

Furthermore, our study found that individual sequences became less turbulent over time, indicating increased stability. This stability resulted from less shifting between low-income employment and unemployment statuses accompanied simultaneously by longer spells spent in health-related rehabilitation, and increased uptake of disability benefits, which often represent a stable and generally permanent state. While previous research consistently highlights the health benefits of being employed compared to being jobless, evidence also suggests that poor working conditions can deteriorate one's health. Current trends towards work fragmentation and flexible labour markets [49] have negatively impacted low-skilled young people [50], trapping them in low-paid, insecure work and unemployment cycles [51]. Job insecurity poses a comparable threat to health as unemployment [52], emphasising that societal perspectives of what is beneficial may not always align with the best-case scenario for individuals.

Work participation

Between the first and last cohort we observed a 16.3% increase in the proportion of individuals following the least problematic trajectory, characterised by normal unemployment, unstable income, and sickness absence (Cluster 3). However, regression analyses found no significant association between the trajectory probability and a specific cohort. Over the observation period, the average time spent with any income remained relatively stable, increasing by only one month, while the average time spent in "no work or education" decreased by one-and-a-half months.

At first glance, this is a rather unintuitive finding. Given the large-scale economic transformations and increased proportion of early school leavers that occurred over the observation period, we expected to see decreased work activity overtime. This suggests that WAA caters to different individuals than the previous health-related rehabilitation benefits, which makes sense given that composition of health-related benefit recipients changed across cohorts.

Compositional changes

Parental factors

We discovered a decline in parental disability pension dependency over time, while the average level of parental education improved. These findings could indicate that individuals on WAA came from increasingly less disadvantaged social backgrounds, which may have brought them closer to the labour market than their predecessors.

The decreasing prominence of intergenerational welfare transmission is an intriguing finding, running counter to current international and Norwegian literature on the topic [53, 54] and requires further exploration. However, it is also important to note that the trajectory ending in permanent disability pension (Cluster 6) was significantly associated with having two parents who were disability pensioners. Moreover, the proportion of individuals following this trajectory tripled over the observation period. Interestingly, the trajectory probability was not associated with parents having a below average level of education.

Educational attainment, country background and mental health problems

We also find evidence that, in some aspects, young people on health-related rehabilitation benefits are becoming more disadvantaged overtime. The role of education in determining employment and income prospects for young individuals is crucial [55], for example incomplete upper secondary education increases the risk of long-term exclusion from the labour market [55]. Our study reveals a concerning trend of a higher proportion of early school leavers over time, indicating a growing educational disadvantage across cohorts. Additionally, we found a significant association between high school dropout and following a trajectory leading to a disability pension dependency.

Our study population became more ethnically diverse over time, likely due to the inflow of non-Western immigrants into Norway [56]. This has resulted in an increasing disadvantage based on country background. Individuals from non-European countries tend to have

lower educational attainment than native-born individuals and face a higher likelihood of unemployment, especially during challenging labour market conditions [10]. Moreover, they encounter more difficulties in finding new employment opportunities [10].

Existing literature also highlights the significant contribution of mental health conditions to welfare dependency among young adults. Over time, there has been a noticeable rise in self-reported mental health problems among Norwegian adolescents and young adults, accompanied by an increased proportion seeking treatment for mental health issues from primary care services. These findings align with our observations regarding educational status and country background. Young people with mental health conditions are more susceptible to dropping out of education and face substantial obstacles in accessing the labour market [57]. Markussen & Seland, 2012 [58] find that approximately half of early school leavers attribute their dropout to poor mental health.

Individuals with a non-European country background face a double disadvantage concerning education and mental health. Not only do they have a higher risk of leaving school early, but a larger proportion report mental health problems [59]. Furthermore, refugees are more likely to consult their general practitioners about mental disorders than the general population [60]. Several factors contribute to this inequality, including lower socioeconomic status, discrimination based on immigrant backgrounds, language barriers, and exposure to adverse life events [61, 62]. Interestingly however, country background was not a significant risk factor for any trajectory type. Most notably, it did not increase the probability of following the trajectory ending in disability pension.

Gender

Our analysis also provides evidence that gender plays a role in young people's work and welfare trajectories. Men are more likely to follow trajectories characterised by unemployment and some labour market activity while women were more likely to participate in long spells of health-related rehabilitation. Women are overrepresented in all cohorts, although the gender gap remained relatively stable overtime.

Future research

Investigating young health-related rehabilitation trajectories using sequence analysis has provided valuable new insights. The influence of administrative status re-categorisations and our observations regarding the diversification of health-related welfare dependency are intriguing findings that warrant follow-up with causal research.

Strengths

Using high-quality, register data sets allowed us to bypass the quintessential challenges associated with longitudinal surveys such as low return- and high attrition rates. Furthermore, our data encompasses the entire Norwegian population rather than a representative sample, which makes it possible to study small but important and hard-to-reach groups.

Limitations

We have identified several limitations. Firstly, our analyses do not include diagnostic information, it would be both interesting and relevant to know if the probability of following a particular trajectory was influenced by one's diagnosis. Another limitation concerns generalisability, the study context is primarily relevant for countries with comprehensive, generous welfare systems and skills-biased labour markets. In addition, due to the descriptive nature of our study, we cannot determine whether observed associations reflect cause-and-effect relationships.

Conclusion

Norwegian health-related rehabilitation benefit recipients aged 23–27 are a vulnerable, disadvantaged group with suboptimal mental health, functioning and labour market outcomes. Our study reveals that (for this demographic) the NAV reform has not succeeded in its objective of getting "more people into work, fewer on welfare benefits".

Given that welfare reform has not led to the intended life course trajectory changes, our research shows that it is difficult for the authorities to divert life courses in a specific direction. One can therefore question the usefulness of such initiatives, which have exposed individuals to more extended periods of temporary health-related rehabilitation (without any visible improvement in health, functionality or employment outcomes) before eventually funnelling a greater proportion into permanent disability benefits. Comparatively, it would be intriguing to explore whether other European countries have succeeded more in redirecting their citizens' welfare-state trajectories through similar one-stop shop reforms.

Appendix

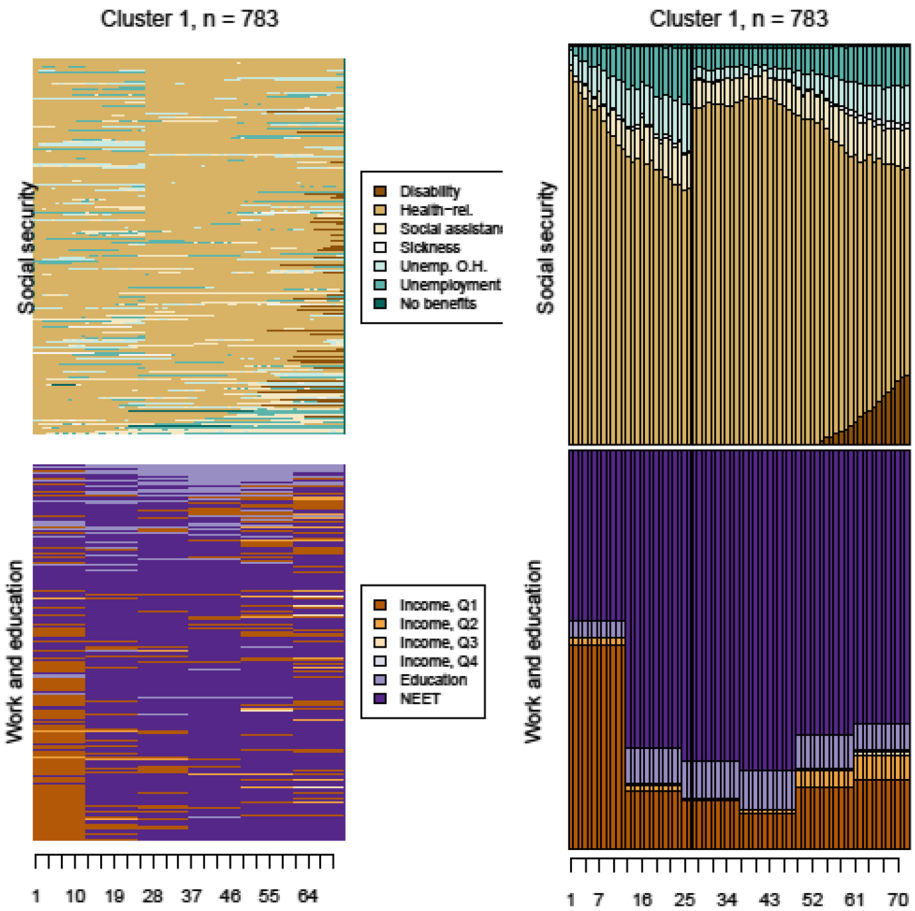

Fig. 1 Cluster 1: Sequence plots and chronograms

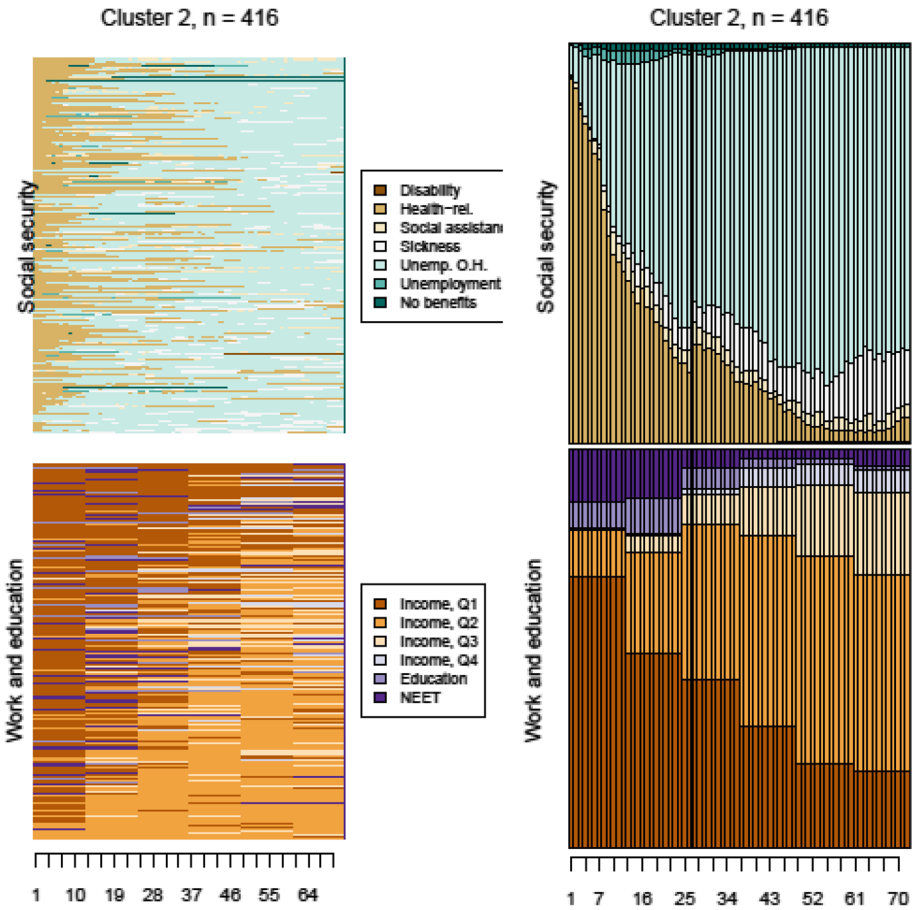

Fig. 2 Cluster 2: Sequence plots and chronograms

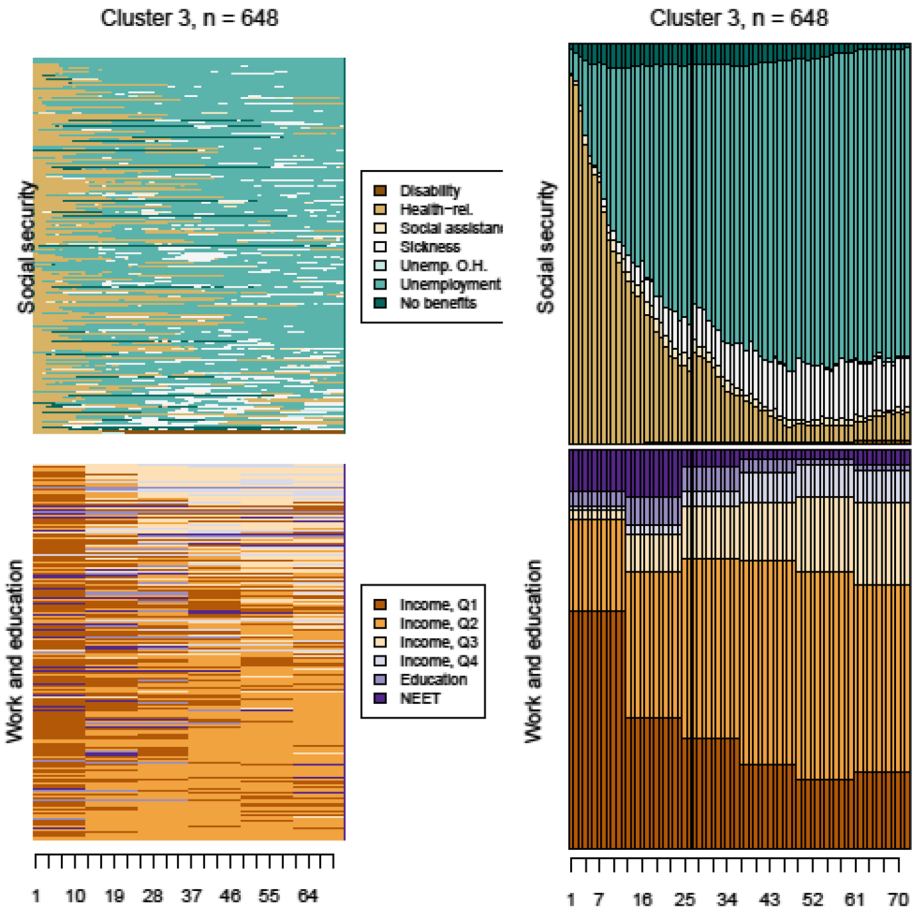

Fig. 3 Cluster 3: Sequence plots and chronograms

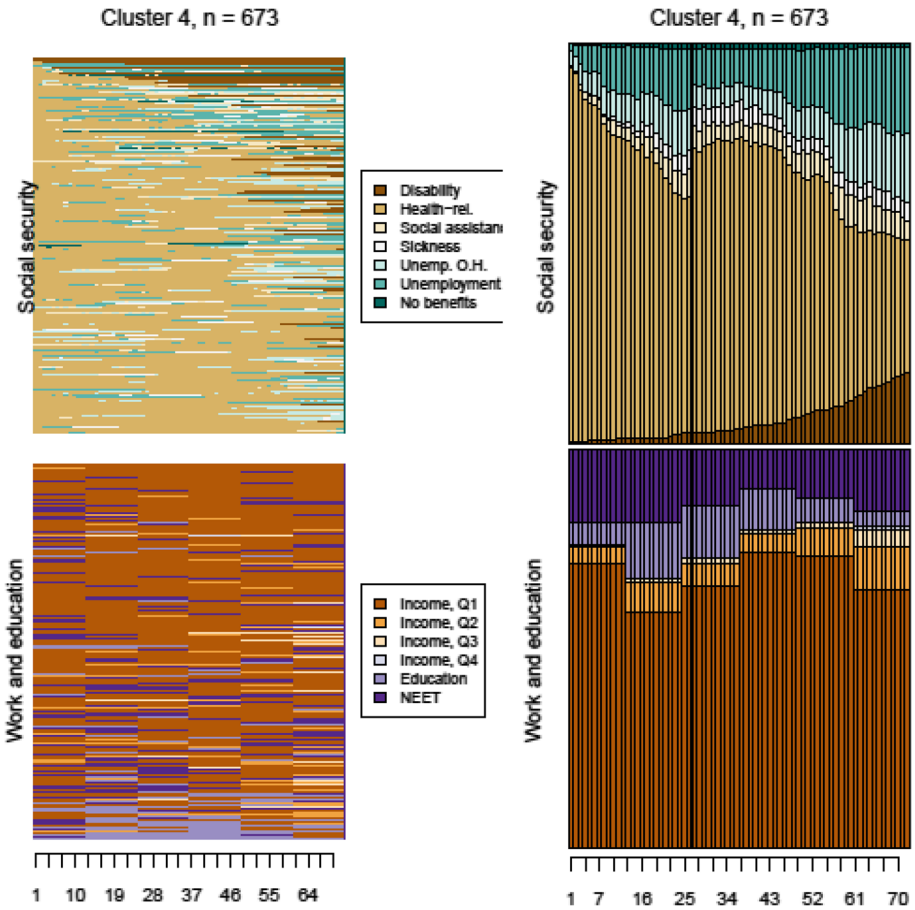

Fig. 4 Cluster 4: Sequence plots and chronograms

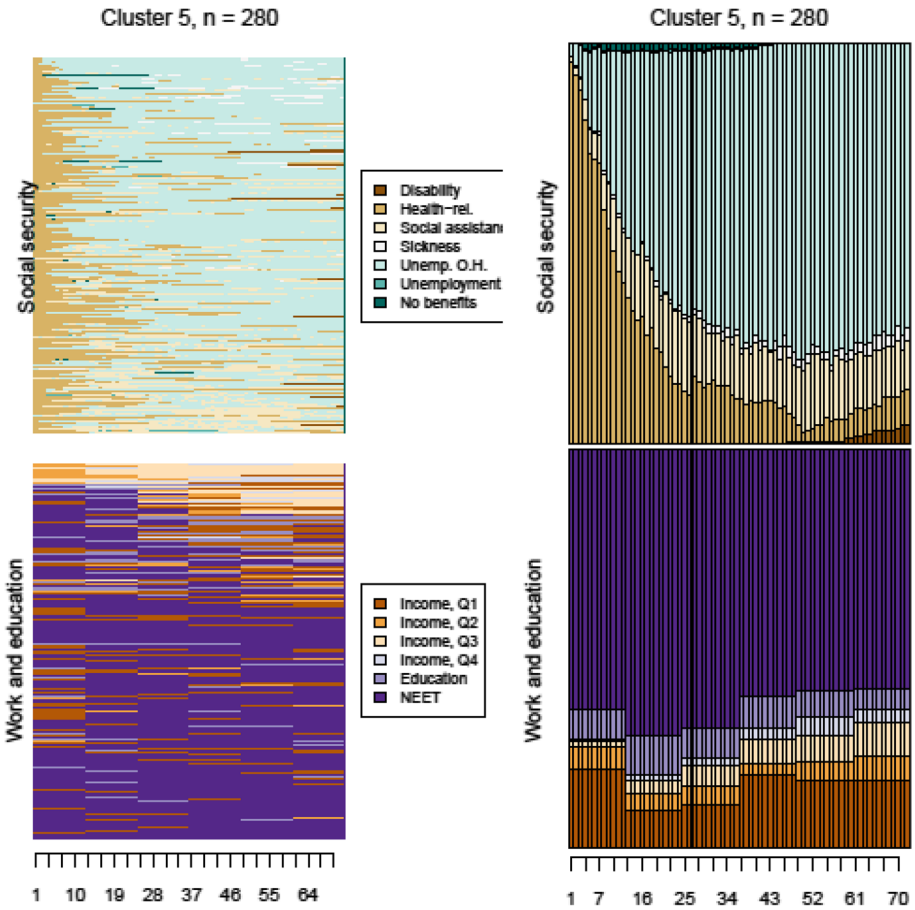

Fig. 5 Cluster 5: Sequence plots and chronograms

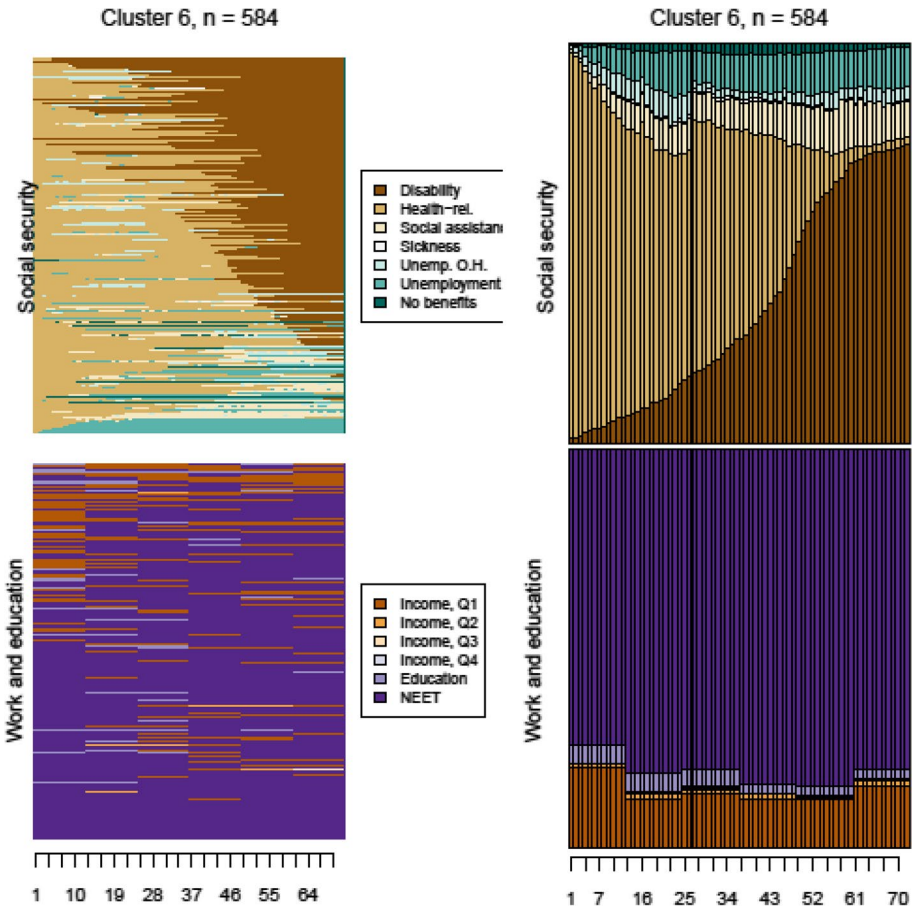

Fig. 6 Cluster 6: Sequence plots and chronograms

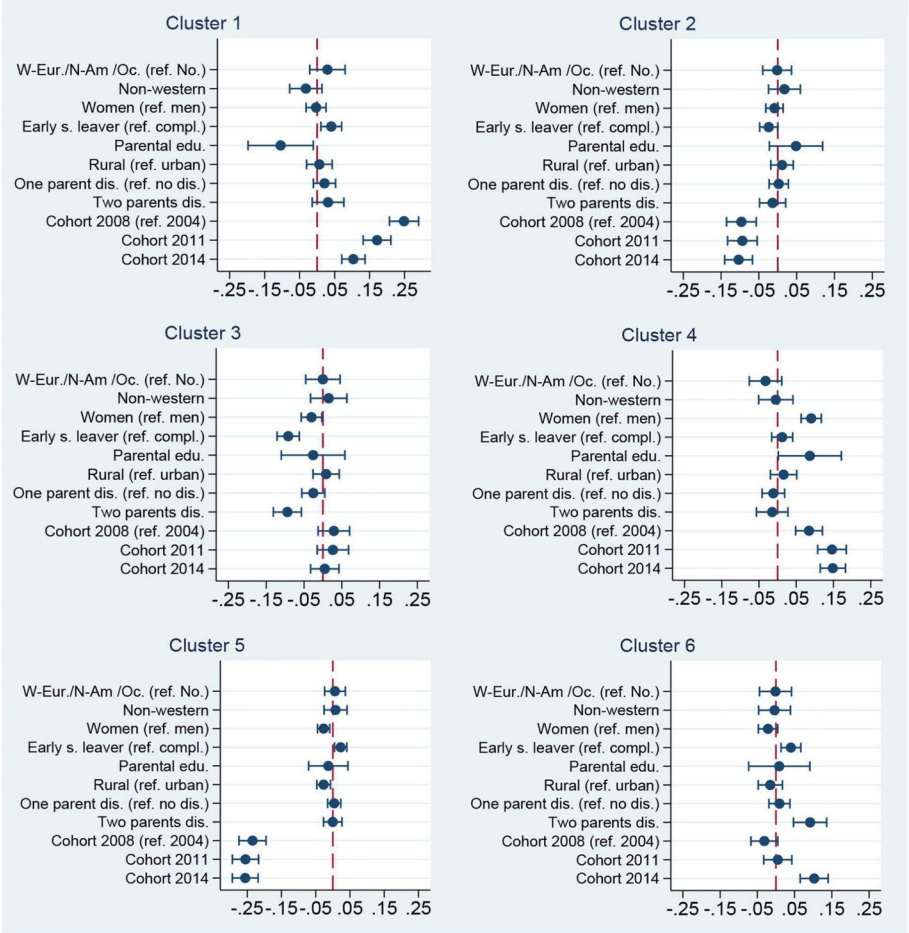

Fig. 7 Average Marginal Effects

Abbreviations

WAA	Work Assessment Allowance
NAV	Norwegian Labour and Welfare Administration
OECD	Organisation for Economic Co-operation and Development
ICPC	International Classification of Primary Care
ICD	International Classification of DiseasesIA
NOK	Norwegian Kroner
LCS	Longest common subsequence
AME	Average marginal effects
GP	General practitioner

Supplementary Information

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Additional file 1.

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Authors' contributions
All authors reviewed the manuscript prior to submission. Sina Wittlund: Conceptualization, Study design, Methodology, Formal analysis, Literature Review, Visualisations, Writing – original draft, Writing – review & editing.
Thomas Lorentzen: Supervision, Conceptualization, Study design, Methodology, Formal analysis, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing.

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Availability of data and materials
The datasets analysed in this study cannot be shared publicly because of Norwegian data protection regulations. Nevertheless, the owners of the data, Statistics Norway, can provide access to the register data. Interested researchers can submit applications to obtain access to the relevant information contained within the public administrative registries in Norway. https://www.ssb.no/en/data-til-forskning/utlan-av-data-til-forskere/soknad

Declarations

Ethics approval and consent to participate

Our study used population-level administrative data sets collected and linked by Statistics Norway, a Government Agency responsible for providing statistics on Norwegian society. Our data encompass the entire Norwegian population and contain extensive information on demography, welfare benefits, income and educational activity.

The activity in Statistics Norway is based on the provisions of the Statistics Act, which impose a requirement on Statistics Norway to produce official statistics. Statistics Norway's statistics are mainly prepared using raw data from two main sources: 1) administrative register-based surveys and 2) survey questionnaires.

Administrative register-based surveys

Statistics Norway collects data from public bodies, such as the Directorate of Taxes and NAV. Large data sets are transferred to Statistics Norway, and according to the Statistics Act, individuals do not have the opportunity to opt-out (i.e. individual consent is not required).

Survey questionnaires

In addition Statistics Norway has the authority to impose a requirement on individuals to take part in surveys (i.e. individual consent to participate is not required). Written information is always provided to respondents prior to any such survey, with details of what the survey is about, what other data will be linked to the data collected, what the data will be used for, who will have access to the data and when it will be deleted. Details of who has taken part in the survey remain confidential.

According to Sect. 15. of the Statistics Act, Public use of anonymous data—Statistics Norway can give researchers access to data for use in research, and public bodies access to data for statistics and analyses, but only in a de-identified or anonymous form. Statistics Norway is a member of and follows the guidelines of the European Statistical System (ESS). Regulation (EC) No. 223/2009 of the European Parliament and of the Council on European statistics is also known as the European "Statistics Act". The regulation is also incorporated into the Norwegian Statistics Act. The overarching principles for the production of European statistics are detailed in guidelines (the European Statistics Code of Practice).

Our study does not include data from Norwegian Health registries and therefore we did not require The Norwegian Regional Committee for Medical and Health Research Ethics (REC) to grant exemption from individual consent.

We confirm that all methods were performed in accordance with the guidelines and regulation of the Norwegian National Research Ethics Committees, the Norwegian Centre for Research Data and the Declaration of Helsinki.

Consent for publication

Not Applicable.

Competing interests

The authors have no competing interests to declare.

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Publisher's Note

Paper 3

Title Page

The societal impact of Individual Placement and Support implementation on employment outcomes for young adults receiving temporary health-related welfare benefits: a difference-in-differences study.

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Abstract

Background

Individual Placement and Support (IPS) is an evidence-based practice that helps individuals with mental illness gain and retain employment. IPS was implemented for young adults at a municipality level through a cross-sectoral collaboration between specialist mental healthcare, primary mental healthcare and the government funded employment service (NAV). We investigated whether IPS implementation had a causal effect on employment outcomes for all young adults in receipt of a temporary health-related rehabilitation (WAA) welfare benefit, measured at the societal level compared to municipalities that did not implement IPS.

Method

We used a Difference in Differences design to estimate the effects of IPS implementation on the outcome of workdays per year using longitudinal registry data. We estimate the average effect of being exposed to IPS implementation during four-years of implementation compared to ten control municipalities without IPS for all WAA recipients.

Results

We found a significant, positive, causal effect on societal level employment outcomes of 5.6 (p=0.001, 95% CI 2.7-8.4) increased workdays per year per individual, equivalent to 12.7 years of increased work in the municipality where IPS was implemented compared to municipalities without IPS. Three years after initial exposure to IPS implementation individuals worked, on average, around 10.5 more days per year equating to 23.8 years of increased work.

Conclusions

Implementing IPS as a cross sectoral collaboration at a municipality level has a significant, positive, causal, societal impact on employment outcomes for all young adults in receipt of a temporary health-related rehabilitation welfare benefit.

1. Introduction

Individual Placement and Support (IPS) is an evidence-based practice that helps individuals with mental illness gain and retain employment (Bond, 2004). It is a form of supported employment that is integrated with mental health services to provide comprehensive multidisciplinary support. IPS is manualised (Becker and Drake 2003) with a fidelity scale (Bond et al 2012) which assesses whether it is being implemented as intended. IPS has been shown to be both the most effective and cost-effective way of supporting individuals with mental illness into employment with over 27 randomised controlled trials (RCTs) finding employment rates to be more than doubled in IPS compared to other vocational approaches (Brinchmann et al. 2020; Park et al. 2022). Internationally, observational studies demonstrate IPS can be implemented into routine clinical practice to good fidelity with local contextual adaptations (Richter and Hoffmann 2019; Bond et al 2020). Based on the effectiveness for individuals with mental illness, IPS is expanding, with positive emerging findings, to serve health conditions beyond mental illness (Bond et al, 2019) including young adults at risk of early work disability (Sveinsdottir et al, 2020). At a macro-economic level, IPS effectiveness is found to be independent of Gross Domestic Product, unemployment rates, generosity of welfare benefits or type of integration policies (Brinchmann et al. 2020).

For people with mental illness there is good RCT evidence for IPS at the individual level (de Winter et.al 2022) and emerging positive RCT evidence for other health conditions (Probyn et al. 2021). However, there is a lack of evidence for a societal impact (Boardman and Rinaldi 2013) and a need for a higher order test beyond individual level efficacy and effectiveness RCTs. This study reports on the implementation of IPS as a cross sectoral collaboration at a municipality level for young adults with mental illness and in receipt of a temporary health-related rehabilitation welfare benefit. An assumption was made that by implementing IPS as a cross sectoral collaboration it would influence employment outcomes that extend beyond the target group as the implementation of IPS would impact on the ways of working across both specialist and primary mental healthcare, and the government funded employment service. It is important to test this hypothesis because of the potential population health and economic benefits as well as implications for societal well-being. Considering this, the aim of this study is to test whether IPS implementation within a municipality area has an effect on employment outcomes for all young adults in receipt of a temporary health-related rehabilitation welfare benefit, measured at the societal level compared to municipalities that did not implement IPS.

2 Methods

2.1 Setting

The intervention municipality was Bodø, which is the second largest city in northern Norway and the capital in Nordland County. The municipality has approximately 50,000 inhabitants and a population density of 39.3/km^2. The specialist mental health services in Bodø provide both inpatient and outpatient care and in primary care there is a mental health outreach service for people with mental illness who need longer-term support based on the nature, duration, and complexity of their needs. The city has a government funded employment service (NAV) which provides all employment and welfare services.

2.2 IPS implementation

IPS was implemented at a municipality level through a cross sectoral collaboration, led by specialist mental health services with the primary care outreach service and NAV. An implementation support team included a 'change agent' within each sector responsible for the preparation and implementation of IPS. Throughout the implementation, clinicians, NAV frontline staff and leaders were frequently brought together for education, training, and guidance about IPS and associated ways of working to counteract the traditional silos between services. To understand the impact of this, repeated testing of NAV staff attitudes towards IPS happened in 2013 and 2017 (Brinchmann et al. 2022).

Two implementation frameworks were used during the preparation and implementation stages: The New Hampshire-Dartmouth Research Center Toolkit (Swanson, Becker, Drake and Merrens 2008) with the IPS fidelity scale and, the Exploration, Preparation, Implementation, Sustainment (EPIS) framework (Aarons, Hurlburt and Horwitz 2011) to understand the inner and outer contexts within the implementation and the interplay between them. For a review of the outer context see (Moe et al. 2022).

IPS implementation occurred in three stages: a preparation stage (2010-2012), an implementation stage (2013-2016) and a sustainability stage (2017-2019). Table 1 shows the preparation and implementation stage factors, timeline, implementation context and process outcome data including independently assessed fidelity scores.

Table 1: Preparation and implementation stage factors, timeline, implementation context and process outcome data

Implementation Measure	Preparation stage			Implementation stage				Implementation context[1]	Data source
	2010	2011	2012	2013	2014	2015	2016		
Organisational – bridging factors									
Formal agreements between organisations								Inner & Outer	Admin data
Community academic partnership								Inner & Outer	Admin data
Funding								Inner & Outer	Admin data
Implementation team and change agents								Inner	Admin data
Assessment of organisational readiness to implement IPS								Inner	Hansen 2012
Organisational - IPS									
Employment specialists (FTE)				n=3				Inner	Admin data
Employment Specialist turnover rate (voluntary employee turnover rate)				94%				Inner	Admin data
Health teams delivering IPS				n=2				Inner	Admin data
NAV counsellors' attitudes towards IPS								Inner & Outer	Brinchmann et al. 2022
Individual characteristics – IPS users									
IPS users				n=200				Inner	Admin data
IPS users employment outcomes achieved				n=98,49%				Inner	Admin data
Quality - Fidelity									
Fidelity support and ongoing quality improvement								Inner	Admin data
Independent fidelity reviews								Inner & Outer	-

- Primary care fidelity scores				93 (Fair)	107 (Good)	105 (Good)		Inner	Admin data
- Specialist care fidelity scores				96 (Fair)	106 (Good)	105 (Good)		Inner	Admin data

[1] Inner context is understood as micro- and meso-level influences, whereas the outer context refers to macro-level influences.

2.2 Target population for IPS

The target population for IPS were young adults (18-40 years) receiving support from a multidisciplinary psychosis team within specialist mental health services, those receiving support from the primary care mental health outreach service and, receiving the Work Assessment Allowance (WAA) welfare benefit. Clinicians were instructed that individuals they considered being unable to pursue life goals such as employment could be included. The WAA is the only temporary health-related rehabilitation benefit in Norway and is available to individuals assessed as having at least a 50% reduced work capacity due to a medical condition (National Insurance Act 2017).

2.3 Study population

Norwegian inhabitants aged 18-40 with an ongoing WAA in Bodø municipality or ten comparable control municipalities without IPS were our study population. Control municipalities were selected a priori based on KOmmune STat RApportering (KOSTRA) reporting from Statistics Norway (SSB) The KOSTRA report classifies Norwegian municipalities into "population size, economic workload, and economic capacity. Economic workload and capacity measures are estimated by the local government spending behaviour model and depend on local government income, socio-demographic factors and geographic variables" (Kringlebotten & Langørgen, 2020). Control municipalities were Kongsberg, Lier, Røyken, Horten, Tønsberg, Larvik, Faerder, Porsgrunn, Grimstad, and Steinkjær.

2.4 Study data source

We used high quality longitudinal registry data collected and linked by NAV. Demographics, contractual man-days henceforth (defined as "the number of days a person has agreed to work for his employer in a given period, adjusted for fraction of employment, weekends and public holidays."[Statistics Norway, 2000]), WAA, and diagnoses were included in the dataset. WAA was originally recorded with exact start and stop dates. WAA main diagnoses

were registered using either International Classification of Diseases (ICD-9 or 10) or International Classification of Primary Care (ICPC, ICPC-1, ICPC-2). Before 2015, workdays were reported quarterly; after 2015, monthly. Workdays per month/quarter were merged into "workdays per year" for comparison across the study period.

Longitudinal data from 2010–2019 enables us to follow individuals. Deaths and migrations are included for the time they were present. To avoid selection bias, first-time WAA exposure in the treatment group (Bodø), where IPS was implemented, is compared to first time WAA exposure controls. Thus, both controls and treatment groups had WAA-triggering health conditions the same year.

2.5. Study design

Registry data allowed us to use a Longitudinal Interrupted Time Series Quasi-Experimental Design, one of the strongest non-experimental Difference-in-Differences (DID) estimate methods that facilitates causal inference when randomisation is not possible (Leatherdale 2019). We used a DID to estimate the effects of IPS implementation on workdays per year. DID estimates the average treatment effect on the treated group (ATET). We estimate the ATET of being exposed to IPS implementation in Bodø during four-years of implementation (2013–2016). IPS-exposure is estimated for all Bodø WAA recipients.

The DID framework is based on two differences: the difference in outcome before and after treatment for both controls and treatment groups and, the difference in mean outcome between the two groups. This second difference, given some restrictions, provides unbiased estimates of the effect of interest.

Given the longitudinal format and repeated observations on each individual, we specify a fixed effects panel data model for the DID analyses.

$$Y_{ict} = \alpha_i + Y_t + z_{ict}\beta + D_{ct}\delta + \varepsilon_{ict} \quad (1.1)$$

Here, y_{ict} represents the dependent variable “work-days-per-year” for individual i at time t which ranges from year 1 to 7, where 4 is the intervention year. Thus, we follow individuals for three years before and after intervention. The group-level variable c denotes city of residence. α_i are the individual fixed effects and Y_t are time fixed effects. z_{ict} are time-varying

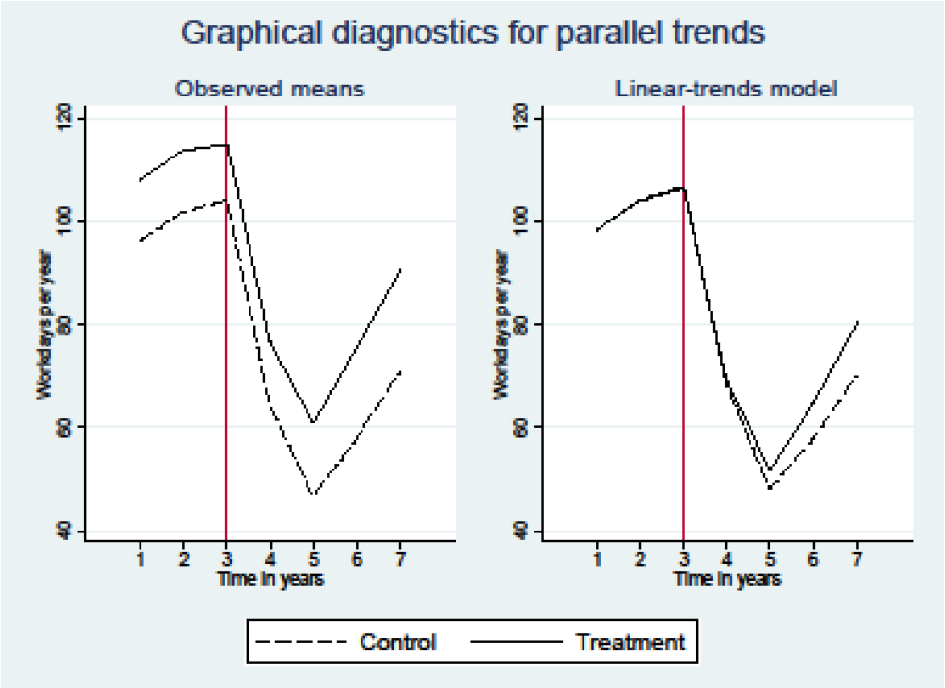
covariates depicting marital status and children, and e_{is} is the error term. D_{ct} denotes IPS-exposure that varies over time and municipality-level. IPS was implemented in Bodø in 2013-2016, and the DID model in 1.1 is estimated for the four years combined, thus providing an overall effect of the program.

The fixed-effects procedure has great strengths. It allows the control for effects of measured and unmeasured time-constant variables and unmeasured variables need not be independent from the measured (Petersen 2004). Unfortunately, these advantages only allow estimation of time-varying variables. The fixed effects estimator uses the within-individual-level deviation from the mean of each variable across time; it is not possible to estimate the effects of time-constant background variables. Thus, variables such as gender, country of birth, and family background can only be controlled for, but not estimated directly in the fixed-effects model.

Unbiased estimates rely on two assumptions. Firstly, there are parallel trends between controls and treatment before the intervention to assure the effects are not driven by trends not related to the intervention. Second, the parallel development would have been the same without the intervention. Only the first assumption is testable.

Figure 1 shows trend plots used to assess the parallel-trends assumption. The left-hand plot depicts the mean outcome over time for treatment and control groups. The right-hand plot incorporates interactions of time with a treatment indicator into our DID model and calculates predicted values of our augmented model for both groups. The vertical lines indicate one year before treatment. Additional F-tests on the trajectories of the mean number of workdays confirms the null-hypothesis of parallel trends cannot be rejected.

Figure 1. Parallel trend plots to assess the parallel-trends assumption[2]



[2] Internal validity of DID models relies on the parallel trends assumption: That there are parallel trends between controls and treatment before the intervention to ensure the effects are not driven by trends unrelated to the intervention.

2.6.2 Post treatment effects over time

Rather than assuming a single treatment-effect estimate is constant, we examined ATET changes over time. We fitted a DID model that included lags and leads of an indicator at the time of IPS initiation. Lag coefficients were used to evaluate any changes in ATET during the post treatment era. Granger plots (Figure 2, Appendix Figure 2) illustrate pre- and post-intervention treatment effects of IPS implementation in Bodø.

2.6.3 Testing if the IPS effect is dependent on diagnosis by triple difference estimation

While it was not possible to identify direct IPS-participation from the data, we used a triple difference method (DiDiD) (Olden and Møen, 2022), an extension of the DiD method, to delve deeper into the impact of IPS implementation across four diagnostic subgroups: 1) all non-organic mental disorders, 2) severe mental illness (SMI), 3) non-severe, non-organic mental disorders, and 4) somatic disorders. The DiDiD method enables a more nuanced causal inference by introducing a third layer of comparison (in this case, diagnostic subgroups). By doing this, we aimed to isolate and estimate the causal effects of IPS exposure within each diagnostic category while controlling for potential biases due to time trends, geographic variations, and other unobserved heterogeneities. The DiDiD approach

can estimate if the causal impact of the IPS intervention varied systematically across different diagnostic groups, thus providing a more comprehensive and detailed understanding of the intervention's effectiveness and applicability across diverse patient groups in the context of workdays per year.

The DiDiD estimator is computed as the difference between two difference-in-difference estimators. In our case, the differences between the broad group of WAA participants in Bodø and controls as well as the difference between the diagnostic subgroups in Bodø and controls. The triple difference estimator does not require two parallel trend assumptions for a causal interpretation (Olden and Møen, 2022).

The fixed effects triple-difference model is given by

$$y_{icst} = \alpha_i + Y_t + Y_t Y_c + Y_t Y_s + z_{ict}\beta + D_{ct}\delta + \varepsilon_{icst} \quad (1.2)$$

In addition to the elements in 1.1, the triple-difference model in 1.2 incorporates the interactions of the group level variables and time. Thus, the city of residence c is interacted with time t, as well as the diagnostic group-variables with time t.

2.6.4 Ethics and consent statement

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human subjects/patients were approved by The Regional Committee for Medical and Health Research Ethics Region North, Norway, approval number: 2012/2239. The ethics committee waived the need for individual consent for this study, given that the register data used are in an anonymised and in a de-identified format.

3. Results

3.1 Descriptives

Bodø and controls were comparable across most demographic variables (Table 2). Our sample is fairly homogeneous, made up of individuals who are on average in their late-20s. While women are generally overrepresented, Bodø had 5.6% (p=0.01) more females than the control group. Bodø residents were also significantly less likely than controls to be married/de-facto (p=0.003) although their average number of children was similar. Bodø had

a slightly lower proportion of individuals with SMI and other non-organic mental disorders and a slightly higher proportion with somatic disorders compared to controls.

Table 2. Demographics and diagnostic distribution[3]

Demographic variables	Bodø	Control group (10 municipalities)	Significance tests
n	561	3,150	
Gender (%)			X^2=6.1 df=1 p=0.01
Female	61.0%[4] (n=342)	55.4% (n=1,744)	
Male	39.0% (n=219)	44.6% (n=1,406)	
Mean age (years)	29.1 (SD 6.9)	28.5 (SD 6.9)	t=-1.9, df =3709, p=0.06
Civil status (%)			X^2=9.8400 df=1 p=0.002
Married/de-facto	12.3% (n=69)	17.7% (n=557)	
Single	87.7% (n=492)	82.3% (n=2,593)	
Country Background (%)			X^2=6.7821 df=2 p=0.03
Norway	18.9% (n=106)	23.5% (n=739)	
Other	2.0% (n=11)	2.6% (n=81)	
Missing[5]	79.1% (n=444)	74.0% (n=2,330)	
Children under 18 (mean)	0.8	0.8	t=-0.4, df=3709, p=0.70
Diagnostic distribution			X^2 =5.5706 df=4 p=0.23
Severe mental illness (SMI)[6]	9.8% (n=55)	11.6% (n=366)	
Non-severe,non-organic mental disorders	44.7% (n=251)	46.5% (n=1,465)	
Organic mental disorders	0.0% (n=0)	0.2% (n=6)	
Somatic disorders	45.1% (n=253)	41.0% (n=1,291)	
Missing	0.4% (n=2)	0.7% (n=22)	

[3] Measured at first time of WWA recipiency.

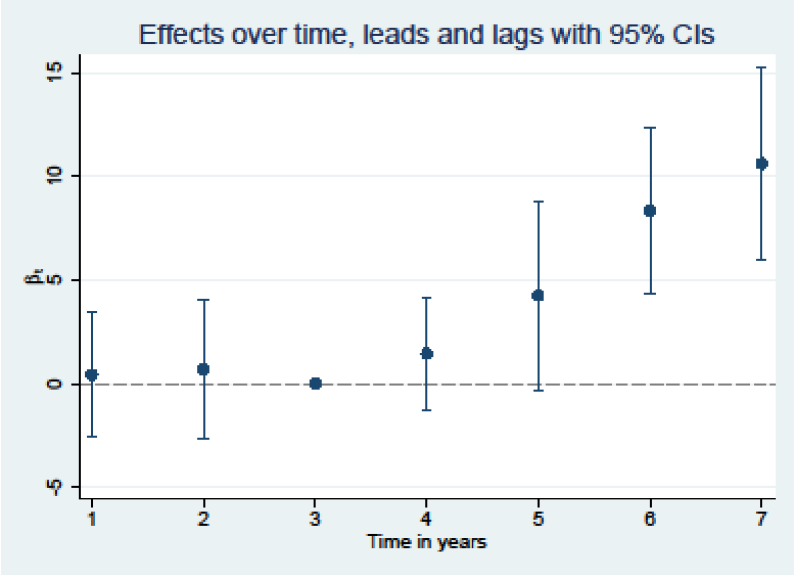
[4] Note that percentages may not add up to 100 due to rounding up.
[5] The ¨Missing¨ category indicates that this data was missing from the register
[6] Severe mental illness as defined in the Norwegian Opptrappingsplan for psykisk helse (Escalation plan for mental health) (2023–2033): Substance use disorders, severe bipolar disorders, major depressive disorder, schizophrenia and personality disorders (ref).

3.2 Causal effects of IPS exposure: Difference-in-differences

Our analyses using the DiD method found that exposure to IPS implementation has a significant, positive, effect on workdays per year at a societal level. The ATET of IPS implementation was 5.6 (p=0.001) increased workdays per year per individual. This is equivalent to 3,141.6 increased workdays per year for the total Bodø sample (n=561). In Norway, there are 248 workdays per year, an ATET of 5.6 workdays per year corresponds to 12.7 (3,141.6/248) increased years of work for the whole group exposed to IPS implementation.

The associated granger plot (Figure 2) indicates the treatment effect improves over time. The coefficients on leads for the first three years (time 1- 3) are close to 0, indicating no anticipatory effects prior to IPS-exposure. However, following initial exposure (time 4), treatment effects increased steadily throughout the post-exposure period (time 5-7). Three years after initial exposure to IPS implementation (time 7), Bodø residents worked, on average, around 10.5 more days per year equating to 23.8 years of increased work.

Figure 2. Granger plot – post treatment effects over time[7]



[7] Granger plots show time-specific treatment effects. Time 1-3 represents the pre-exposure period, the three years before an individual received WAA. Time 4 represents the year an individual started receiving the WAA for the first time (and was thus exposed to IPS implementation). Time 5-7 corresponds to the post-exposure period, i.e. the three years following initial WAA receipt/exposure to IPS implementation.

3.3 Causal effects of IPS exposure: Triple difference

While all our analyses using the DiDiD method were statistically insignificant (Table 3), they do suggest that exposure to IPS implementation was more effective in the context of workdays per year for individuals who receive the WAA due to mental disorders than it is for those who receive the WAA recipients due to somatic disorders.

Table 3: Triple difference results

Diagnostic group	**ATET: Work days per year**
All non-organic mental disorders	4.4 (p=0.26) (CI -3.9 - 12.8)
Severe mental illness	4.1 (p=0.32) (CI -4.7 - 12.9)
Other non-organic mental disorders	5.7 (p=0.15) (CI -2.4 - 13.7)
Somatic disorders	-2.0 (p=0.63) (CI -11.2 - 7.1)

3.4 Sensitivity check

Our results came from Bodø or control municipalities residents with valid-observation years across the observation period. Thus, contributing to the estimates for the years they were present in the municipality. This is comparable to an “intention to treat” RCT design.

A design could include only those who are resident in the municipalities over the full observation period which would be comparable to an RCT design including only the treated. Excluding the possibility of selection effects driving our results, we ran analyses excluding those who died, moved, or migrated. 980 individuals were lost to follow-up. 682 moved to another municipality, 31 died, 13 migrated and 254 were unknown.

Descriptive statistics for this second analytical sample (Appendix Table 1) are markedly like the first analytical sample (Table 1). The most notable difference is within both groups there was a slightly lower proportion granted WAA due to non-organic mental disorders and a slightly higher proportion with somatic disorders (Table 1, Appendix Table 1).

Parallel trends plots (Appendix Figure 1) and F-tests confirmed the parallel trends assumption was fulfilled for this narrower study population and DID analysis again found a significant positive result in favour of Bodø, with ATET of 5.9 (p=0.002) workdays per year, corresponding to a societal impact of 11.0 increased years of work for the whole treatment group. Furthermore, the associated granger plot (Appendix Figure 2) shows the effect of IPS exposure improved over time, after three years the ATET was around 9.5 workdays per year

equating to 17.8 increased years of work for the treatment group. DiDiD estimates, excluding those lost to follow-up, were all statistically insignificant (Appendix Table 2).

Discussion

We tested the bold assumption that implementing IPS as a collaborative partnership within a municipality would have a societal impact on the employment outcomes for young adults who received WAA. We found a significant, positive, effect on societal level employment outcomes corresponding to 5.6 (p=0.001) increased workdays per year per individual which is equivalent to 12.7 years of increased work where IPS was implemented, compared to municipalities without IPS. The effect found is measured for a large population, all WAA recipients, not just those who received IPS employment support, or individuals with mental illness. Additionally, the effect improves over time, three years after initial exposure to IPS implementation individuals worked, on average, around 10.5 more days per year equating to 23.8 years of increased work. When carefully conducted, quasi-experimental designs can be a robust alternative to RCTs (Kontopantelis, et al, 2015). Assuming one accepts the premises of the statistical model and that the assumptions have been satisfied; Longitudinal Interrupted Time Series Quasi-Experimental Design models provide unbiased estimates. However, and given the design of the study, the analytical approach does not allow the direct identification of the mechanism mediating the effect. In our case the effects can be the result of two separate mechanisms or the combination of them. Thus, the estimated effects can be a direct cause of IPS participation for the approximately 200 IPS participants, or it can be a spill-over effect stemming from the larger WAA population of Bodø. Thirdly, and most likely, the estimated effect from IPS can be a combination of direct and spill-over effects.

As far as we know, this is the first study to investigate a societal impact of IPS implementation on employment outcomes. To date, RCTs demonstrate the effectiveness of IPS for individuals with mental illness (de Winter et al. 2022) with emerging evidence for other populations (Bond et al, 2019; Probyn et al. 2021; Sveinsdottir et al, 2020). The majority of IPS implementation studies demonstrate effectiveness at the individual level with only one study demonstrating a population level impact on the employment rates of individuals using specialist mental health services (Rinaldi, Montibeller and Perkins 2011).

From an implementation perspective, the estimated direct and spill-over effects found have several possible explanations. IPS implementation was a purposeful collaborative partnership between specialist and primary mental healthcare services, and NAV with the aim to implement the values, principles, and practice of IPS across each organisation. It is

therefore unsurprising to find that exposure to IPS implementation was more effective for individuals with mental illness than it was for those with somatic disorders. NAV frontline staff and primary and specialist mental healthcare professionals received extensive IPS training and technical assistance before and during implementation. The change agents actively used the inner context implementation outcome data to enhance implementation efforts and improve the quality of services. Whilst health professionals' attitudes to individuals with mental illness gaining employment are well documented (Lettieri, et al 2022; Finne and Holt, 2023) it was important for the implementation team to understand the attitudes of NAV frontline staff as they are pivotal in the assessment, decision-making and trajectories of all WAA and Disability Pensions claimants. NAV frontline staff in Bodø were consistently more positive towards the evidence-based principles of IPS and associated ways of working compared to municipalities where IPS was not implemented (Brinchmann et al. 2022).Media (newspapers and social media) were actively used to frame the unemployment of individuals with mental illness as a community challenge. The collaborative partnership ensured IPS was embedded within each organisation's broader strategies whilst the employment specialists and the implementation team worked horizontally and vertically across the organisations to bridge the silos between specialist and primary mental healthcare and NAV. Frequent collaborative meetings brought together leaders, clinicians, employment specialists and frontline NAV staff which we believe provided an implementation mechanism to help to counteract the traditional silos of services, supported the diffusion and spread of IPS, challenged stigma and discrimination for individuals with mental illness whether or not they received IPS and provided better continuity of support for individuals across the organisations.

The IPS service received 'good' ratings from independent fidelity reviews. Though, short-term annual project funding caused a high turnover of employment specialists which appears to be a common phenomenon (Butenko et al. 2022). However, all employment specialists who left their IPS roles continued to support unemployed individuals with mental illness or somatic disorders to gain and retain employment within Bodø. They left to work in NAV, health services or private vocational rehabilitation agencies which may have further supported the spill-over effect found.

Regardless of the merits of IPS as an intervention, how such interventions are implemented within and across systems matters. In most countries, health services and government funded employment services operate independently of each other, with different aims and objectives along with different approaches and are often organised under different government departments. Since 1997, Norwegian health policy has prioritised the

employment of individuals with mental illness (Ministry of Health and Care 1997) and in 2007, the Ministry of Labour and Social Inclusion and, Ministry of Health and Care Services jointly published a national strategic plan for work and mental health (Ministry of Health and Care Services and Ministry of Labour and Social Inclusion 2007). This policy framework highlighted IPS and recognised the need for coordinated support from health and social services and the Labour and Welfare Administration to support individuals with mental illness to be able to work. The effects found in our study support the use of multisectoral and collaborative approaches to the implementation of IPS. Individuals exposed to IPS implementation had a shorter duration on WAA before returning to employment suggesting they received an early vocational intervention with support that was personalised and addressed their needs.

There are several strengths to our study. Control municipalities were selected a priori, and registry data was used for the main outcome measure. Before being approved for research, registry data is subjected to rigorous quality controls. The study is well powered, and causality is assured as the parallel trend assumptions for a DID were met. The NAV interventions in the control municipalities were also available in Bodø. Finally, author SW under the supervision of author TL, neither involved in the IPS implementation, performed the statistical analysis. There are several limitations. Whilst well powered, this is an n=1 study and our findings warrant replication. There could be a bias to something else occurring however, to the best of our knowledge we are unaware of other initiatives occurring in the control municipalities and, NAV financial allocations are per capita. Unemployment rates across all the municipalities ranged from a 1% decrease to a 1.8% increase during the study period; however, IPS effectiveness is not moderated by unemployment rates.This study addressed societal employment outcomes and the impact on welfare benefits is unknown but will be addressed through a future publication. Finally, we do not know whether the higher employment outcomes come at the expense of lower hourly wages though, IPS is typically associated with higher wages earned (Bejerholm et al. 2015; Burns et al. 2007; Drake et al. 1999).

This study is the first in the IPS literature to move from RCTs or observational studies at the individual level to showing the relationship between IPS implementation, a societal impact on employment outcomes for individuals on temporary health-related welfare benefits and a policy effect. The findings have implications for population health and economic benefits as well as implications for societal well-being. The traditional separation of health services from employment and education services typically results in those individuals with the greatest need not receiving effective approaches or support to enable them to achieve their goals.

This separation can, in part, be driven by attitudes but also by siloed government funding. Instead, by integrating services through multisectoral and collaborative approaches, there is an impact that is larger than the sum of its parts.

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Conflict of Interest

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Author Contribution

All authors reviewed the manuscript prior to submission. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

- Beate Brinchmann: Conceptualization, Study design, Methodology, Visualisations, Writing – original draft, Writing – editing.
- Sina Wittlund: Conceptualization, Study design, Methodology, Formal analysis, Visualisations, Writing – original draft, Writing – editing.
- Thomas Lorentzen: Supervision, Conceptualization, Study design, Methodology, Formal analysis, Writing – original draft, Writing – critical review & editing.
- Cathrine Moe, PhD: Conceptualization, Writing – critical review & editing.
- David McDaid, MSc: Conceptualization, Writing – critical review & editing.
- Eoin Killackey, PhD: Conceptualization, Writing – critical review & editing.
- Miles Rinaldi, BA (Hons), Dip Psych: Supervision, Conceptualization, Study design, Methodology, Project administration, Writing – original draft, Writing – editing.
- Arnstein Mykletun: Supervision, Conceptualization, Study design, Methodology, Project administration, Software, Writing – critical review.

Transparency Declaration

We affirm that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted. There are no discrepancies from the study as planned.

Data Availability

The datasets analysed in this study cannot be shared publicly because of Norwegian data protection regulations. Nevertheless, the owners of the data, the Norwegian Labour and Welfare Administration (NAV), can provide access to the register data. Interested researchers can submit applications to NAV to obtain access to the relevant data.
https://www.nav.no/no/nav-og-samfunn/kunnskap/data-og-forskning-pa-nav

Analytic Code Availability

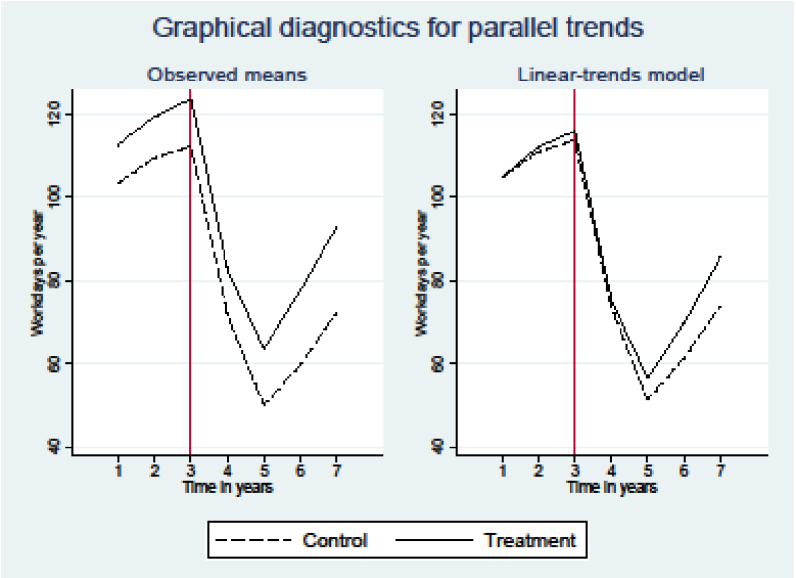
The analytic code used in this study is available from the authors upon reasonable request.

Appendix

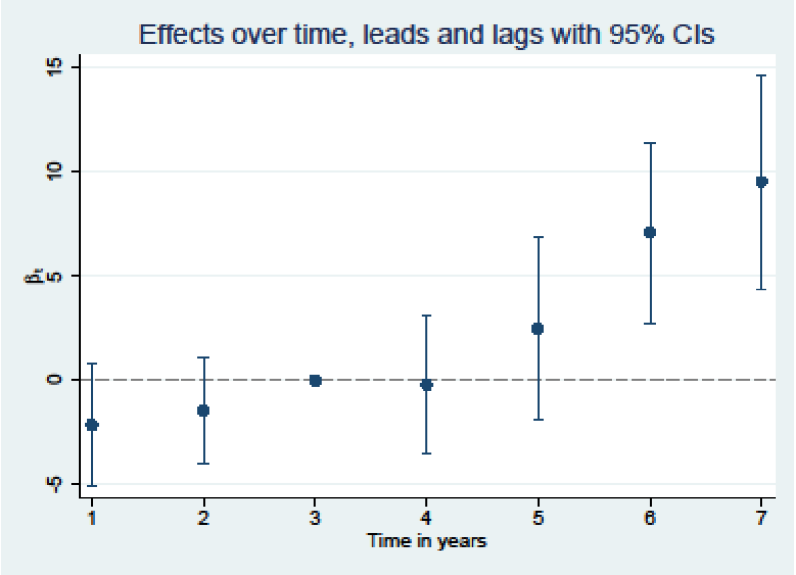
Appendix Table 1: Demographics and diagnostic distribution (excluding those lost to follow-up)

Demographic variables	Bodø	Control group (10 municipalities)	Significance test
n	464	2,267	
Gender (%)			X^2 = 4.8102, df=1, p = 0.03
Female	61.2% (n=284)	55.7% (n=1,262)	
Male	38.8% (n=180)	44.3% (n=1,005)	
Mean age in years	29.6 (SD 7.0)	29.3 (SD 7.1)	t = -0.8, df = 2729, p=0.40
Civil status (%)			X^2 = 15.9230, df = 1 p=<0.001
Married/de-facto	13.2% (n=61)	21.3 (n=482)	
Single	86.9% (n=403)	78.7 (n=1,785)	
Country Background (%)			X^2= 8.8560, df = 2, p= 0.01
Norway	18.1% (n=84)	23.8% (n=539)	
Other	1.7% (n=8)	2.6% (n=59)	
Missing	80.2% (n=372)	73.6% (n=1,669)	
Number of children under 18 (mean)	0.9	0.9	t = 0.7, df = 2729, p=0.5
Diagnostic distribution			X^2 =3.6424 df=4 p=0.457
Severe mental illness	8.4% (n=39)	9.7% (n=220)	
Other non-organic mental disorders	43.1% (n=200)	46.5% (n=1,465)	
Organic mental disorders	0.0% (n=0)	0.2% (n=5)	
Somatic disorders	48.3% (n=224)	44.8% (n=1,015)	
Missing	0.2% (n=1)	0.5% (n=11)	

Appendix Figure 1 Parallel trend plots to assess the parallel-trends assumption



Appendix Figure 2 Granger plot – post treatment effects over time



Appendix Table 2: Triple difference results

Diagnostic group	**ATET: Work days per year**
All non-organic mental disorders	2.4 (p=0.51) (CI -5.4 - 10.2)
Severe mental illness	0.8 (p=0.86) (CI -9.3 - 10.9)
Other non-organic mental disorders	5.0 (p=0.18) (CI -2.6 - 12.6)
Somatic disorders	0.3 (p=0.95) (CI -8.9 - 9.3)

Appendix

1. Appendix Table 1: Overview of NAV's vocational measures
2. Appendix Table 2: Overview of data sources
3. Letter of Approval from The Regional Ethics Committee of Medical and Health Research Ethics (Rec North), project number #2012-2239 (Paper 3)

Appendix Table 1: Overview of NAV's vocational measures

Initiative	**Description**
Temporary wage subsidy	● The employer who applies for the subsidy ● Available to those who are: ○ looking for work but having trouble finding a regular job ○ have an employer, but are at risk of losing their job after prolonged sickness absence ○ have received a work capacity assessment from NAV that determines a need for help to obtain employment
Training Programs	
Work preparatory training (Train and Place - sheltered workplace)	● Work preparation training is an offer for those who need to work in a sheltered environment before starting work training in a competitive normal company. ● The aim is to clarify clients' work ability through work training in various work situations.
Work training	● Offer for those who have little work experience

(Train and Place)	• try out a competitive employment for a short period • May be relevant for those who need work experience to master a certain type of job, or need a reference while looking for regular jobs. • The employer does not pay for the participants salary
Training programs (Train and Place)	Training for those who have problems getting a job due to a lack of formal qualifications or weak basic skills. • labour market training (AMO), which are short work-oriented courses based on the local needs of the labour market. • vocational training that follows the curriculum at upper secondary school level. • higher vocational education (vocational school). • higher education at a university or college.
Work-oriented rehabilitation (Train and Place)	Adapted to the individual's needs based on their possibilities in the labour market, and may include among: • motivational and coping activities • individual training plan with guidance • work trial in a secure environment • lifestyle guidance

	● follow-up: ○ job search and career guidance ○ adaptation and facilitation of the working situation ○ practical tasks related to work ○ training in social and work-related skills
NAV employment support initiatives for those with MSMI	
Individual placement and support (Place and Train)	Supported employment approach for people with moderate and severe mental illness
Supported education (Place and Train)	Offer for those who: ● Have mental health problems and need support to complete schooling or studies ● Receiving training measures through NAV ● Individual support and follow-up to achieve study goals. ○ Student creates an action plan - in collaboration with Studies with support, the learning center and NAV, to help achieve study goals ● The follow-up will be adapted to students' needs i.e. help with practical tasks, conversations, someone to go to the lecture/canteen with, help with arrangements, help with

	setting goals for the learning and following up on these. ● For some students, it may also be relevant to follow-up in groups with other people in the initiative. ● A support person can talk to the student's educational institution if there is something the student finds challenging about student life. ● Can combine the offer with treatment. ● The measure can last up to one year. ● If the student has reduced working capacity, the measure can be extended for a further year plus another year, so that the total duration can be up to 3 years. ● If the student receives the measure in connection with a transition from schooling/studies to ordinary paid work, the duration can be extended by a further 6 months beyond the maximum duration of 3 years. ● There may be different requirements in the counties to get the offer.
Green work (Sheltered workplace)	● Offer for those who have mental health problems and/or substance abuse problems, and who want help getting into work.

	● Participate in the day-to-day operations of a farm and are assigned tasks that suit your situation.

Appendix Table 2: Overview of data sources

Paper	Study population	Study period	Selection of research subjects	Registers	Variables	Approvals	Software
1	18-29 DP recipients Whole Norwegian population	1993-2014	Chosen due to increasing DP in this age group during the study period	The National Population Register	Demographic variables: Year of birth Gender Country background	DPIA[1]	Stata 17 R version 1.4.3.
				FD-Trygd (SSB)	Welfare benefits: Social security benefits Unemployment benefits Health-related rehab benefits: ● Medical and vocational rehabilitation		

[1] Data Protection Impact Assessment (ref)

					benefits (1992-2010) • Time-limited disability benefits (2004-2010) • Work assessment allowance (2010 onwards) Disability benefits		
				Income and Wealth (SSB)	Work days Work hours		
				Norwegian Education database (NUDB)	Highest completed education Completion/non-completion upper secondary education Ongoing education for		

					each year		
2	23-27 health-related rehab recipients Whole Norwegian population	2003-2019	Chosen due to increasing DP in this age group in parallel with the NAV reform	The National Population Register	Year of birth Gender Country background	DPIA	Stata 17 R version 1.4.3.
				FD-Trygd (SSB)	Welfare benefits Social security benefits Unemployment benefits Health-related rehab benefits: ● Medical and vocational rehabilitation benefits (1992-2010)		

					• Time-limited disability benefits (2004-2010) • Work assessment allowance (2010 onwards) Disability benefits		
				Income and Wealth (SSB)	Income		
3	18-40 WAA recipients in Bodø and 10 control municipalities	2010-2019	Bodø: based on the age-group exposed to IPS implementation in Bodø municipality. Controls: equivalent group in 10 comparable	NAV	Year of birth Gender Country background Marital status Work assessment allowance Work days per quarter Work days per month	DPIA REK[2]	Stata 17

[2] Regional Committees for Medical and Health Research Ethics

			municipalities without exposure to IPS implementation				

REK
REGIONALE KOMITEER FOR MEDISINSK OG HELSEFAGLIG FORSKNINGSETIKK

Region:	Saksbehandler:	Telefon:	Vår dato:	Vår referanse:
REK vest	Anne Berit Kolmannskog	55978496	05.03.2013	2012/2239/REK vest
			Deres dato:	**Deres referanse:**
			07.02.2013	

Vår referanse må oppgis ved alle henvendelser

Arnstein Mykletun
Nasjonalt folkehelseinstitutt

2012/2239 Naturalistisk kontrollert forsøk med utprøving av Individuell Jobbstøtte (IPS) i Bodø

Forskningsansvarlig: Nordlandssykehuset HF
Prosjektleder: Arnstein Mykletun

Vi viser til søknad om forhåndsgodkjenning av ovennevnte forskningsprosjekt. Søknaden ble behandlet av Regional komité for medisinsk og helsefaglig forskningsetikk (REK vest) i møtet 14.02.2013. Vurderingen er gjort med hjemmel i helseforskningsloven (hfl.) § 10, jf. forskningsetikklovens § 4.

Prosjektomtale
Formålet med denne studien er å undersøke hvor effektiv metoden «Individual Placement and Support» (IPS) er i å få personer på uføretrygd i Bodø ut i lønnet arbeid. IPS-metoden har som mål å finne arbeid for de med alvorlig psykisk lidelse og gi individuell støtte på en ordinær arbeidsplass i stedet for å tilby dem tradisjonelle jobbtilbud i skjermede bedrifter. Målgruppen er unge mellom 18 og 40 år med psykiske lidelser. Hvorvidt Bodø kommune oppnår å redusere gruppens avhengighet av trygdeordninger, og om prosjektet er kostnadseffektivt, skal kontrolleres mot ti andre sammenlignbare kommuner som ikke implementerer IPS i samme periode. Studien har følgende fem delprosjekt: 1. Effektiviteten til IPS-tiltaket skal måles. 2. Kostnytteanalyse av tiltaket. 3. Prospektiv oppfølgingsstudie av de som mottar IPS i Bodø kommune over 15 år. 4. Retrospektiv studie av bakgrunnen for uføretrygd. 5. Holdningsundersøkelse blant helsearbeidere og NAV-ansatte. Registerdata fra FD trygd, Nasjonal utdanningsdatabase (NUDB), Strafferegisteret, Norsk Pasientregister, Dørsårsakregisteret og Reseptregisteret skal benyttes til dette arbeidet. Det søkes om fritak fra samtykkekravet for å gjennomføre delstudie 1 og 2.

Tidligere behadling i REK
Søknaden ble første gang behandlet på møte 10.01.2013. Komiteen mente den gang at prosjektet virket gjennomarbeidet og godt strukturert. De ønsket imidlertid tilbakemelding på behovet for antall variabler, og da spesielt behovet for data fra Strafferegisteret/Straffesaksregisteret, og hvordan disse data skulle kobles til de andre opplysningene i prosjektet. Ville data bli koble på individnivå og hvem ville få rollen som tiltrodd tredjepart? Videre ønsket komiteen en begrunnelse for den lange oppfølgingstiden i delstudie 3. Tilbakemelding fra prosjektleder forelå ved ny behandling av saken i møte 14.februar 2013.

Vurdering
Komiteen vurderer tilbakemelding fra prosjektleder som tilfredsstillende og har ingen ytterliggere innvendinger til prosjektplanen slik den nå foreligger.

Antall variabler er redusert i delstudie 1 og 2 og disse vil nå inneholde data fra FD trygd, Nasjonal

utdanningsdatabase (NUDB) og Dørdsårsakregisteret. Det er også argumentert godt for behov for det planlagte datasettet og den lange oppfølgingstiden i delstudie 3. Her vil utvalgte variabler fra følgende registre kobles; Registerdata fra FD trygd, Nasjonal utdanningsdatabase (NUDB), Strafferegisteret, Norsk Pasientregister(NPR), Dørsårsakregisteret og Reseptregisteret.

Komiteen er oppmerksom på at det i tilbakemeldingen er lagt opp til å benytte den samme koblingen mot de aktuelle registrene også i delstudie 4., noe som er nytt i forhold til opprinnelig søknad. Komiteen har imidlertid ingen innvendinger til dette og legger til grunn at informasjon til deltakerne vil bli utformet slik at samtykket dekker det nye som skal skje.

Samtykke
Deltakelse i delstudie 3, 4 og 5 er frivillig og komiteen har ingen innvendinger til rekrutteringsprosedyrene. Informasjonsskrivene er forbedret og synes å være dekkende for det som skal skje. Det er også gjort klart at datamengden som samles inn i prosjektet gjelder den enkelte deltaker. Komiteen godkjenner at det benyttes data fra FD trygd, Nasjonal utdanningsdatabase (NUDB), Strafferegisteret, Norsk Pasientregister, Dørsårsakregisteret og Reseptregisteret som beskrevet og har ingen innvendinger til den planlagte oppdateringen etter 3, 7 og 15 år. Statistisk sentralbyrå vil være tiltrodd tredjepart for koblingen og koblingsnøkkelen vil ikke være tilgjengelig for forsker. Utlevering av data fra FD-trygd og Nasjonal utdanningsdatabase og Strafferegisteret må godkjennes av registereier. Datatilsynet må godkjenne utlevering av data fra Reseptregisteret.

Fritak fra samtykkekravet
Komiteen innvilger fritak fra samtykkekravet jf. helseforskningsloven § 35. for datainnsamling i delstudie 1 og 2. Komiteen har ingen innvendinger til kobling mellom FD trygd, Nasjonal utdanningsdatabase (NUDB) og Dødsårsaksregisteret. Komiteen vurder formålet med datainnsamlingen som nyttig og anser den enkelte deltaker sin velferd og integritet for ivaretatt slik prosjektet er lagt opp. Komiteen forutsetter at datasettet utleveres avidentifisert til forsker og at Statistisk sentralbyrå er tiltrodd tredjepart for koblingen. Utlevering av data fra FD-trygd og Nasjonal utdanningsdatabase må godkjennes av registereier.

Informasjonssikkerhet
Forskningsdata skal lagres etter interne rutiner ved Nasjonalt folkehelseinstitutt. Personidentifiserbare forskningsdata og koblingsnøkkel skal slettes straks det ikke lenger er behov for dem og senest fem år etter prosjektslutt. Ved eventuelt behov for lengre oppbevaring, må det sendes en velbegrunnet endringssøknad til REK. Prosjektslutt er satt til 15.12.2033.

Vilkår
Statistisk sentralbyrå er tiltrodd tredjepart for koblingene i alle delprosjekt og datasettene skal utleveres til forsker i avidentifisert form.

Vedtak

1. *REK Vest godkjenner prosjektet på betingelse av at ovennevnte vilkår tas til følge.*
2. *REK Vest godkjenner søknad om bruk av angitte helseopplysninger til forskning, uten innhenting av samtykke i delstudie 1 og 2.*

Sluttmelding og søknad om prosjektendring
Prosjektleder skal sende sluttmelding til REK vest på eget skjema senest 15.06.2034, jf. hfl.
12. Prosjektleder skal sende søknad om prosjektendring til REK vest dersom det skal gjøres vesentlige endringer i forhold til de opplysninger som er gitt i søknaden, jf. hfl. § 11.

Klageadgang

Du kan klage på komiteens vedtak, jf. forvaltningslovens § 28 flg. Klagen sendes til REK vest. Klagefristen er tre uker fra du mottar dette brevet. Dersom vedtaket opprettholdes av REK vest, sendes klagen videre til Den nasjonale forskningsetiske komité for medisin og helsefag for endelig vurdering.

Med vennlig hilsen

Jon Lekven
komitéleder

Anne Berit Kolmannskog
sekretariatsleder

Kopi til: knut.sorgaard@nordlandssykehuset.no