The effect of employment support integrated in substance use treatment: A health economic cost-effectiveness simulation of three different interventions

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Abstract

Background: Unemployment rates for individuals in treatment for substance use disorder (SUD) are high, with Norwegian estimates in the range of 81%–89%. Although Individual Placement and Support (IPS) represents a promising method to improved vocational outcome, cross-disciplinary investigations are needed to document implementation benefits and address reimbursements needs. The aim of this study was to model the potential socioeconomic value of employment

support integrated in SUD treatment. **Methods:** Based on scientific publications, an ongoing randomised controlled trial (RCT) on employment support integrated in SUD treatment, and publicly available economy data, we made qualified assumptions about costs and socioeconomic gain for the different interventions targeting employment for patients with SUD: (1) treatment as usual (TAU); (2) TAU and a self-help guide and a workshop; and (3) TAU and IPS. For each intervention, we simulated three different outcome scenarios based on 100 patients. **Results:** Assuming a 40% employment rate and full-time employment (100%) for 10 years following IPS, we found a 10-year socioeconomic effect of €18,732,146. The corresponding effect for the more conservative TAU + IPS simulation assuming 40% part-time positions (25%) for five years, was €2,519,906. Compared to the two alternative interventions, IPS was cost-effective and more beneficial after six months to two years. **Discussion:** This concept evaluation study suggests that integrating employment support in the health services is socioeconomically beneficial. Our finding is relevant for decision makers within politics and health. Once employment rates from our ongoing RCT is available, real-life data will be applied to adjust model assumptions and socioeconomic value assumptions.

Substance use disorders (SUD) impose a significant burden in terms of individual suffering and societal costs (United Nations Office on Drugs and Crime, 2018). Employment is associated with better outcome of opioid substitution treatment (Eastwood et al., 2018) and protects against relapse after treatment completion for patients addicted to alcohol or opioids (Henkel, 2011). Reasons for this may be that having a job gives structure through the day and provides the person with a substance-free social network and a stable economy. Having a job may also give a sense of dignity, belonging and meaning – needs commonly expressed by patients with SUD, but perhaps insufficiently met by the treatment system.

Despite the beneficial effect of work, the unemployment rates for persons in SUD treatment are extremely high, with Norwegian estimates in the range of 81%–89% (Abel et al., 2018; Lauritzen et al., 2012; Velferdsetaten, 2019; Waal et al., 2018). Norway has the largest mental health-related unemployment gap of all OECD countries (OECD, 2013), and mental and behavioural disorders, hereunder SUD, represent the most common reason for non-participation in the labour market, accounting for 61% of all disability benefits among young adults in 2015 (NAV, 2015). Improving vocational participation for persons with SUD could therefore affect both health outcomes and constitute a substantial economic gain for society.

Individual Placement and Support (IPS) is an evidence-based method developed to help individuals with severe mental disorders obtain and keep employment (Brinchmann et al., 2020). In IPS, a team of employment specialists is integrated in the health services, providing high-quality employment support to the patient, including assessment of competence, systematic job seeking, close in-labour follow-up and support to the employer. The employment specialists participate in treatment meetings, share office space with the treatment providers and document in the same electronic patient journal system. The method follows eight principles: (1) no exclusion criteria; (2) focus is on regular paid employment; (3) participation is based solely on the patient's choice; (4) job support is integrated with the treatment; (5) financial counselling is provided; (6) the job search starts rapidly; (7) the employment specialists engage in systematic job development together with the patient; and (8) the support

is continuous and individualised (Drake & Becker, 1996). Adherence to the model is assessed by evaluators outside of the service in accordance with a 25-item scale with a possible score of 1–5 on each item (Bond et al., 2012b). There is no specific educational background qualification for employment specialists, but the combination of relevant experience and personal qualification is emphasised. IPS is effective across a variety of settings and economic conditions, and is, for patients with severe mental illness, more than twice as likely as traditional vocational rehabilitation methods to lead to employment (Modini et al., 2016). A meta-analysis shows that the overall employment rate for IPS clients in American studies is 62%, while it is 47% in non-American studies (Bond et al., 2012a). Within a Norwegian context, IPS has been documented as effective (Reme et al., 2019) and cost-effective (Holmås et al., 2021) for people with moderate to severe mental disorders.

It is uncertain whether IPS is equally effective for patients with SUDs, though results from a pilot study in the USA has provided promising results (Lones et al., 2017). In this study, 45 patients on methadone maintenance treatment were randomised to either IPS or waiting list control, and after six months employment rates were 50% in the IPS group compared to 5% in the control group. The effect of IPS on employment and health for persons with SUD is being investigated in two randomised controlled trials (RCTs). One takes place in England, with inclusion completed and results soon to be published (Marsden et al., 2020). The other trial takes place in Norway, with inclusion completed and results expected in 2024. Details of the Norwegian trial are presented in a protocol paper (Rognli et al., 2021).

In Norway, the Health Services is responsible for treatment of SUD, while the Labour and Welfare Administration (NAV) is responsible for employment. Comparable divisions are found in most countries. The health services only occasionally address employment and education, and the resources and competence to intervene and aid the patient in obtaining work are limited. Correspondingly, NAV has insufficient knowledge on mental health and substance use to be able to provide adequate job support when such problems are prominent. People with SUD are usually first treated in the healthcare system, and when substance-free and after treatment completion they may look for activity and employment in the labour and welfare systems. However, for those with chronic or long-lasting conditions, where relapse is imminent in the disorder, as is the case for SUD, health problems may continue to impair functioning for many years. As reflected in the high unemployment rates for persons with SUD, the fragmented and sequential services of today are insufficient.

Despite our knowledge of the importance of work for better mental health, the impact of addressing employment as part of the mental health treatment services and IPS as an effective intervention, there is a lack of incentives for implementing IPS as a method in the health services. First, the registration systems and associated economic incentives of new public management in the health sector do not encourage the health services to intervene towards employment. Second, unemployment and social benefit costs are expenses paid by sectors other than the health service. Third, the judicial framework for a fully integrated model between the employment sector and the health sector, as given in IPS, is lacking in Norway. This means that even if IPS proves to be effective for people with SUD as well, implementation into the health services is not a given. Structural barriers may hinder the implementation of new and effective methods. This calls for wider scope and cross-disciplinary investigations.

The aim of this study was to model the potential socioeconomic value for integrated employment support in the specialised healthcare services for SUD in Norway.

Methods

We made qualified assumptions about the proportion of patients that we expected would obtain employment after three different types

of interventions offered in a RCT at Oslo University Hospital, Norway, and inserted these assumptions into a simulation model together with estimates of costs.

The study is reported according to the standards of the Consolidated Health Economic Evaluation Reported Standards (CHEERS) (Husereau et al., 2013).

Study design and model description

The socioeconomic effects of the following interventions are included in this simulation study: Intervention 1 = treatment as usual (TAU): outpatient treatment with a specialised healthcare provider; Intervention 2 = TAU and a self-help guide and a workshop; Intervention 3 = TAU and IPS. Early health technology assessment (Støme et al., 2019) with stakeholder insights and scenario drafting was applied to identify the costs and gains of TAU and of the two different enhanced employment interventions. Early health technology assessment is used to evaluate innovations still under development, to explore their potential value before implementation (Støme et al., 2020). As IPS is a more expensive intervention than traditional treatment for this patient group, the scope of this early assessment was to assess the potential benefits of investing in increased employment support. A simulation model on the potential costs and effects of adopting each intervention was constructed based on input from the ongoing RCT, published literature, publicly available economy data and hospital administrative data. To our knowledge, early health technology assessment has not been used to assess the cost-effectiveness on IPS for people with mental health problems before this study.

Costs

The cost of implementing each intervention were derived from a Norwegian health sector perspective and from expenses. Estimates of direct costs associated with each type of intervention were derived from the perspective of the payer, in this case the healthcare services,

and included hospital charges and professional fees. Estimates on outcome were derived from a social perspective, including effects on public budgets. We also included estimates for any subsequent services or procedures that might be necessary to manage, such as social security benefits and lost tax income .

Estimates about cost were informed from administrative data from Oslo University Hospital (average number of consultations for TAU and duration of a consultation) and from the ongoing RCT (hours spent for the different interventions) and from Statistics Norway (SSB) (hourly rates).

Estimates about the proportion who will obtain work in the different interventions was based on available evidence about IPS on moderate to severe mental disorders in Norway (Reme et al., 2019) (the 12-month employment rate for IPS clients was 37%), on IPS on severe mental illness in the neighbouring country Sweden (Bejerholm et al., 2015) (the 18-month employment rate for IPS clients was 46%), from a pilot study on IPS and SUD from the USA (Lones et al., 2017) (the six-month employment rate for IPS clients was 50%) and from publications describing unemployment rates among persons with SUD in Norway, finding these to be in the range of 81%–89% (Abel et al., 2018; Lauritzen et al., 2012b; Velferdsetaten, 2019; Waal et al., 2018).

The rationale for the three different scenarios was based on a review stating that across studies, IPS clients mostly work part–time, typically half-time, about two-thirds work 20 h or more per week and few work full-time (Bond et al., 2012a).

For simulation purposes, we used a one-year time horizon for the interventions and a 10-year time horizon for the socioeconomic effects of the interventions. Costs associated with the intervention were calculated over one year; thus, the discount rate for the intervention is not relevant (for clarity, the discount rate is 0%). However, for the estimation of the socioeconomic effects of increased employment outcomes among persons with SUD, a discount

rate of 4% was used, based on recommenda-
tions from the Ministry of Finance of Norway
(2016) on public investment projects.

The primary outcome for the simulation
model was employment outcomes for persons
with SUD associated with the three interven-
tions. The benefit of increasing the employment
outcomes for persons with SUD in the open
labour market was estimated in socioeconomic
terms. Socioeconomic estimates of increased
labour market participation among people with
reduced working capability was based on a
report commissioned from The Confederation
of Norwegian Enterprise (Gran et al., 2020).

Employment outcome. Three outcome scenarios
were selected to simulate the potential benefits of
increasing employment outcomes for persons
with SUD in the open labour market. Scenario1
assumes that all participants reaching employment
do so in full-time (100%) work and continue to
work full-time for 10 years. Although not a prob-
able outcome, it provides a maximum potential
gain from the intervention. Scenario 2 assumes a
mean position held among the candidates, reach-
ing employment of 50% for 10 years, and scen-
ario 3 assumes a 25% position for five years
among those who obtain work. Scenario estimates
of increased employment outcomes in the open
labour market were based on the below.

Tax financing cost. For interventions financed
from public budgets, a tax financing cost must
be included in the model. The reason is that
taxes affect the use of resources and can lead to
a loss of efficiency. In this model, the tax financing
cost is set at 20 cents per euro (20%) and is to
represent the marginal cost of collecting an extra
euro in taxes. In Norwegian public funding, the
traditional view is that per euro needed to
finance a public project, the value creation on
the private side is correspondingly reduced by 20
cents (Holtsmark & Bjertnæs, 2015).

Salary input. In order to estimate value creation
per employee, the average salary was set to
€45,144 (2019) for a full-time employee

(Statistics Norway, 2021). When we take into
account other wage costs (employer's contribu-
tion and social costs), this gives total wage costs
of approximately €56,430 per full-time
employee. This forms the basis for value cre-
ation per year for a person who enters the
labour market after intervention. In the esti-
mates, value creation is adjusted down as a per-
centage according to working capacity.

Social security transfer. If the people do not enter
ordinary working life after intervention, the
alternative for most is some form of social
security transfer. In this model, we have
assumed that persons will receive disability
benefits. In 2019, a social security recipient
received an average of €25,047 per year (Gran
et al., 2020). In the simulation model, this will
be used to estimate the annual public conse-
quence for persons with SUD that end up
outside the labour market after intervention.

Tax revenue. Participation in ordinary working
life provides increased tax revenue to the
public sector through income tax and employ-
er's contribution. We have assumed this at
€17,622 per year for a person with an income
of €45,144. This is based on an income tax of
25% and employer's contribution of 14.1%
(The Norwegian Tax Administration, 2021).

We used hospital administrative data and
data from Statistics Norway to estimate the
costs of each intervention. We used scientific
literature to estimate employment outcomes
for persons with SUD in the open labour
market for the three interventions and calculated
the socioeconomic value of each intervention
based on costs associated with enhanced
health supply (in Interventions 2 and 3).
Currency was converted from NOK to Euro fol-
lowing the going rate at 28 September 2021 (1
NOK = 0.099 Euro).

Average yearly costs per patient were calcu-
lated based on time (h), unit costs and number
of units as shown in Table 1. For modelling pur-
poses, we calculated with 100 per intervention.
The overall socioeconomic value for each

intervention reflects the cost of intervention, the gain of employment and the socioeconomic loss of unemployment.

Model assumptions

The modelling in this study is based on the following assumptions:

- the employment rate for Intervention 1, TAU, was set to 11%, based on reported employment rates for patients in SUD treatment in Norway (Abel et al., 2018; Lauritzen et al., 2012b; Velferdsetaten, 2019; Waal et al., 2018)
- the employment rate for Intervention 2, TAU + self-help guide and workshop, was set to 15%, assuming that offering a job training course as a supplement to TAU will increase the employment rate somewhat
- the employment rate for Intervention 3, TAU + IPS, was set to 40%. This has not been tested in a SUD population in a country similar to Norway, but is based on previous studies of relevance, with employment rates for IPS clients in the range of 37%–50% (Bejerholm et al., 2015; Lones et al., 2017; Reme et al., 2019)
- a total of 13 people will participate in each job training course (based on experience from the RCT)
- the administrative tasks will be the same for the three interventions, with an additional 1.5 h for job training course coordination (based on experience from the RCT)

Results

Costs and outcomes

The assumed employment outcomes for each intervention and the associated socioeconomic effects are shown in Table 2. In this model, the costs of providing TAU (Intervention 1) to 100 patients was €158,705. Supplementing TAU with a job training course (Intervention 2) increased the cost to €178,661, while supplementing TAU with IPS (Intervention 3) increased the cost to €920,581. Compared to the other inventions, there was a cost-effectiveness difference in favour of IPS for all three employment outcome scenarios. Socioeconomic gains for the most optimistic (40% will work in 100% of positions for 10 years) and conservative (40% will work in 25% of positions for five years) IPS scenarios was €18,732,146 and €2,519,906, respectively.

Figure 1 shows the socioeconomic gain and the net present value for the three interventions, accumulated over a 10-year period. The figure shows the model assumptions for a 40% employment rate for 100% of positions over 10 years (Figure 1a), 50% of positions over 10 years (Figure 1b) and 25% of positions over five years (Figure 1c), respectively. For 100% and 50% of employment positions, the socioeconomic IPS cost-gain effect exceeds the other interventions during the first year. For 25% of employment positions over five years, the corresponding finding is found within the first two years of the intervention.

Discussion

In this concept evaluation study applying scenario drafting, a substantial potential socioeconomic gain of IPS was found, even for the scenario where IPS only was assumed to result in 25% of employment positions among 40% for a five-year period. Although both TAU and a job training course were expected to improve employment rates, these effects were modest compared to the modelled IPS effects. By extrapolating the socioeconomic effect over 10 years, we found that the initial cost investment of IPS, though 10 times higher than the cost of the other two interventions, was small compared with the profit from helping people begin working.

A major barrier to IPS implementation is inter-sectorial collaboration, including reimbursement issues, financing and judicial clarifications. Simulations such as in the present study can show the potential gain of new

Table 1. Time per hour, unit costs and number of units required for Interventions 1, 2 and 3 with total cost a year per patient for each intervention and source of the data collected.

	Time (h)	Unit cost (€)	No. of units	Total cost a year/ patient (€)	Source
Intervention 1: TAU					
Consultation length	1				Hospital administration data
Cost of therapist/h		59			Statistics Norway
Average number of consultations			22.2		Hospital administration data
Cost of treatment per year per patient				1301	
Intervention 2: TAU and job training course					
Cost TAU				1301	
Course length	6				RCT
Course coordination	1.5				RCT
Individual follow-up after course	1				RCT
Cost course instructor		45			Statistics Norway
Cost course coordinator		35			Statistics Norway
Average course participants			13		RCT
Individual cost of job training course				70	
Cost of treatment per year per patient				1370	
Intervention 3: TAU and IPS					
Cost TAU				1301	
Consultation with IPS specialist	1				RCT
Cost IPS specialist/h		44			Statistics Norway
Average number of consultations with IPS specialist			87.5		RCT
Cost of IPS specialist				3813	
Cost of treatment per year per patient				5114	

Note. IPS = Individual Placement and Support; RCT = randomised controlled trial; TAU = treatment as usual.

interventions and stimulate stakeholders to overcome implementation challenges. Early economic modelling thus provides an opportunity for innovative health services to be tested, evaluated and optimised before full-scale implementation. This may assist in completing a health service that meets predefined user needs, while reducing associated risks (Kværner et al., 2021). Despite uncertainty due to the lack of valid data sources at this

Table 2. Costs (in €) and outcomes of the three different interventions simulated with N = 100 patients over 10 years, and with three different scenarios of mean proportion of employment

	Percentage of position among those employed, assumed stable and extrapolated over 10 years			
	100% employment over 10 years	50% employment over 10 years	25% employment over 5 years	Unemployed over 10 years
Intervention 1: TAU				
Employment rate	11	11	11	89
Additional costs associated with the intervention	14,309	14,309	14,309	115,777
Increased value creation	4,615,182	2,307,591	690,426	0
Impact on public budgets	592,416	278,784	58,806	−281,952
Social effect	5,193,289	2,572,066	734,923	−397,729
Intervention 2: TAU and job training course				
Employment rate	15	15	15	85
Additional costs associated with the intervention	20,615	20,615	20,615	116,817
Increased value creation	6,293,430	3,146,715	941,490	0
Impact on public budgets	807,840	380,160	80,190	−269,280
Social effect	7,080,655	3,506,260	1,001,065	−386,097
Intervention 3: TAU and IPS				
Employment rate	40	40	40	60
Additional costs associated with the intervention	204,574	204 574	204 574	306 860
Increased value creation	16,782,480	8,391,240	2,510,640	0
Impact on public budgets	2,154,240	1,013,760	213,840	−190,080
Social effect	18,732,146	9,200,426	2,519,906	−496,940

Note. IPS = Individual Placement and Support; TAU = treatment as usual.

early stage, early economic modelling provides health authorities with highly desired decision support in the planning of future health services.

As shown, the economic effect was derived from increased labour supply. Although the benefit does not transfer directly back into public health budgets that carry the cost burden of the intervention, the indirect benefit is significant as the transition from benefit schemes to the labour market contributes to
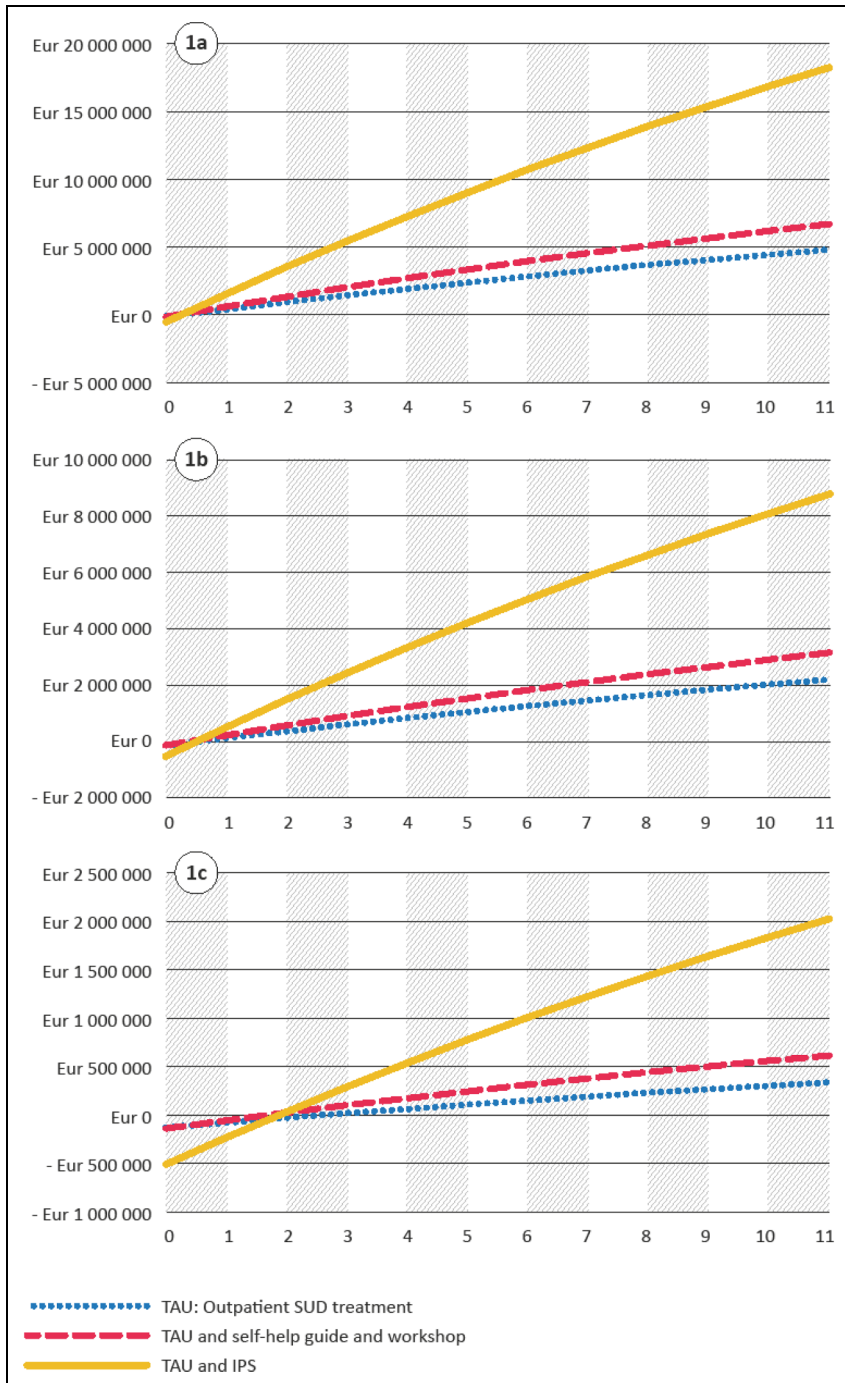
Figure 1. Comparison of simulated cumulative socioeconomic cost-gain effect of three different interventions for 100 individuals with substance use disorder over a period of 10 years, assuming (a) 100% employment in 10 years, (b) 50% employment in 10 years or (c) 25% employment in 5 years.

both increased tax revenue and reduced social security payments.

Characterising uncertainty

In the absence of data, stakeholder insight and scenario drafting were applied. As such, the estimated socioeconomic value of the interventions is based on assumptions, as accounted for in the methods section. In addition to the assumptions about employment rates and percentage of positions, the time span for the calculations and the amount of variables included in the model may affect the cost-effectiveness.

In this simulation model, we assumed an analysis period of 10 years for effect measurement. If we reduce this period, the positive results will also be reduced. Equally, if we extend the analysis period, this will also increase the positive effects of increased employment. Further, a model assumption was that the patients undergo treatment for one year. The longer a patient participates in the interventions, the longer the person needs to remain in the labour market afterwards for the positive socioeconomic effects to exceed the costs. This also applies for possible relapses after treatment and repeated treatments.

New contacts with the health service were not included in our simulation. For individuals with psychosis, IPS is associated with fewer hospitalisations (Burns et al., 2008; Henry et al., 2004; Hoffmann et al., 2014). If the same is true for people with SUD remains to be seen, but it is plausible, given that having a job protects against relapse and is associated with better treatment outcomes (Eastwood et al., 2018; Henkel, 2011). The model in this paper assumes equal relapse rates in all three groups, but this may be too conservative, and may thus underestimate the cost-effectiveness of IPS in relation to the two other groups. Further, possible gains from the criminal sector have not been included. A Norwegian five-year prospective study of drug users found that 45% were imprisoned at least once during the study period, with a mean duration of 65 incarcerated days (Gjersing & Bretteville-Jensen, 2021). We know that treatment, including opioid maintenance treatment for persons with opioid dependency, is associated with reductions in criminal behaviour and convictions (Gossop et al., 2005; Lind et al., 2005; Soyka et al., 2012). The average cost per inmate per day in Norway is €318 (Aebi & Tiago, 2021). Possible gains associated with the effect of employment on health and crime may therefore further increase the socioeconomic gain of IPS.

There are systemic and structural barriers to the vocational integration of individuals with SUD, including lack of collaboration between employment support programmes and treatment providers (Henkel, 2011). IPS may partly remedy this but investing in employment support together with treatment may seem costly in the short term. The results of our simulations suggest that the socioeconomic gains exceed the costs within two years. Until further evidence is available, this could encourage future health services for SUD to include IPS.

As this was a socioeconomic simulation study, effects were evaluated in economic terms only. The impact of employment on substance use, mental health and quality of life is of utmost importance for those involved. These outcomes will be made available through our ongoing RCT (Rognli et al., 2021).

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