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Vocational Rehabilitation in Young Adults With Incident Schizophrenia—A Danish Retrospective Cohort Study

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ABSTRACT

Introduction: The aim of this study was to compare the multidisciplinary vocational intervention, Morpheus, with standard vocational rehabilitation for young adults with incident schizophrenia undergoing the OPUS specialised early intervention programme. The study evaluated whether the type of vocational intervention was related to attachment to the labour market and educational system, outpatient contacts, hospital admissions and psychotropic drug use.

Methods: This retrospective cohort study included patients of the OPUS programme in the period from January 1, 2014, to December 31, 2019. Patients at Aarhus University Hospital Psychiatry (Aarhus) were offered the Morpheus intervention, while patients at Aalborg University Hospital (Aalborg) received standard vocational rehabilitation. The study used register and clinical data. The analyses involved logistic and linear regression presented as crude and adjusted models.

Results: Of the 404 OPUS patients from Aarhus and 246 OPUS patients from Aalborg, patients participating in the Morpheus intervention ($n = 116$) were more likely to be employed or enrolled in education 2 and 4 years after diagnosis compared with patients undergoing standard vocational intervention ($n = 130$). Specifically, the adjusted odds ratio for employment was 1.14 (0.37; 3.45) and 1.51 (0.70; 3.27) at 2 and 4 years, respectively. Morpheus patients were less likely to attend somatic outpatient contacts, which involve consultations or treatment for physical health conditions, as well as psychiatric outpatient contacts. Furthermore, they were less likely to be admitted to somatic departments or to redeem antipsychotic medication. However, Morpheus patients had a higher likelihood of being admitted to psychiatric departments during the periods 0–2 and 2–4 years after diagnosis.

Conclusion: Young adults with incident schizophrenia receiving the Morpheus intervention within the OPUS treatment did not show statistically significant increased odds of employment or education enrolment compared to those in standard vocational rehabilitation.

1 | Introduction

Schizophrenia is one of the leading causes of disability worldwide (Chong et al. 2016), due to its disabling nature, early onset and low remission rates (Weye et al. 2021). The disorder significantly impairs workforce participation, with unemployment rates around 80%–90% in Europe (Evensen et al. 2016; Hakulinen, Elovainio, et al. 2019; Hakulinen, McGrath, et al. 2019; Marwaha and Johnson 2004; Vernal et al. 2020). Many individuals rely on income transfer payments (Hakulinen et al. 2020), and those diagnosed between ages 15 and 25 face a 20-fold higher risk of lifelong exclusion from the workforce compared to those without the diagnosis (Hakulinen, McGrath, et al. 2019). Educational attainment is also lower, with few completing secondary or higher education (Hakulinen, Elovainio, et al. 2019; Tempelaar et al. 2017). As a result, schizophrenia imposes a substantial societal economic burden, primarily due to healthcare costs and productivity losses (Chong et al. 2016; Evensen et al. 2016; Jin and Mosweu 2017).

Most individuals are diagnosed with schizophrenia in their second or third decade of life (Pedersen et al. 2014), a critical period for identity formation, social development and career initiation. Supporting young adults with schizophrenia in employment or education is essential, as they are often motivated to resume these activities (Humensky et al. 2017; Rinaldi et al. 2010). Employment has positive effects on self-esteem, independence, cognition and quality of life, while also reducing psychiatric symptoms, hospitalisations, psychotropic drug use and stigmatisation (Luciano et al. 2014; Luciano et al. 2016; Saavedra et al. 2016; Öz et al. 2019).

In Denmark, the employment rates both before and after a schizophrenia diagnosis have declined over recent decades (Christensen et al. 2022). This highlights the need for vocational interventions to support individuals in entering and remaining in the workforce. Supported employment programmes, which provide on-the-job support for competitive employment, are recommended to address these challenges (Crowther et al. 2001; Norman et al. 2017). These programmes should be combined with comprehensive treatments that address functional deficits impacting job performance (Carmona et al. 2017).

In Denmark, individuals aged 18–35 with schizophrenia are referred to OPUS, a specialised 2-year early intervention service (Jørgensen et al. 2000). Since 2014, patients at Aarhus University Hospital Psychiatry (Aarhus) have also been offered Morpheus, a multidisciplinary, tailored, vocational intervention classified as supported employment. Morpheus is a collaboration between Aarhus Municipality's employment unit and regional mental health services to ensure coordinated, high-quality care. The programme combines vocational training, job coaching and mental health support, focusing on personalised plans to help participants enter and maintain employment or education. The collaboration between healthcare providers, employers and local government ensures a strong support network for participants.

1.1 | Aim

The primary aim of this study was to compare the multidisciplinary vocational intervention, Morpheus, with standard vocational rehabilitation for young adults with incident schizophrenia participating in the OPUS early intervention programme. The study assessed whether the type of vocational intervention was associated with attachment to the labour market and educational system. Secondary aims included examining associations with the number of outpatient contacts, hospital admissions and psychotropic drug use.

2 | Materials and Methods

2.1 | Design and Study Population

The retrospective cohort study utilised register data and clinical data from patient files of incident patients who started OPUS treatment in Aarhus or at Aalborg University Hospital (Aalborg) between January 1, 2014, and December 31, 2019.

In Aarhus, patients were offered the Morpheus intervention in addition to OPUS, while patients in Aalborg received standard vocational rehabilitation provided by the municipalities.

Morpheus targeted OPUS patients aged 18–35 who neither were employed nor enrolled in school but were motivated to do so and were in remission. Exclusion criteria included inability to speak Danish/English, a criminal record, substance use that impaired work capacity, or severe functional restrictions. Patients were assessed through interviews by an OPUS occupational therapist (BBO), based on daily functioning and vocational motivation. Those with severe impairments or a high level of functioning were excluded, as they either required different interventions or were expected to recover without specialised support.

Patients from Aalborg were included based on the same criteria. A nurse (MKP) reviewed the hospital records of all OPUS patients during the inclusion period, consulting with the occupational therapist (BBO) responsible for the Morpheus intervention, when necessary, to ensure alignment between the target groups.

2.2 | Social Policy in Denmark

Denmark is a welfare state that guarantees essential rights to all residents facing social challenges such as unemployment, illness or dependency, providing social security benefits and services regardless of labour market status. Education is tuition-free at public and most private educational institutions, and citizens also receive state educational grants for further studies (Ministry_of_higher_education_and_science 2021).

2.3 | The OPUS Programme

In the OPUS programme, first-episode patients with schizophrenia are offered 2 years with regularly scheduled weekly

appointments with a case manager. Methods and strategies from cognitive behavioural therapy are used by the case manager and form part of the foundation of OPUS treatment. Other elements of the programme include medical treatment, a focus on psychosocial aspects of daily life and various group interventions, such as psychoeducation, social skills training and family groups (Jørgensen et al. 2000).

2.4 | Standard Vocational Rehabilitation

The municipalities of Denmark are individually responsible for implementation of the labour market policy, which is administered through local job centres (Danish_agency_for_larbour_market_and_recruitment 2022). The job centres provide guidance, education and training to enhance the employability of the individual (Danish_agency_for_labour_market_and_recruitment 2023). The approach is generally standardised, focusing on employment support for a broad range of individuals, including those with mental health conditions. However, the support provided often lacks specific adaptations for individuals with complex mental health issues, such as schizophrenia.

2.5 | Morpheus

In contrast, the Morpheus team offered a highly specialised approach tailored to the unique needs of individuals with schizophrenia. The team included a social worker from Aarhus Municipality with expertise in schizophrenia and an occupational therapist from the OPUS team. The Morpheus programme thus integrated a holistic and personalised approach, combining cognitive therapy, social therapy and psychoeducation to address both the emotional and practical challenges faced by the individuals. As part of this work, the team used a modified version of the English Work Behaviour Inventory Scale (Bull et al. 2015; Vesterager et al. 2011).

A key distinction of Morpheus was the emphasis on rebuilding self-confidence, social skills and workplace adaptation through a 6-week group therapy programme. This programme involved weekly 90-min contacts that directly addressed managing schizophrenia-related challenges in the workplace, such as symptom management, socialisation and coping strategies.

Additionally, Morpheus also engaged employers directly. Employers received tailored information and guidance from the OPUS occupational therapist to facilitate job adjustments, promote social inclusion and reduce stigmatisation. This close collaboration between the patient, therapist, social worker and employer made the Morpheus programme distinctively personalised and focused on long-term workplace sustainability.

Moreover, Morpheus was designed to quickly engage patients in vocational activities during the OPUS programme as soon as they showed motivation to work or to engage in education, which is not always the case in standard vocational rehabilitation, where a more gradual approach is often applied.

2.6 | Data Sources and Data Collection

2.6.1 | Clinical Data

Patients in the OPUS programme from Aarhus and Aalborg were identified through electronic medical records. Two student workers at each hospital, one of whom was also a nurse (MPR), extracted data from the hospital records. The variables included start and end date of OPUS treatment, gender, age at inclusion, language, criminal history, substance misuse, positive symptoms (auditory hallucinations, other types of hallucinations and delusions) and negative symptoms (marked apathy, affective flattening or blunting, poverty of speech/poverty of content of speech, avolition/apathy or incongruity of emotional responses) (at inclusion and 6 months after), and psychoactive drug use (at 6 months after inclusion). For Morpheus patients, the inclusion date in Morpheus was also extracted.

The student workers received training on variable definitions, and a lecture on psychopathology. After the training, the two student workers and a specialised healthcare professional at each hospital compared their outcomes from the extraction of 10 records. The test showed a low degree of agreement (32%–53%) on positive and negative symptoms. Therefore, four healthcare professionals reviewed the hospital records for all patients who were part of the OPUS programme during the study period and revised the information on these items.

2.6.2 | Register Data

Employment status was obtained from the Danish Register for Evaluation of Marginalisation (DREAM), a database that contains weekly updates on the social benefits received (Hjollund et al. 2007; Stapelfeldt et al. 2012). DREAM data covered periods when patients received social benefits such as state educational grants, unemployment benefits, sickness benefits, or disability pension. Weeks with labour market contribution were defined as periods of employment, with the specific number of hours worked each month extracted. Non-competitive employment was defined by weeks during which individuals received social benefits, contingent on their engagement in supportive employment or internships. Education was defined by the number of weeks with state educational grants.

DREAM data has been validated against workplace-registered sick leave and self-reported income types (Hjollund et al. 2007; Stapelfeldt et al. 2012). Both studies found DREAM to provide valid data. Moreover, ethnicity was extracted from DREAM.

Data on admissions and outpatient contacts were obtained from the Danish National Patient Register (Lynge et al. 2011), and categorised as somatic or psychiatric based on the department type. Outpatient contacts included in-person meetings, virtual consultations and home visits. Information on antipsychotic medication (ATC code N05A) and antidepressant medication (ATC code N06A) were extracted from the Danish National Prescription Registry (Wallach Kildemoes et al. 2011). Data on the highest completed education were

sourced from Statistics Denmark (Statistics_Denmark 2024), and categorised into three levels: short (primary school), intermediate (high school and vocational education) and long (higher education).

Clinical data and register data were merged using the unique identification number assigned to all Danish residents. This information was securely stored on a server at Statistic Denmark (Statistics_Denmark 2024). Baseline was defined as the date of inclusion in the OPUS programme.

2.7 | Outcomes

2.7.1 | Primary Outcomes

1. Employment, education and non-competitive employment at 2 and 4 years of follow-up as well as employment any time during the periods 0–2 and 2–4 years of follow-up.
2. Hours in employment during the periods 0–2 and 2–4 years of follow-up.

2.7.2 | Secondary Outcomes

3. Admission days, outpatient contacts, defined daily dose (DDD) of antipsychotic medication and antidepressant medication of redeemed prescriptions (filled by the patients at the pharmacies) during the periods 0–2 and 2–4 years of follow-up (the period 0–2 years is omitted for antipsychotic medication as it is provided free of charge during the first 2 years following a schizophrenia diagnosis and is therefore not registered in the Danish National Prescription Registry (Rohde et al. 2022)).

Information on employment and education is recorded in weeks, with the periods 0–2 and 2–4 years converted to 0–104 and 105–208 weeks, respectively. Information on admission, outpatient contacts and medication is recorded in days, with the periods 0–2 and 2–4 years converted to 0–730 and 731–1461 days, respectively.

2.8 | Statistical Analyses

The characteristics of patients receiving Morpheus or standard vocational rehabilitation were analysed at baseline and 6 months' follow-up with proportions and percentages for categorical data and mean and standard deviation (SD) for continuous data. Differences in characteristics were tested using Chi-squared tests for categorical data and unpaired *t*-tests for continuous data and presented with *p*-values.

To assess the impact of Morpheus, logistic regression was used to evaluate outcomes related to employment, education and non-competitive employment, while linear regression examined employment hours among those who were employed. Additionally, logistic regression analysed the impact of Morpheus on admissions, outpatient contacts and the use of antipsychotics and antidepressant medication. For patients with these outcomes, linear regression was applied to investigate the number of admission days, outpatient contacts and DDD of antipsychotics and antidepressants.

All analyses were conducted as both crude and adjusted models, with adjustments made for gender, age, education and employment status at baseline. Results were reported with a 95% confidence interval (CI) and a significance level of 5%. Statistical analyses were performed using Stata statistical software (State/MP 18.0) (StataCorp LLC 2023).

3 | Results

A total of 404 patients were referred to the OPUS programme in Aarhus, of whom 116 (41.0%) were included in Morpheus (Figure 1). In Aalborg, 246 patients were referred to OPUS, with 130 (60.2%) eligible for Morpheus.

3.1 | Characteristics

The distribution of Morpheus patients was relatively consistent across 2014 to 2019, whereas 75% of patients receiving standard vocational rehabilitation were included between 2016 and 2019, following an expansion of the OPUS catchment area in Aalborg after mid-2015 (Table 1). At baseline, Morpheus patients were more likely to be employed or enrolled in education, to possess intermediate or long education levels, and reported "other hallucinations" more frequently than those in standard vocational intervention. At 6 months after baseline, a higher proportion of Morpheus patients displayed no psychotic symptoms and were prescribed long-acting injectable antipsychotic medication compared to those receiving standard vocational rehabilitation (Table 1).

The Morpheus programme started at a median of 183.5 days (IQR: 90.5; 359.5) following OPUS inclusion.

3.2 | Employment and Education

At the 2- and 4-year follow-ups, Morpheus patients had a non-significantly higher adjusted OR for being employed (1.14 [0.37; 3.45] and 1.51 [0.70; 3.27], respectively) or enrolled in education (2.02 [0.64; 6.29] and 1.08 [0.42; 2.75], respectively) compared to patients in standard vocational rehabilitation. However, Morpheus patients exhibited a statistically significant lower OR for engaging in non-competitive employment in the crude model (Table 2).

Among patients employed at any time during the 0–2-year period after baseline, Morpheus patients worked on average 218 h more (adjusted model). This difference diminished to 50 h during the subsequent 2–4-year period (Table 4).

3.3 | Hospital Admissions and Outpatient Contacts

Morpheus patients had a lower OR for somatic admissions throughout both follow-up periods, while they had a higher OR for psychiatric admissions the first two follow-up years

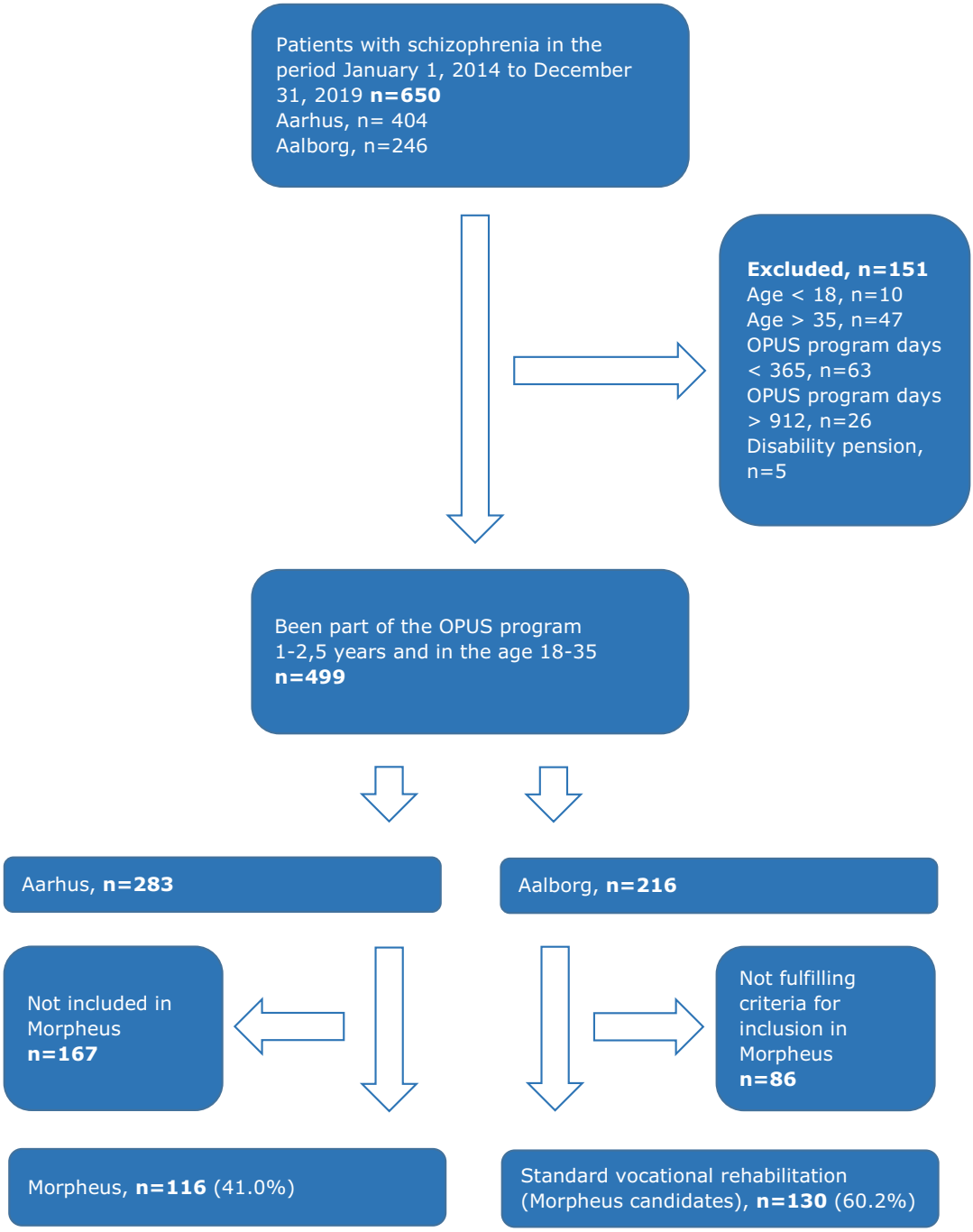

FIGURE 1 | Flow chart of the inclusion.

compared to patients undergoing standard vocational rehabilitation (Table 3). In the 2–4-year period, Morpheus patients had on average an additional 20 psychiatric admission days in the adjusted model (Table 4). All results related to somatic and psychiatric admissions were non-significant.

Morpheus patients showed a significantly lower OR for somatic outpatient contacts during the initial period 0–2 years after baseline, and a non-significantly lower OR in the following 2 years compared to patients in standard vocational rehabilitation (Table 3). During the latter follow-up period, Morpheus patients had a mean of four somatic outpatient contacts less than those in standard vocational rehabilitation, which was statistically significant (Table 4). They also had 15 psychiatric outpatient contacts less than patients in standard vocational rehabilitation during the first 2 years, which was statistically significant (Table 4).

3.4 | Antipsychotics and Antidepressants

Compared to patients undergoing standard vocational rehabilitation, those in the Morpheus intervention exhibited a significantly lower OR for redeeming antipsychotic medication during the period 2–4 years after baseline (Table 3), and a non-significantly lower number of DDD (Table 4). Regarding antidepressants, Morpheus patients redeemed a significantly higher volume during the first 2 years of follow-up, and a

TABLE 1 | Baseline characteristics of patients included in Morpheus and patients receiving standard vocational rehabilitation.

Variables	Morpheus *n* (%)	Standard *n* (%)	*p*
Total	116 (47.2)	130 (52.9)	
Year of inclusion in OPUS			
2014–2015	46 (39.7)	32 (24.6)	0.04
2016–2017	35 (30.2)	53 (40.8)	
2018–2019	35 (30.2)	45 (34.6)	
Days in OPUS			
Mean (SD)	758.92 (101.97)	737.42 (90.63)	0.08
Age			
Mean (SD)	23.34 (3.69)	23.17 (4.41)	0.74
Gender			
Male	70 (60.3)	77 (59.2)	0.86
Employment status at inclusion in OPUS			
Employment	18 (15.5)	7 (5.4)	
Education grant	19 (16.4)	16 (12.3)	0.02
Non-competitive employment	9 (7.8)	19 (14.6)	
Public transfer payment	70 (60.3)	88 (67.7)	
Education			
Short	59 (50.9)	86 (66.2)	
Intermediate or long	57 (49.1)	44 (33.9)	0.02
Symptoms at inclusion			
Auditory hallucinations	82 (70.7)	100 (76.9)	0.27
Other hallucinations	78 (67.2)	70 (53.9)	0.03
Delusions	75 (64.7)	83 (63.9)	0.90
Negative symptoms	72 (62.1)	67 (51.5)	0.10
Symptoms 6 months after inclusion			
Auditory hallucinations	58 (50.0)	72 (55.4)	0.40
Other hallucinations	37 (31.9)	39 (39.2)	0.23
Delusions	37 (31.9)	40 (30.8)	0.85
No positive symptoms	34 (29.3)	23 (17.7)	0.03
Negative symptoms	58 (50.0)	67 (51.5)	0.81
Antipsychotic medication 6 months after inclusion			
Tablet	75 (64.7)	96 (73.9)	0.12
Sustained-release medication	30 (25.9)	19 (14.6)	0.03
Antidepressant medication 6 months after inclusion			
Yes	38 (32.7)	30 (23.1)	0.09
Number of antipsychotics 6 months after inclusion			
0	13 (11.2)	17 (13.1)	0.38
1	89 (76.7)	90 (69.2)	
≥ 2	14 (12.1)	23 (17.7)	

non-significantly higher DDD during the last 2 years of follow-up compared to patients in standard vocational rehabilitation (Table 4).

4 | Discussion

This retrospective cohort study found no significant differences in employment and education outcomes between patients in Morpheus and patients in standard vocational rehabilitation. Additionally, there were no differences in somatic or psychiatric hospital admission days. However, Morpheus patients had significantly fewer somatic outpatient contacts during the 2–4 years after baseline and fewer psychiatric outpatient contacts during the 0–2 years after baseline. Regarding medication, Morpheus patients were less likely to redeem antipsychotic medication 2–4 years after baseline but redeemed a significantly higher volume of antidepressant medication during the first 2 years.

The Morpheus intervention did not outperform standard vocational rehabilitation in promoting employment and education. A Norwegian study comparing two supported employment groups—one with cognitive behavioural therapy and the other with cognitive remediation—similarly found no distinction between groups, with 21% of individuals in both securing competitive employment after 2 years (Evensen et al. 2017). This is comparable to the 19% of Morpheus patients who obtained employment or enrolled in school. Additionally, the Norwegian study revealed that 25% had work placement (Evensen et al. 2017), which is similar to the 21.5% of participants in standard vocational rehabilitation in this study who were in non-competitive employment but higher than the percentage of the Morpheus patients (11%).

In contrast, an American study of individuals with incident schizophrenia reported that 43% were employed or in school at baseline, increasing to 73% after 2 years (Dixon et al. 2015).

TABLE 2 | Employment, education and non-competitive employment during follow-up.

	Morpheus	Standard		
	n = 116	*n* = 130	Crude	Adjusted[a]
	n (%)	*n* (%)	OR (95% CI)	95% CI
Employment				
2 years after baseline	10 (8.6)	10 (7.7)	1.13 (0.45; 2.83)	1.14 (0.37; 3.45)
4 years after baseline	22 (19.0)	15 (11.5)	1.79 (0.88; 3.65)	1.51 (0.70; 3.27)
0–2 years after baseline	33 (28.5)	24 (18.5)	1.76 (0.96; 3.20)	1.37 (0.68; 2.78)
2–4 years after baseline	37 (31.9)	33 (25.4)	1.38 (0.79; 2.40)	1.20 (0.65; 2.22)
Education				
2 years after baseline	12 (10.3)	5 (3.9)	2.88 (0.98; 8.45)	2.02 (0.64; 6.29)
4 years after baseline	12 (10.3)	10 (7.7)	1.38 (0.57; 3.34)	1.08 (0.42; 2.75)
Non-competitive employment				
2 years after baseline	13 (11.2)	28 (21.5)	0.46 (0.23; 0.94)	0.51 (0.23; 1.16)
4 years after baseline	9 (7.8)	24 (18.5)	0.37 (0.16; 0.84)	0.44 (0.19; 1.01)

[a]Adjusted for gender, age, education and employment status at baseline.

TABLE 3 | Admissions, outpatient contacts and medication during the periods 0–2 years and 2–4 years after inclusion in OPUS treatment.

	Morpheus	Standard	Crude	Adjusted[a]
	n (%)	*n* (%)	OR (95% CI)	95% CI
Admissions				
Somatic				
0–2 years after baseline	11 (9.5)	22 (16.9)	0.51 (0.24; 1.11)	0.54 (0.23; 1.24)
2–4 years after baseline	9 (7.8)	16 (12.3)	0.60 (0.25; 1.41)	0.66 (0.27; 1.62)
Psychiatric				
0–2 years after baseline	61 (52.6)	56 (43.1)	1.47 (0.89; 2.42)	1.52 (0.90; 2.58)
2–4 years after baseline	34 (29.3)	36 (27.7)	1.08 (0.62; 1.88)	1.13 (0.64; 2.01)
Outpatient contacts				
Somatic				
0–2 years after baseline	59 (50.9)	87 (66.9)	0.51 (0.31; 0.86)	0.47 (0.27; 0.81)
2–4 years after baseline	53 (45.7)	72 (55.4)	0.68 (0.41; 1.12)	0.66 (0.39; 1.12)
Psychiatric				
0–2 years after baseline	116 (100)	130 (100)	—	—
2–4 years after baseline	106 (91.4)	121 (93.1)	0.79 (0.31; 2.01)	0.73 (0.28; 1.91)
Medication				
Antipsychotic				
2–4 years after baseline	71 (61.2)	96 (73.8)	0.56 (0.33; 0.96)	0.51 (0.29; 0.91)
Antidepressant				
0–2 years after baseline	63 (54.3)	57 (43.8)	1.52 (0.92; 2.52)	1.55 (0.91; 2.62)
2–4 years after baseline	37 (31.9)	47 (36.2)	0.83 (0.49; 1.40)	0.83 (0.48; 1.44)

[a]Adjusted for gender, age, education and employment status at baseline.

TABLE 4 | Employment hours, admission days, outpatient contacts and medication during the periods 0–2 years and 2–4 years after inclusion in OPUS treatment.

	Morpheus		Standard		Crude	Adjusted[a]
	n (%)	Mean (SD)	*n* (%)	Mean (SD)	Mean differences (CI)	Mean differences (CI)
Employment hours						
0–2 years after baseline	33 (28.5)	615.66 (933.40)	24 (18.5)	468.27 (544.18)	147.39 (−279.59; 574.37)	218.09 (−217.00; 653.17)
2–4 years after baseline	37 (31.9)	909.96 (1082.27)	33 (25.4)	809.35 (978.93)	100.60 (−393.88; 595.08)	50.35 (−439.39; 540.08)
Number of admission days						
Somatic						
0–2 years after baseline	11 (9.5)	5.36 (8.44)	22 (16.9)	4.82 (4.71)	0.55 (−4.10; 5.19)	−0.57 (−5.94; 4.80)
2–4 years after baseline	9 (7.8)	9.33 (23.51)	16 (12.3)	4.38 (4.51)	4.96 (−7.40; 17.32)	5.63 (−10.09; 21.34)
Psychiatric						
0–2 years after baseline	61 (52.6)	49.83 (74.09)	56 (43.1)	49.01 (66.57)	0.83 (−25.05; 26.71)	−3.77 (−31.19; 23.65)
2–4 years after baseline	34 (29.3)	82.47 (117.27)	36 (27.7)	69.38 (81.29)	13.10 (−34.80; 61.00)	20.09 (−30.12; 70.31)
Number of outpatient contacts						
Somatic						
0–2 years after baseline	59 (50.9)	4.07 (8.37)	87 (66.9)	5.44 (6.13)	−1.37 (−3.74; 1.00)	−1.07 (−3.52; 1.38)
2–4 years after baseline	53 (45.7)	3.91 (5.50)	72 (55.4)	8.13 (13.11)	−4.22 (−8.01; −0.43)	−4.22 (−8.10; −0.35)
Psychiatric						
0–2 years after baseline	116 (100)	63.74 (20.43)	130 (100)	77.62 (30.05)	−13.99 (−20.41; −7.35)	−15.28 (−22.02; −8.53)
2–4 years after baseline	106 (91.4)	25.53 (24.03)	121 (93.1)	30.48 (24.29)	−4.95 (−11.29; 1.38)	−5.63 (−12.21; 0.95)
Mediation						
Antipsychotic						
2–4 years after baseline	71 (61.2)	457.15 (394.16)	96 (73.8)	538.34 (420.96)	−81.19 (−207.85; 45.46)	−89.86 (−229.69; 31.98)
Antidepressant						
0–2 years after baseline	63 (54.3)	754.01 (652.49)	57 (43.8)	521.47 (500.40)	232.53 (20.67; 444.40)	243.48 (12.78; 474.17)
2–4 years after baseline	37 (31.9)	824.92 (728.42)	47 (36.2)	612.78 (519.70)	212.16 (−74.33; 498.64)	153.64 (−154.58; 461.86)

[a]Adjusted for gender, age, education and employment status at baseline.

These variations likely reflect differences in labour markets and social security systems across countries (Marwaha and Johnson 2004). Therefore, it is important to consider these factors when interpreting results across countries. In welfare-oriented countries like Denmark and Norway, unemployed individuals with schizophrenia face less pressure to work, while in countries without such social benefits, economic necessity may drive employment. Moreover, it could also be hypothesised that finding employment is more attainable in countries with a greater number of jobs that do not require specialised education or skills.

Although no significant effect of Morpheus was found, patient interviews suggest positive experiences. Patients appreciated the individualised approach of the programme, which helped them gain confidence in their ability to work. In contrast,

those receiving standard vocational rehabilitation were more uncertain about their employment prospects (Ørtenblad et al. 2025).

Supported employment models like Individual Placement and Support (IPS) have proven effective in improving competitive job placement for individuals with schizophrenia (Carmona et al. 2017) and young adults with first-episode psychosis (Bond et al. 2015). In the latter group, those undergoing supported employment exhibited a higher employment rate during follow-up at 49%, compared to control patients at 29% (Bond et al. 2015). Additionally, a review indicated a significantly higher employment rate for IPS compared to standard treatment in young adults with mental health conditions and first-episode (Bond et al. 2023). An RCT in Denmark from 2012 to 2017 confirmed IPS's positive outcomes (Christensen et al. 2019), leading to its implementation in several municipalities as part of standard vocational rehabilitation. This may explain why patients in both Morpheus and standard vocational rehabilitation had similar employment outcomes, as some municipalities in the study were already using IPS.

Employment and education rates for Morpheus patients decreased from 31.9% at baseline to 18.9% at 2 years, then rebounded to 29.3% at 4 years. A systematic review encompassing patients with a first-episode of psychosis also revealed a significant decline over time in the number of individuals engaged in employment or education (Ajnakina et al. 2021). This decline can be attributed to the substantial levels of disability that predominantly emerge during the early stages of psychosis (Griffiths et al. 2019; Hakulinen et al. 2020). A Danish register study also found a decline in employment rates among individuals diagnosed with schizophrenia (Christensen et al. 2022), emphasising the need for coordinated efforts between health, employment and social services.

Active workforce participation is associated with reductions in psychiatric admissions, outpatient contacts and psychotropic drug use (Luciano et al. 2014; Luciano et al. 2016). Although, Morpheus did not show superiority in facilitating employment and education, our analyses indicated tendencies towards fewer somatic and psychiatric outpatient contacts, somatic admissions and redemption of antipsychotic medication. It is important to note, however, that we observed a higher likelihood of admission to psychiatric departments. This discrepancy may not necessarily be attributed to the intervention itself but could reflect administrative differences between the two regions and hospitals or variations in patient characteristics.

4.1 | Strengths and Limitations

A major strength of this study is the use of high-quality register data to track all outcomes, ensuring complete follow-up and minimising selection bias. By including data from both hospitals, we captured all patients who received OPUS treatment during the study period. Standardised procedures were followed for data extraction, and when variables showed low agreement, records were re-examined.

However, patient inclusion in Morpheus was not standardised, which made it challenging to identify a comparable population in Aalborg. We estimated that 60% of OPUS patients in Aalborg would have been eligible for Morpheus had they been in Aarhus, a higher proportion than those who received Morpheus in Aarhus. Although the baseline characteristics of the two hospital groups were similar in several aspects, differences in education and employment existed, and we adjusted for these in our analyses. Baseline differences in completed education may have influenced follow-up outcomes, as individuals with prior education were not counted as being in education, reflecting the impact of course completion rather than lack of participation. Unfortunately, we lacked information on the standard vocational rehabilitation received by patients, which may have included IPS, potentially blurring the distinction between the two interventions.

Geographical differences between Aarhus and Aalborg may also have influenced the results. Both cities offer ample employment and education opportunities, but differences in municipal and hospital organisation and procedures could have affected patient outcomes.

5 | Conclusion

Young adults with incident schizophrenia who underwent the Morpheus intervention as part of the OPUS treatment did not exhibit a significantly greater likelihood of being employed or enrolled in education compared to patients undergoing standard vocational rehabilitation. Nevertheless, these findings may be influenced by administrative variations between the two regions and hospitals, as well as disparities in patient characteristics.

Ethics Statement

The Central Denmark Region Committee on Health Research Ethics approved accessing information from the patient files and identification of patients who had received the OPUS programme (no. 1-45-70-60-21). The study was registered and approved in the Central Denmark Region's register of research project (no. 1-16-02-276-21).

Conflicts of Interest

D.L.V. and O.M. serve as sub investigators for a pharmaceutical company sponsored RCT study conducted by Boehringer Ingelheim (Connex trial), investigating an add-on treatment to antipsychotics aiming to enhance cognition in patients with schizophrenia. It should be noted that D.L.V. and O.M. do not receive personal compensation from the company. The rest of the author group have no financial or proprietary interests in any material discussed in this article.

Data Availability Statement

Register data are not available due to legal restrictions as data are stored on a server at Statistics Denmark. Clinical data are available upon reasonable request.

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