

Employment and attendance in day care centres for people with mild intellectual disabilities – do age, gender, functional level or hospital admissions matter?

J. Engeland,^{1,2}  B. H. Strand,^{1,3,4,5} S. T. Innstrand² & E. M. Langballe^{1,3}

¹ Norwegian National Advisory Unit on Ageing and Health, Vestfold Hospital Trust, Vestfold, Norway

² Department of Psychology, Norwegian University of Science and Technology, Trondheim, Norway

³ Department of Geriatric Medicine, Oslo University Hospital, Oslo, Norway

⁴ Department of Chronic Diseases and Ageing, Norwegian Institute of Public Health, Oslo, Norway

⁵ Faculty of Medicine, University of Oslo, Oslo, Norway

Abstract

Background Workforce inclusion is an important political goal in many countries. However, nearly 70% of Norwegians registered with mild intellectual disabilities (IDs) are not registered employed or attending in day care centres. This study investigates the association between age, gender, functional level and hospital admissions with employment or attendance in public financed, community-based day care centres for adults with mild IDs in Norway.

Method This study is based on data from a linkage of the national population-based registries from 2013 to 2015: Statistics Norway (SSB), the Norwegian Information System for the Nursing and Care Sector (IPLOS) and the Norwegian Patient Registry (NPR). The sample consisted of 2370 adults registered with a mild ID, receiving disability pension in Norway, aged 18–67 years. Binary and multinomial logistic analyses, adjusted for age, gender, functional level and hospital admissions, were performed.

Results In 2015, 45.7% and 19.6% of the samples aged 20–31 and 52–63 years, respectively, were registered as employed or in day care centres. Participation in day care is a public service registered in IPLOS, which requires registration of functional level, while attendance in employment support is registered in SSB, where functional level is not registered. Compared with people registered with a high functional level, the probability of being employed or in day care centres was lower for people without registration of functional level. People with hospital admissions were less likely to be employed, especially if they had both psychiatric and somatic hospital admissions. People were less likely to attend day care and open employment only if they had a combination of both types of hospital admissions. Attendance in day care centres was less likely for men than women.

Conclusions Older people with mild ID, without registered functional level (meaning not receiving public community-based services) and with a history of hospital admissions were significantly less likely to be employed or participate in day care centres. The clear association between not being employed or attending day care centres and not having one's functional level registered implies there is a need for increased focus on how to enhance work participation

Correspondence: Ms Jeanette Engeland, Norwegian National Advisory Unit on Ageing and Health, Vestfold Hospital Trust, Norway (e-mail: jeanette.engeland@aldringoghelse.no)

among people with mild IDs who are not within the system of receiving public services.

Keywords ageing, day care, employment, functional level, hospital admissions, intellectual disability

Introduction

Norway is part of the Nordic welfare states, where high degree of employment and equal opportunities in the labour market is central in governmental policy. Workforce inclusion is an important political goal, in line with many other countries, and includes people with intellectual disabilities (IDs) (Ministry of Labour and Social Affairs 2002, p. 126; WHO 2011). The rights for people with ID to live an active life, use their resources and work inclusion are enshrined in laws, legislation and political strategies (Ministry of Labour and Social Affairs 2002; Ministry of Children 2012). Day care centres are alternative daily activities for people with IDs.

However, there is a gap between policy and practice in employment and participation in day care for people with IDs, reflected in the relatively low rates of people employed or in day care in Norway (Hvinden 2004; Halvorsen *et al.* 2016; Kuznetsova *et al.* 2017). In 2015, 25.7% of people with mild IDs, aged 20–69, were employed and 6.3% participated in day care in Norway (Engeland and Langballe 2018), compared with 70.7% and 0.2% in the general population (Statistics Norway 2015a). International statistics also report low employment rates for adults with IDs, with a range between 34% and 47% (Australia, Canada, the UK, the USA and Finland) (Taanila *et al.* 2005; Lysaght *et al.* 2015).

The WHO (2011) estimates that 1–3% of the population have IDs. However, in Norway, only 0.4% of the population is registered with an ID (Søndenaa *et al.* 2010), and as in the world in general, the exact number of people with mild IDs in Norway is unknown.

Individuals with mild ID are often able and willing to work (Parmenter and Knox 1991; Li 2004; Katz and Lazcano-Ponce 2008), and employment for people with IDs may entail better opportunities for independent living, meaningful social participation and enhanced self-confidence (Dixon and Reddacliff 2001; Kober and Eggleton 2005; Li *et al.* 2006;

Jahoda *et al.* 2008; Lysaght *et al.* 2012).

Unemployment is associated with poor mental and physical health (Bartley *et al.* 2006; van der Noordt, IJzelenberg, Droomers & Proper, 2014; Heggebo 2016), but little is known whether this is actually the case for people with IDs (Milner *et al.* 2014; Curnock *et al.* 2016).

Disability pension is granted in Norway when work capacity is considered low and there is no prospect of improvement. Almost all people with IDs in Norway receive disability pension when they reach 18 years, without assessment of functional level (Proba 2016), while 9.4% of the general population receives disability pension and requires assessment of workability (Statistics Norway 2019). The local offices of the Norwegian Labour and Welfare Administration (NAV) cooperate with the central government for solutions to increase the employment rate, into mainstream employment or through measures for people with difficulties entering the labour market (NOU, 2016). This includes people with IDs, even if disability pension is granted.

Despite the overall goal of improving access to mainstream employment and open employment, recruitment has been limited for people with IDs in Norway (Spjelkavik *et al.* 2012; Proba 2016). Tuckerman *et al.* (2012) found the same negative trend in Australia. Even though employment support is available, a Norwegian study reported that daily activities for people with IDs are mainly limited to day care centres or sheltered employment (Engeland and Langballe 2018). Research has also found a negative trend in employment rate and attendance in day care in Norway over the last decades (Kittelsaa and Tøssebro 2013).

Research on quality of life in employment for people with IDs shows that people in sheltered and open employment report better quality of life than people in day care, while no significant differences were found between open and sheltered employment (Reinertsen 2015). In contrast, a study from New Zealand found better quality of life for people with high functional level in open employment compared with sheltered employment (Kober and Eggleton 2005).

Studies from Scotland, Spain and the USA indicate that factors like functional level, physical condition, psychiatric disorders and age impact work participation (McDermott *et al.* 1999; Cooper *et al.*

2; Martorell *et al.* 2008). In addition, external factors like access to employment and public services, integration and attitudes towards people with IDs may affect the possibility to work (Ellenkamp *et al.* 2016; Wendelborg *et al.* 2017). Some studies found that employment is strongly impacted by severity of the disability and that people with mild ID have a significantly higher chance of employment than adults with moderate and severe IDs (Hum and Simpson 1996; Wilkins 2004). In relation to gender differences, research varies. McDermott *et al.* (1999) found that probability of employment was higher for men than women, while Martorell *et al.* (2008) found no differences.

Research on employment status/day care participation in association with health and functional level among people with ID is scarce, and to the authors' knowledge, no research exists concerning people with mild ID. Based on a unique large, population-based sample, with linked national registry data, this study investigates whether age, gender, functional level and hospital admissions are associated with employment and participation in day care centres for people with mild IDs in Norway. Better knowledge of the employment situation for people with mild IDs may help policy makers and service providers increase participation in work-related activities for this group.

Method

Study population

Mild ID is defined based on the diagnosis criteria in ICD-10, coded F70, which includes significant impairment of cognitive and adaptive functioning with an intelligence quotient ranging between 50 and 69 (WHO 2016).

The eligible study population consisted originally of a total of 2471 adults registered with mild IDs in the disability pension register in Norway, aged 18–67 at 31.12.2013, alive per 31.12.2015. Individual data from Statistics Norway (SSB), the Norwegian Information System for the Nursing and Care Sector (IPLOS) and the Norwegian Patient Registry (NPR) were linked by means of unique personal identification numbers. Data from 2015 were used in the analyses (most recent available year for employment status),

sample aged 20–69. The number of missing values in the dataset was very low.

In Norway, functional level is only registered for people with public community-based services. People registered with services, with missing registration of functional level, were excluded prior to the analyses (59 individuals; 2.4%). People registered in education ($n = 30$) were excluded as well, because of irrelevance to the present research questions. A sensitivity test between models including or excluding the category of *other measures* (wage subsidies, work practice and clarification of workability; $n = 12$) showed no significant differences and therefore excluded.

Hence, the final sample included in the analyses consisted of 2370 people with a mild ID, which is 96% of the potential eligible population (Fig. 1).

In addition, a stratified and randomly selected sample representative of the general population of $N = 18\,612$ people aged 41–67 provided comparative descriptive statistics for overall employment rate and participation in day care in Norway. Using the same exclusion criteria as for the sample in the present study with mild IDs, the total sample of the general population in the analysis was $N = 13\,063$.

Study variables

Employment and attendance in day care centres

Because of the low rate of people with IDs in mainstream employment without support, employment type was defined as being registered as a participant in the facilitated employment measures, sheltered and open employment, in Statistics Norway. Sheltered employment includes individual facilitation in a sheltered workshop, while open employment refers to mainstream employment with support (Labour Market Act 2004). Employment services are administered as public or public–private partnerships, and employees in sheltered and open employment generally receive an additional low wage subsidised by the Norwegian Labour and Welfare Administration, on top of their disability pensions (NOU, 2012).

Day care centres are public financed, community-based activity centres, registered in the Norwegian Information System for the Nursing and Care Sector (IPLOS). Day care centres in Norway provide services to people who need support for personal care, social support, activation, training in activities of

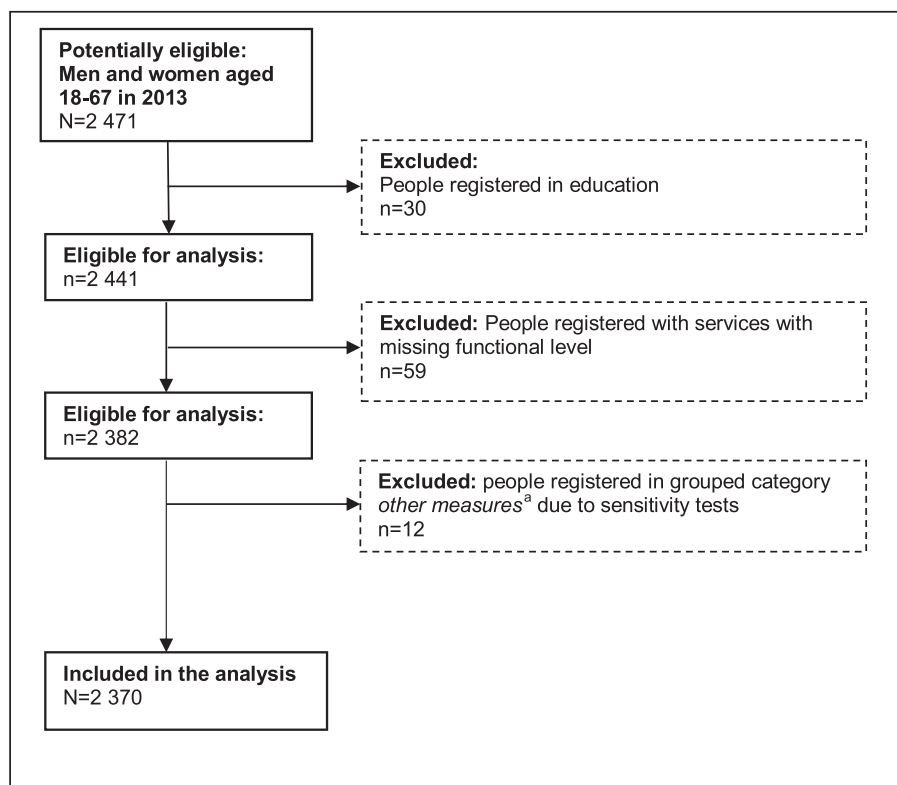


Figure 1. Flow chart for study population. ^aOther measures included the following employment supports: wage subsidies, work practice and educating, clarification of workability.

daily living and so on. Participation in day care activities aims to stimulate and increase coping with activities adapted to their individual functional abilities (Public Health Act 2011). Day care for people with IDs in Norway is often segregated from centres or wards with clients who have other diagnoses. Activities and tasks in sheltered employment and day care often overlap. A difference between sheltered employment and day care is that workers in sheltered employment are expected to meet certain production requirements, while people at day care centres do not have such requirements (NOU, 2012).

The registered employment status and attendance in day care variables in this study were grouped into four categories: not employed/not in day care, day care centre, sheltered employment and open employment. All were conducted per 31.12.2015 from Statistics Norway and IPLOS.

To avoid double registration of persons registered with more than one type of activity, the highest level of activity was preferred in the analyses. Eighteen

people were registered in both day care and sheltered employment and registered with sheltered employment for the analyses. Three people were listed in day care and open employment and registered with open employment for the analyses.

Age, gender, functional level and hospital admissions

Information about age, gender, functional level and hospital admissions was included in the analyses on employment status.

Because of the threat to anonymity, age was categorised by SSB into five categories (Table 1). We found no deviation from linearity and treated age as continuous in the logistic analyses.

Functional level is based on a summary of 15 variables registered in IPLOS assessing ability to perform activities of daily living in order to map the need for public community-based services, regardless of diagnosis. The 15 variables include social functioning, cognitive functioning, self-care and

Table 1 Descriptive statistics of employment type by age, gender, functional level and hospital admissions

	Not employed or in day care		Day care		Sheltered employment		Open employment		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Age										
20–31	522	54.3	75	7.8	286	29.7	79	8.2	962	100
32–41	387	71.0	31	5.9	106	19.4	21	3.9	545	100
42–51	291	81.1	7	1.9	53	14.8	8	2.2	359	100
52–63	276	80.4	24	7.0	*	*	*	*	343	100
64–69	133	82.6	16	10.0	12	7.5	0	0.0	161	100
Gender										
Men	785	66.1	65	5.5	279	23.5	58	4.9	1187	100
Women	824	69.7	88	7.4	217	18.3	54	4.6	1183	100
Functional level										
Low	139	58.1	59	24.7	36	15.1	5	2.1	239	100
Moderate	302	50.2	74	12.3	192	31.9	34	5.6	602	100
High	218	61.2	20	5.6	96	27	22	6.2	356	100
Not registered	950	81.0	— [†]	— [†]	172	14.7	51	4.3	1173	100
Hospital admissions										
None	1017	65.0	86	5.5	369	23.6	92	5.9	1564	100
Psychiatric admissions only	67	65.0	13	12.6	18	17.5	5	4.9	103	100
Somatic admissions only	437	73.7	44	7.4	98	16.5	14	2.4	593	100
Both psychiatric and somatic	88	80.0	10	9.1	*	*	*	*	110	100
Total	1609	67.9	153	6.5	496	20.9	112	4.7	2370	100

[†]People without registered functional level cannot be registered in day care.

*Because of number <5 in some cells, numbers are replaced with an asterisk to ensure anonymity.

ability to perform household tasks (scored from 1 to 5, *no difficulty* to *extreme difficulty*). The mean score of all questions is categorised into three main groups: *high* (≤ 2), *moderate* ($>2-3$) and *low functional level* (>3). Registration of functional level in IPLOS includes only people receiving public services, which include attendance in day care centres but not work support (Gabrielsen *et al.* 2011). Almost half (49.5%) of people with mild IDs are not registered with community-based services, that is, not registered with functional level. Hence, this was added as a fourth category.

Hospital admissions may be an indicator of poor health and are a risk factor for unemployment (Bartley *et al.* 2006; Bamba and Eikemo 2009). In this study, hospital admissions registered in the Norwegian Patient Registry during 2013–2015 were divided into four categories: no hospital admissions, psychiatric admissions only, somatic admission only or having both psychiatric and somatic hospital admissions. Psychiatric hospital admissions entail hospital

admissions due to psychiatric health problems or illnesses. Somatic hospital admissions entail hospital admissions due to medical illnesses or physical health problems.

The study was approved by the Regional Committees for Medical and Health Research Ethics (REK; September 2014), the Norwegian Data Inspectorate (NSD; June 2015) and by all included registries.

Statistical analyses

Descriptive statistics were used to describe the sample. Logistic regression models were used to examine the association between the covariates (age, gender, functional levels and hospital admissions) and the outcome variable of employment status. Binary logistic regression was used when the dependent variable had two outcomes (employed/in day care or not), whereas multinomial logistic regression was used when a dependent variable had more than two

outcomes (no employment/day care, day care, sheltered employment or open employment). The reference categories in both logistic models were no employment/day care, high functional level and no hospital admissions. All analyses involved comparisons of these groups and were adjusted for age, gender, functional level and hospital admissions.

Analyses were carried out in STATA/IC version 15.1.

Results

Descriptive statistics

In the total sample of 2370 people with mild IDs, 49.9% were women. As shown in Table 1, 67.9% of the sample were not registered employed/not in day care, 6.5% were registered in day care centres, 20.9% in sheltered employment and only 4.7% in open employment. In comparison, 70.7% of the general population in the same age group were registered as employed, 0.3% in sheltered employment and <0.1% in open employment, while 0.2% were registered in day care (Statistics Norway 2015a).

Concerning people aged 20–31 with mild IDs, 45.7% were registered as employed or in day care centres, while 69.9% of the general population aged 20–39 were employed (Statistics Norway 2015b). The corresponding figure among people aged 52–63 was 19.6% for people with IDs and 66.6% in the general population aged 55–66 (Statistics Norway 2015b). Employment in sheltered and open employment clearly decreased with age for people with mild IDs, while attendance in day care centres increased for the two oldest age groups. Still, the overall rate of people not employed/not in day care decreased by age.

Of the 2370, 1173 (49.5%) of our study population were not registered with public services, that is, not registered with a functional level. This group was registered with the highest rate of people as neither employed nor in day care, with 81.0%. In comparison, 50.2% of people with moderate and 61.2% with high functional levels were not registered as employed or in day care.

Regarding hospital admissions, 34.0% were admitted at least once during 2013–2015, and the number of people with somatic hospital admissions was almost six times higher than psychiatric.

There was a similar trend in the rate of hospital admissions for the general population as for people

with mild IDs, with 30.0% admitted at least once in the same period. Indeed, the rate of people with somatic hospital admissions, not registered as employed, was lower than for people with IDs, with 73.7% for people with IDs compared with 28.9% in the general population. The unemployment rate for those who had previous psychiatric hospital admissions was 65.0% for people with IDs compared with 61.6% for the general population. For those registered with both psychiatric and somatic hospital admissions, the rate of people not being employed or in day care increased for both people with IDs and the general population, 80.0% and 87.0%, respectively.

Association between employment and attendance in day care, age, gender, functional level and hospital admissions

As shown in Table 2, higher age decreased the odds of employment or attendance in day care. There were no significant differences between genders.

The odds of being employed were 33% higher for people registered with a moderate functional level compared with those with a high functional level (odds ratio = 1.33, 95% confidence interval = 1.01–1.77) and 67% lower for people not registered with any functional level (odds ratio = 0.33, 95% confidence interval = 0.25–0.43). There were no significant differences between people registered with low and high functional level.

People registered with psychiatric or somatic hospital admissions separately were less likely to be employed compared with those without any admissions. A combination of both admission types substantially lowered the likelihood of being employed.

When comparing different types of employment and day care versus not being employed or in day care, age did not impact participation in day care centres in this study (Table 3). However, higher age was associated with lower odds of both sheltered and open employment.

Men were underrepresented in day care and somewhat overrepresented in sheltered employment, while there were no gender differences regarding open employment.

Regarding functional level on employment type, those with a low functional level were five times more likely to participate in day care centres compared with those with a high functional level, while they were less

Table 2 Logistic regression, odds ratio (OR) of being registered as employed or participation in day care

OR of being registered employed/day care to not employed/not in day care			
	OR	(95% CI)	P-value
Age	0.82	(0.79–0.86)	<0.001
Gender [†]			
Women [‡]	—	—	—
Men	1.04	(0.86–1.25)	0.698
Functional level [†]			
High [‡]	—	—	—
Moderate	1.33	(1.01–1.77)	0.045
Low	1.23	(0.87–1.75)	0.246
Not registered	0.33	(0.25–0.43)	<0.001
Hospital admissions [†]			
None [‡]	—	—	—
Psychiatric admissions only	0.48	(0.31–0.75)	0.001
Somatic admissions only	0.67	(0.53–0.84)	<0.001
Both somatic and psychiatric admissions	0.23	(0.14–0.38)	<0.001

[†]Fully adjusted analyses.[‡]Reference group.**Table 3** Multinomial logistic regression odds ratio (OR) on employment type (sheltered or open) or participation in day care

	OR of day care, sheltered and open employment to not employed/not in day care								
	Day care			Sheltered employment			Open employment		
	OR	(95% CI)	P-value	OR	(95% CI)	P-value	OR	(95% CI)	P-value
Age [†]	0.95	(0.88–1.01)	0.105	0.81	(0.78–0.85)	<0.001	0.65	(0.58–0.73)	<0.001
Gender [†]									
Women [‡]	—	—	—	—	—	—	—	—	—
Men	0.63	(0.44–0.91)	0.013	1.20	(0.96–1.49)	0.094	0.97	(0.66–1.45)	0.900
Functional level [†]									
High [‡]	—	—	—	—	—	—	—	—	—
Moderate	2.73	(1.60–4.66)	<0.001	1.17	(0.85–1.61)	0.325	0.76	(0.42–1.36)	0.351
Low	5.02	(2.88–8.77)	<0.001	0.58	(0.37–0.91)	0.019	0.31	(0.11–0.87)	0.026
Not registered	— [§]	— [§]	— [§]	0.36	(0.26–0.48)	<0.001	0.47	(0.27–0.81)	0.006
Hospital admissions [†]									
No [‡]	—	—	—	—	—	—	—	—	—
Psychiatric admissions only	0.72	(0.37–1.40)	0.338	0.42	(0.24–0.72)	0.002	0.56	(0.21–1.46)	0.232
Somatic admissions only	1.02	(0.67–1.56)	0.911	0.64	(0.49–0.83)	0.001	0.36	(0.20–0.66)	0.001
Both somatic and psychiatric admissions	0.46	(0.22–0.94)	0.033	0.19	(0.10–0.37)	<0.001	0.08	(0.01–0.58)	0.013

[†]Fully adjusted analyses.[‡]Reference category.[§]People without registered functional level cannot be registered in day care.

likely to participate in sheltered employment and open employment. Those with a moderate functional level were also significantly overrepresented in

care compared with those with high function, while there were no significant differences in participation in sheltered or open employment for this group.

Compared with people with a high functional level, people not registered with any functional level were less likely to be registered in sheltered employment and in open employment.

Those with only a history of psychiatric hospital admissions were less likely to participate in sheltered employment. By contrast, there was no significant association between having psychiatric hospital admissions and attendance in day care or open employment. Also, those with somatic hospital admissions were underrepresented in sheltered employment, as well as in open employment. People with both somatic and psychiatric hospital admissions were significantly underrepresented in all employment types.

Discussion

In this large registry-based study of people with a mild ID, we found that being employed or attending day care centres was significantly associated with younger age, a moderate functional level and not having somatic or psychiatric hospital admissions.

Decreased employment rate at higher ages was expected because of the increased risk of poorer health with ageing (WHO 2015). However, this study finds that over 80% of people with mild IDs over 42 years old were registered without employment or day care was surprising. This indicates that people with a mild ID are falling out of employment at an early age or, alternatively, that younger people have an excessively higher chance of gaining employment compared with those middle aged and older.

For people with a mild ID, supported employment services may be essential to succeed in the open labour market, and co-worker support increases the job placement rate in open employment (Farris and Stancliffe 2001; Rose *et al.* 2005). Xu and Stancliffe (2017) claim that mainstream employment decreased the rate of depression for people with IDs compared with those in other employment arrangements.

The link between unemployment and poor health is well known (Bartley *et al.* 2006; Bamba and Eikemo 2009; van der Noordt *et al.* 2014). Being employed or partaking in organised day care activities may improve coping practices for people with mild IDs. This may, in the long run, be positive for health, decrease the chances of sickness and maintain the ability to work or actively participate in society. Hospital admissions

can be used as an indicator of health status; this study finds negative associations between employment status and somatic and psychiatric hospital admissions for people with mild IDs, particularly if they have both types of admissions. Decreased work capacity is natural when getting ill, but not having employment may also cause poor health. These findings support that health promotion and early interventions may be crucial to maintain employment and that it is essential to strive for better work inclusion. Reasons for the high rate of unemployed people with mild IDs day care should be studied.

It is important to assess a person's functional level to find the right type of employment. Support centres and service providers need a structured system to match individual abilities, resources and rights. Previous research reports that the more severe the disability, the lower the work participation (Hum and Simpson 1996; Wilkins 2004); this was not supported by the results in this study. In contrast, as much as 61.2% of people with mild IDs with high functional level are registered without employment or day care. Moreover, this study finds that employment is significantly lower for people with a high functional level compared with people registered with a moderate functional level. This means that many of the people registered with high functional level may have unused resources and are able and willing to work.

This study also found that the risk of unemployment is much higher for people with mild IDs without public services and consequently does not have their functional level registered. This may be because most people with IDs receive a disability pension without an assessment of functional level, are never in contact with service providers, and no consideration of workability is performed. Other reasons for the high rate of unemployment among people with high functional level and people without registered functional level might include insufficient awareness of opportunities, support and public services in the community, as well as a lack of trust in the service system and differing family beliefs regarding the political aims of employment. Alternatively, limited public services resources might also affect the status of activities. Additionally, our findings support the previous literature: The gap between policy and practice in employment for people with mild IDs still exists (Hvinden 2004; Halvorsen

et al. 2016; Kuznetsova *et al.* 2017). These results imply a societal need for an increased focus on people with mild IDs, especially for those not receiving public services who have perhaps fallen through the gaps of public systems that provide help with work inclusion.

Our study partly supports the findings of McDermott *et al.* (1999) on gender differences in employment. No overall significant difference was found between men and women in employment, but results showed that more women than men attended day care. This might indicate that women are more easily allocated in day care centres than men. Traditionally, there have been more 'women's assignments' in day care, such as needlework and weaving, which might be a reason for the higher proportion of women. However, men may also benefit from participation in day care centres, and service providers should make efforts to equalise gender differences in all types of employment.

We need strategies on both organisational and individual levels to facilitate employment for people with IDs. Employment services are important actors in increasing the employment rate for this group, and support and motivation in these agencies might increase the likelihood of employment (Rose *et al.* 2005; Cheng *et al.* 2018). Additionally, political guidelines and economic frameworks for public services should facilitate employment for people with IDs.

There is also a new opportunity for employment for people with IDs in Norway in which they have mainstream employment in such service sectors as hotels and restaurants (the so-called *ALL IN*). People included in this project receive approximately 20% of the tariff salary from their respective employers, in addition to their disability pension. Currently, 49 people with IDs are employed through this project (per 04.06.2019), and the project aims to employ 1000 people by 2027 and should be included in future research. Increased mainstream employment may result in more positive societal attitudes towards people with disabilities. Farris and Stancliffe (2001) found that co-workers of people with IDs in open employment valued them more after attending a co-worker training course. A more positive attitude towards people with IDs and their resources might in turn increase the possibilities for work in open employment.

Strengths and limitations

A strength of the study is that the analyses were based on a large dataset including the total population with mild ID receiving disability pension, with a low number of missing values, which give a high statistical power.

However, the number of people with mild ID without being registered is unknown. In most countries, it is difficult to identify people with an intelligence quotient at the border for diagnosis of mild ID (Søndenaa *et al.* 2010; Maulik *et al.* 2011). Another limitation is that this study only utilised people registered in public day care centres and in sheltered or open employment. There could be persons employed who are not registered in the employment services, for example, to avoid taxes or because family or friends offer jobs and do not think registration is necessary. However, most likely the number in this category is low because of the financial resources and support that follows registration in employment services.

Both random and systematic errors in registry-based data may affect the study's reliability. However, the probability for errors in registry-based data is generally low, and testing of Statistics Norway's event database confirms the low probability of error. The functional level should be assessed and registered the same way. Indeed, bias may occur because level of function is assessed by employees in public service centres, and differences may exist.

Limitations also include relying on unconventional age spans to secure anonymity. Displacement in age groups due to the population draw date (2013) to analysis (2015) indicates that some retirees might be included in the oldest age group. But, with a total of 161 in the oldest age group, that number is probably low. Differences in employment between 2013 and 2015 were checked by a sensitivity test. Although better model fit was found for 2015, the results showed higher probability of employment for the oldest age group in 2013 (the sample all younger than retirement age) compared with the same group in 2015. Indeed, the results showed the same for the second oldest age group, which makes it difficult to distinguish between an actual decrease in employment and inclusion of people naturally retired (>67 years old). Age as a continuous variable could have yielded more precise analyses, but the results still

indicate trends. Further research may also include a time series to see a fuller picture of employment.

Moreover, there may be other hindrances to employment, such as work or day care offers in the municipality, prejudice from workplaces against the workability of people with IDs or the idea that it takes a lot of resources to have employees with IDs. Future research may include other variables affecting employment, including additional sociodemographic variables, differing public services and health measures to get more complex knowledge on employment for people with mild IDs.

Conclusion

To our knowledge, this is the first study to investigate the association between employment and attendance in day care and age, gender, functional level and hospital admissions among people with mild IDs using national registry data. The data are representative for adult Norwegian inhabitants registered with a mild ID who received disability pension in 2013–2015. The analyses are based on employment status in 2015.

The study found that older people with mild ID, without registered functional level (meaning not receiving public community-based services) and with a history of hospital admissions were significantly less likely to be employed or participate in day care centres. More women than men attend day care centres. The strong, negative association between lack of work or day care and not being registered with a functional level was particularly surprising and puzzling. This reveals a need for assessment of functional level to capture people without public community-based services and for an increase of necessary support for inclusion in meaningful work or other daytime activities. Additionally, many people registered with a high functional level are neither employed nor in day care, and the probability is high that many with resources to work are excluded from the labour market.

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Conflict of interest

To all authors knowledge, there are no conflicts of interest.

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