

MRS BEATE BRINCHMANN (Orcid ID : 0000-0002-5793-7668)

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A meta-regression of the impact of policy on the efficacy of Individual Placement and Support

Beate Brinchmann^{1, 2}
Tarjei Widding-Havneraas⁴
Matthew Modini^{5,6}
Miles Rinaldi⁷
Cathrine F. Moe^{1, 8}
David McDaid⁹
A-La Park^{1, 9}
Eoin Killackey^{10,11}
Samuel B. Harvey¹²
Arnstein Mykletun^{1, 2, 3, 4}

Affiliations

1. Nordland Hospital Trust, Centre for Work and Mental Health, Bodø, Norway
2. UiT – The Arctic University of Norway, Tromsø, Norway
3. Norwegian Institute of Public Health, Division of Mental Health, Oslo, Norway

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4. Centre for Research and Education in Forensic Psychiatry and Psychology, Haukeland University Hospital, Bergen, Norway
5. School of Psychology, The University of Sydney, Australia
6. Concord Centre for Mental Health, NSW Health, Sydney, Australia
7. South West London & St George's Mental Health NHS Trust, London, UK
8. Nord University, Faculty of Nursing and Health Sciences, Norway
9. Personal Social Services Research Unit, Department of Health Policy, London School of Economics and Political Science, London, UK
10. Orygen, The National Centre of Excellence in Youth Mental Health, Australia
11. Centre for Youth Mental Health, The University of Melbourne, Australia
12. Black Dog Institute, University of New South Wales, Sydney, Australia

Corresponding Author: Beate Brinchmann beate.brinchmann@nordlandssykehuset.no

Postal address:

Nordlandssykehuset HF

P.O. box 1480

8092 Bodø

Norway

+4741461774

Word count: 5897

Authors' contributions

BB, SBH, TWH, MM, and AM devised the study. BB, MM and TWH devised the literature search and assessed for inclusion and the quality of the studies. BB, TWH and AM wrote the first draft of this manuscript. TWH extracted and analysed the data. All authors read and contributed to subsequent versions and approved the final version of this manuscript.

Abstract

Objective

Individual placement and support (IPS) has shown consistently better outcomes on competitive employment for patients with severe mental illness than traditional vocational rehabilitation. The evidence for efficacy originates from few countries, and generalization to different countries has been questioned. This has delayed implementation of IPS and led to requests for country specific RCTs. This meta-analysis examines if evidence for IPS efficacy can be generalized between rather different countries.

Methods

A systematic search was conducted according to PRISMA guidelines to identify RCTs. Overall efficacy was established by meta-analysis. The generalizability of IPS efficacy between countries was analyzed by random effects meta-regression, employing country- and date-specific contextual data obtained from the OECD and the World Bank.

Results

The systematic review identified 27 RCTs. Employment rates is more than doubled in IPS compared to standard vocational rehabilitation (RR 2.07 95% CI 1.82-2.35). The efficacy of IPS was marginally moderated by strong legal protection against dismissals. It was not moderated by regulation of temporary employment, generosity of disability benefits, type of integration policies, GDP, unemployment rate or employment rate for those with low education.

Conclusions

The evidence for efficacy of IPS is very strong. The efficacy of IPS can be generalized between countries.

Declaration of interest

None

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Keywords

Individual placement and support, systematic review, meta-analysis, meta-regression, employment, disability benefits, employer regulations, unemployment, supported employment, mental illness

Summary

- Most of the early research on IPS was conducted in the US, but increasingly researchers outside the US, especially northern Europe, have begun contributing to the IPS literature. IPS was developed in the US in a context of less generous welfare systems than the average of Europe and particularly in Scandinavia. It may be questioned if a generous welfare system reduces the efficacy of IPS, as employment is not a necessity to avoid poverty. Our study suggests the generosity of the welfare system does not influence the efficacy of IPS.
- Similarly, legal protection against dismissal for employees in the US is weaker than in European countries. It may be questioned whether strong employment protection is a barrier for employment of individuals with severe mental disorder, thus reducing the efficacy of IPS. Our study indicates strong legal protection against dismissal does reduce the efficacy of IPS, but the effect is modest.
- It is often suggested that high unemployment rates may challenge the efficacy of IPS as increased supply of labor force increases competition. We find no support for this hypothesis.

Limitations

- Varying definitions of competitive employment in the published literature is a challenge. The content and quality of the services provided in the control groups of published trials is also a challenge.
- Similarly, inclusion criteria varied. All studies included individuals on the basis of mental illness, but varied as to severity of mental illness, disability benefits, criminal convictions, comorbid drug- and alcohol problems.
- Finally, the control group condition varied between studies, and included variations in types of vocational rehabilitation and treatment as usual.

Introduction

The disabling effects of severe mental illness are well-recognized (1), one of them being that it greatly reduces the likelihood of being employed (2-5). The number of people who are outside the workforce due to mental illness has been rising for years in developed economies (4). Mental disorder is now the leading cause of disability in most western societies and in turn is costly, not only for the individual but also for welfare systems and for the economy as a whole (5). This is a challenge both for society at large and for individuals with severe mental illness who report that appropriate work is essential for their recovery (6). Participation in competitive employment is shown to enhance self-esteem, improve health and increase income (7-9), while unemployment can lead to further economic deprivation and social exclusion (10). This non-participation probably contributes to the stigmatising attitudes surrounding people living with mental illness that suggest that they are incapable of work. This, in turn, creates vicious circles where people with mental illness internalize these thoughts as self-stigmatisation and lose faith in seeking work (11-13).

However, there are ways to reduce the high unemployment rate seen in people with mental disorders and do more to support their recovery. The efficacy of the vocational rehabilitation approach using Individual Placement and Support (IPS) is reported in three Cochrane reports (14-16) and two meta-analysis covering 21 different randomized controlled trials across Europe, Asia and North America (17, 18). The results are convincing; IPS is more effective in achieving competitive employment for patients with severe mental illness (SMI) than traditional vocational rehabilitation. Where traditional vocational rehabilitation use sheltered and other forms of non-competitive training or employment, IPS place people into competitive jobs in line with their preferences without preparation or clinician's screening (19). Employment specialists in IPS are integrated in health services, but collaborate directly with managers and employers in the open job market. The efficacy of IPS may thus be vulnerable to labour market conditions. High unemployment rates may also challenge IPS, as may legal regulation of temporary contracts and legal protection against dismissal.

Despite evidence for the efficacy of IPS, implementation at a large scale and as a standard intervention within more traditional treatment approaches has not been the norm (20-24). There are several reasons for this. One of the major obstacles for implementation is that policy makers

and clinicians in many countries are still uncertain about generalizability of IPS-efficacy to their specific country and context. One of the contextual factors are welfare policies. Welfare policies face two possibly contradictory goals. On the one hand they aim to avoid attracting people onto welfare and the concern is that benefits may become too generous compared to expected income. On the other hand, welfare benefits must be generous enough to provide a social welfare safety net that should provide a decent economic life to individuals unable to work. The generosity of and access to welfare benefits varies much between countries where IPS has been tested, and it is fair to be concerned that the generous Scandinavian welfare system may challenge the efficacy of IPS as employment is not necessary to avoid poverty. The Organisation for Economic Co-operation and development (OECD) have raised concerns that generous disability welfare benefits may encourage income from welfare benefits rather than employment (25). One large European study commented that welfare benefit traps were an impediment to successful vocational employment overall, but not to IPS' effect size relative to other options (26). A meta-analysis reported that IPS was more effective in countries with less generous benefits, less active integration strategies between health and employment sectors and less robust employment legislative frameworks (17). Since this meta-analysis, more RCTs have been conducted in countries with a very generous welfare state, inviting the hypothesis to be re-investigated.

Employment regulations that govern employers' rights and flexibility on hiring practices, as well as rules governing termination of employment and the rights of temporary and contract workers, is hypothesized to influence the willingness of employers to hire new employees. The basic argument is that employers may be reluctant to hire patients with moderate or severe mental disorder in the context of strong legal protection against temporary contracts and legal protection against dismissal (27). It is fair to be concerned that this may challenge the efficacy of IPS.

A final factor that has been proposed to potentially impact the relative efficacy of IPS are labour market conditions. Recession (falling gross domestic product (GDP)) and high unemployment rates among individuals with low educational levels may challenge the efficacy of IPS, as the supply of labour force supposedly then on average is healthier. Studies have suggested that recession and high unemployment rates may challenge the efficacy of IPS, but findings are mixed (18, 26, 28).

IPS is an evidence-based alternative to the current train-and-place approach still dominating the western world. The request for RCT evidence for efficacy of IPS in every country and context are understandable as hypotheses of contextual factors' influence of IPS efficacy has

great face validity. Still, it is costly and time-consuming, slowing IPS implementation with years and decades. The randomization in eventual further trials may also be unethical as we now are aware of the detrimental effect of the control conditions.

IPS has been tested through randomised controlled trials in countries with diversity in generosity of welfare benefits, integration policies, employment regulations and labour market conditions. This heterogeneity provides a unique possibility to explore if evidence of IPS efficacy is generalizable across countries and contexts.

Aim of the study

This systematic review and meta-analysis aim to determine if we now can safely generalize IPS efficacy between countries and contexts. First, we will systematically review the RCTs of IPS for mental illness. Second, we will estimate the overall efficacy of IPS compared to treatment as usual by meta-analysis. Third, with meta-regression, we will examine if the efficacy of IPS challenged by generous welfare benefits, strong integration policies, strong legal employment protection rights and strong legal protection against dismissals.

Method

This systematic review and meta-analysis were conducted according to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (<http://www.prisma-statement.org>) following a predetermined, but unregistered protocol.

Inclusion and exclusion criteria

A study was eligible for inclusion if it was a randomized controlled trial (RCT) comparing individual placement and support with traditional vocational services/service as usual. Modified or enhanced IPS were to be excluded, and studies focusing solely on abuse were also to be excluded. Study participants had to have a mental illness and the outcome was competitive employment defined as permanent jobs paying commensurate wages available to anyone (not set aside jobs for individuals with disabilities) (29). The IPS in the trials had to demonstrate moderate to high fidelity, as measured by the IPS fidelity scale (30), or evidence that fidelity was adhered to needed to be included in the paper. Studies published in peer reviewed journals and in the English language after 1993 were included. This date was selected as it represents the earliest controlled

trials of IPS. Disagreements about inclusion and exclusion, two other researchers would assist (AM and MR).

Searches

The electronic databases PsychINFO, EMBASE and Medline were searched for published studies from January 1st, 1993 to September 10th, 2019. The search was a combination of keywords of mental illness, individual placement and support, and randomized trials. The reference list of included studies was also reviewed to increase coverage and identify studies the searches did not identify. The Cochrane Central register of controlled trials was searched using the search terms “individual placement and support” and “supported employment and mental illness”. The search strategies in PsycINFO, Medline and EMBASE are visualised in Figure 1. We also contacted active IPS researchers to locate other relevant studies. Two researchers (BB and TWH) independently went through every title and abstract according to the inclusion and exclusion criteria. The full texts of papers that met inclusion criteria were carefully reviewed to confirm inclusion. If there were disagreements, a third and fourth researcher (AM and MR) would assist.

Appraisal of quality

The Downs & Black Checklist (31) was used to assess the quality of included studies. The checklist consists of 27 items with five subscales that measure reporting, external validity, bias, confounding and power. This checklist was used in a previous meta-analysis of IPS from Modini et al (18) and shows strong criterion validity (0.90) and good interrater validity (32). As reported in the Cochrane review (15), blinding of employment specialist, clinical personnel and patients is not possible in these trials. As in the Modini meta-analysis we have also excluded questions 14 and 15 concerning blinding. Question 27 asking for a clinically important effect is modified to a yes (1 point) or no (0 point) for studies with less power than 0.80 with $\alpha = 0.05$ scored zero. Because of these modifications the total potential maximum score was 26 points. Scores of 12 or less were classified as overall poor quality and excluded. Two researchers (BB and TWH) independently assessed the quality of each included study and further discussed the results with one other researcher to take account of any considerations arising (AM).

Data extraction

The following variables were extracted from each included randomized controlled trial: sample characteristics, country of origin, length of follow-up, and competitive employment rate for the experimental and control groups. The data used as moderators were grouped under the following headlines:

Generosity of welfare disability benefits

This represents an index constructed by the OECD named *Compensation index* which describes access to welfare benefits, population coverage, duration and generosity. The index is composed of ten sub-components. These sub-components are measured according to a predefined score between zero to five, and are based on both qualitative and quantitative measures. The higher the score the more generous the welfare benefit, with easier access and longer duration. A score close to zero indicated less generosity, poorer access and shorter duration. The scores from all the sub-components were added to obtain the overall score, with the highest possible score of 50 for ten components. Traditionally, the USA and the UK have scored lower than countries with more generous welfare states like Germany, Switzerland and Scandinavian countries. Time series data for this index and the integration index and its subcomponents were made available by the OECD. These measures give us the opportunity to adjust our analyses for changes over time in indexes, compared to the more static scores reported in OECD reports (33, 34, 35).

Integration policies

This is measured through the *Integration index* constructed by the OECD and describes different employment and vocational rehabilitation schemes – their extent, permanence, and flexibility. It also consists of anti-discrimination legislation, suspension of welfare benefit and possibilities of combining work and benefits. This index is composed of ten sub-components and each sub-component has scores between zero and five, of which zero represents a less active state effort to integrate people into the workforce again. The index is based on a summative score from all these sub-components, and the highest possible score would be 50. A higher score would indicate a more active approach from the state.

Legal protection against employment dismissals

This index measures procedures and costs of individual dismissals. It's a summative index constructed by the OECD named *strictness of employment protection - individual dismissals (regular contracts)*. The index consists of nine indicators that capture procedural inconveniences employers meet in dismissal processes, notice periods, severance pay and difficulty of dismissal (36). The indicators are measured on a continuous 6-point scale derived from national statutes, and based on an established methodology (37). A higher score represents stricter regulations for the employer and more protective regulations for employees already employed, while a lower score means that employers to a greater degree can 'hire and fire' as they please. OECD has developed two versions of this index over time due to availability of more information. The first version is based on eight indicators from 1985-2013, while the second version includes information on maximum time to make a claim of unfair dismissal, and is based on nine indicators from 2008-2013. The second version is currently the main indicator of employment protection for individual dismissals used by OECD and is used when available.

Regulation of temporary employment

This index measures regulations on temporary employment. The index is constructed by the OECD and named *strictness of employment protection legislation for temporary employment*. The index consists of six indicators that include regulation of fixed-term and temporary work agency contracts and their duration (36). The index is based on the same methodology described under legal protection against dismissals and is also measured on a continuous scale from 0 to 6 in a summative score. A higher score represents stricter regulations on employer's scope to offer employees temporary contracts.

Unemployment, employment by educational attainment, economic growth and disability welfare benefit rate.

Data on each countries' disability welfare benefit receipt rate and employment by educational attainment rate was extracted from the OECD database. Data on GDP and the unemployment rate from the World Development Indicators (World Bank) online database were used to assess the economic situation in the countries where studies were carried out.

The data in the indexes are collected and systemized by the OECD (<https://data.oecd.org/>) and the data on GDP growth and unemployment rate are collected from World Bank

(<http://data.worldbank.org>). Time series data for employment regulation indexes and their individual indicators are available at OECD

(<http://www.oecd.org/employment/emp/oecdindicatorsofemploymentprotection.htm>), while time series data for the compensation and integration index and their individual indicators was made available from OECD upon request. Data for the generosity of welfare disability benefits index for Hong Kong and Bulgaria were extracted from Metcalfe et al. (17).

Time for inclusion of data

Data were extracted from the median follow-up time for each study. The median was calculated by extracting the start and end date for recruitment in each study. We added the follow-up time to the end date of recruitment and calculated the median between start of recruitment and the conclusion of follow-up. For the four indexes and their sub-components, we used last available data when there was no observations. For disability benefit reciprocity rate we used available data and for employment for those with lower education we used data from 2014 for most studies as this was the first time-series data from OECD, unless the median follow-up time was post 2014.

Statistical analysis

Random-effects meta-analysis and meta-regressions were performed as this approach allows the true effect to vary by study (38). A binary competitive employment rate (i.e. achieved / not achieved competitive employment) was the main outcome, which makes it possible to calculate risk ratios. The summary effect of the meta-analysis was presented as a risk ratio with a 95 % confidence interval. One meta-analysis comprising all studies was conducted to determine the overall efficacy of IPS compared to traditional vocational rehabilitation. Meta-regressions were conducted for the primary analysis which examined associations between IPS efficacy, and the four indexes developed by OECD to capture characteristics of disability policies and employment regulation. The secondary analysis examined the association between IPS efficacy and single indicators in the indexes to explore whether single variables yielded different results to the overall indexes. Finally, meta-regressions were carried out to examine associations between IPS efficacy and labour market conditions, assessed by GDP growth, unemployment rate, disability welfare benefit receipt rate and employment by educational attainment rate to assess labour market conditions. The meta-analysis includes Nordic registry studies that differ from the other studies as competitive employment is measured by registry data instead of self-reported data. Nordic registry

studies additionally have higher mean index values. Due to concern of confounding introduced by Nordic registry studies, we adjusted meta-regressions with a binary registry study indicator. Study site at country level is used as our unit of analysis (total $n = 32$).

Restricted maximum likelihood (REML) is applied to estimate the value of tau-squared (τ^2 , i.e. the estimated variance of true effects) (39) Heterogeneity between studies in the meta-analysis was assessed with Cochran's Q statistic and the I^2 statistic. We assessed publication bias visually with funnel plots and statistically with Egger's test and Duval and Tweedie's trim-and-fill method. The random-effects meta-analysis and meta-regressions were performed in Stata SE 16 (40) and Comprehensive Meta-Analysis Version 3.3 (41).

Results

Aim 1: Identifying RCTs on IPS for mental illness

The database search revealed 348 titles from 1993. All titles and abstract were examined independently by two researchers (BB and TWH). Eighty-eight articles met initial criteria and then full texts were examined, whereof 30 studies met our full criteria. Hoffmann et al. (42, 43) and Howard et al and Heslin et al (44, 45) report the efficacy of IPS for the same patient population at two follow-up periods, so we only included the latter study from both in our meta-analysis. The meta-analysis is based on 27 studies (Fig 1). Total sample size in these trials are 6651, with a mean of 207.8 (SD = 358.54). Median sample size is 118.5. The smallest trial consists of 37 and the biggest of 2055 persons.

(INSERT FIGURE 1 ABOUT HERE)

Three of the included studies have a majority of patients with moderate mental illnesses, mainly affective disorders (46-47), two studies included young patients with first-episode psychosis (48, 49), and two studies were for military veterans with PTSD (50, 51). Three studies had requirements for inclusion beyond mental illness; one required that the patients had prior involvement with the criminal justice system (52), and two required patients to be receivers of some form of disability insurance (47, 53). One of these studies is the Drake et al., (2013) study.

This is a large study that the previous review chose to exclude, mainly because of many sites and the large sample size (17). This may have moderately biased the results in Metcalfe et al., (2018). The Drake study is treated as one site only in our review, and therefore not excluded. There was also a range in the control conditions, from high-quality version of treatment as usual (TAU - vocational rehabilitation) and non-integrative SE (46, 54, 55) to the possibility to apply for other vocational services (47).

Studies include trials from Asia (Japan, Mainland China, Hong Kong), Australia, North America (Canada and the United States) central and northern Europe (Italy, Switzerland, Germany, Netherlands, Norway, Sweden, Denmark and the United Kingdom) and Eastern Europe (Bulgaria) (Table 1). We excluded two studies from Scandinavia, and one from U.S. that used a modified version of IPS with patients with moderate mental illness and substance abuse (56, 57, 58). One Norwegian study with enhanced IPS and no fidelity report were excluded (59), and we also excluded one randomized trial performed at a methadone clinic in U.S (60), with primarily opioid use disorders.

(INSERT TABLE 1 ABOUT HERE)

Aim 2: Meta-analysis of the overall efficacy of IPS

The overall meta-analysis (Figure 2) shows that recipients of IPS were more than twice ($RR = 2.07$, $CI\ 95\% 1.82-2.35$, $p < 0.0001$) as likely to find competitive employment than recipients of TAU. The homogeneity test, Q , is 75.57 with a p -value of < 0.0001 , which indicate that heterogeneity is present. The between-study heterogeneity, $I^2 = 59.82$, implies that about 60% of the variability in the effect-size estimates is due to between-study differences instead of sampling variation. This is considered moderate to high according to Higgins et al., 2003 (61). The between-study variance, τ^2 , is 0.06. The effect size at ≤ 12 months follow-up was $RR\ 2.61$ ($CI\ 95\% 2.08-3.28$, $p < 0.0001$), and at > 12 months follow-up $RR\ 1.96$ ($CI\ 95\% 1.70-2.25$, $p < 0.0001$). However, as these samples are smaller ($n = 8$ and $n = 24$) caution is warranted for conclusions, especially regarding the effect size for ≤ 12 months follow-up. There is evidence for a decrease in IPS efficacy over follow-up time, as tested by including a binary covariate in a meta-regression

(log(RR) = -0.36, CI 95% -0.66 to -0.005, p -value = 0.047). There is also evidence to support a decrease in IPS efficacy using the year the study was conducted as a discrete covariate in meta-regression (log(RR) = -0.03, CI 95% -0.04 to -0.01, $p < 0.001$) (see Supplementary material, Figure S7 for a graphical presentation).

(INSERT FIGURE 2 ABOUT HERE)

Aim 3: Meta-regressions to determine if IPS efficacy is challenged by country- and context specific factors

Table 1 summarizes the studies and the moderators.

Meta-regressions were carried out to test for moderators of IPS efficacy adjusted for registry study (Figure 3, see Supplementary material Table S3 for unadjusted and adjusted estimates). We found evidence for a marginal decrease in efficacy of IPS with increases in the index for legal protection against employment dismissals (log(RR) = -0.15, CI 95% -0.28 to -0.02, p -value = 0.025).

There was no support for a moderating effect for IPS efficacy for the generosity of welfare benefits index (log(RR) = -0.02, CI 95% -0.05 to 0.01, p -value = 0.23), nor the integration policies index (log(RR) = -0.03, CI 95% -0.07 to 0.004, p -value 0.08), or the regulation of temporary employment index (log(RR) = -0.16, CI 95% -0.38 to 0.05, p -value 0.14).

(INSERT FIGURE 3 ABOUT HERE)

Economic growth, unemployment, disability welfare benefit rate and employment by educational level

There was no support for a moderating effect of labor market conditions, including GDP growth (log(RR) = 0.02, CI 95% -0.03 to 0.06, $p = 0.54$), unemployment rate (log(RR) = -0.04, CI 95% -0.09 to 0.02, $p = 0.18$), disability welfare benefit rate (log(RR) = -0.03, CI 95% -0.12 to 0.06, $p =$

0.56), or employment rate for people with low education ($\log(RR) = -0.005$, CI 95% -0.04 to 0.03, $p = 0.76$) (see Supplementary material Table S8 for unadjusted and adjusted estimates).

Secondary analysis for sub-components in the indexes

Secondary analyses were carried out to determine if there were any moderating effect of single indicators in indexes on the efficacy of IPS. For an overview of the single indicators explored as moderators in the efficacy of IPS, we refer to Table S4-S7 in Supplementary material.

There was no evidence of effects of single indicators in the adjusted analyses for generosity of welfare benefits, the integration policies index, or the regulation of temporary employment index.

However, in the legal protection against employer dismissals, there was evidence to support a moderating effect of notification procedure ($\log(RR) = -0.09$, CI 95% -0.18 to -0.01, $p = 0.029$) and definition of justified or unfair dismissals ($\log(RR) = -0.07$, CI 95% -0.14 to -0.004, $p = 0.04$) (see Supplementary Table S6 for unadjusted and adjusted estimates).

Publication bias

Visual inspection of the funnel plot of standard error and precision indicates asymmetry consistent with publication bias in favour of positive findings: Smaller studies tend to have higher effect size than larger studies (Supplementary material, Figure S1, S2 and S3). The Egger's test indicates publication bias ($\beta_1 = 1.64$, SE 0.44, $p = 0.0002$). Duval and Tweedie's trim-and-fill method (specified to look for missing studies to the left of the summary effect) imputes nine studies. When these are added, the adjusted summary effect size for the meta-analysis is reduced from RR 2.07 to RR = 1.83 (CI 95% 1.57-2.14).

Discussion

The primary aim of this systematic review and meta-analysis was to examine whether the efficacy of IPS compared to traditional vocational rehabilitation was equally strong when implemented in countries with more generous disability welfare benefit, integration policies and also stricter employment regulations on whether employers can hire, fire and regulate temporary work. The systematic review identified 27 randomized controlled trials from 14 different countries. IPS is more than twice as effective (RR = 2.07, CI 95% 1.82-2.35, $p < 0.0001$) as traditional vocational rehabilitation in getting people with mental illness into competitive work, which is line with past

reviews (14-18). IPS efficacy is not challenged by generous disability welfare benefits, integration policies or legal restriction on temporary employment. IPS efficacy is slightly reduced by legal employee protection against 'hire and fire' flexibility.

The efficacy of IPS is apparently somewhat stronger in countries with a 'hire-and-fire' attitude than in countries with stricter legal protection for employees' rights against dismissals. Legal regulations aimed at protecting employees may in turn have the unforeseen side-effect in increasing employers' reluctance towards job seekers with mental disorders, which may be understandable. On the opposite side regulations could also lead to higher job-retention if first accepted, higher employee rights to higher wages and paid sickness leave. This could support job retention, and more stable economic living conditions for people with severe mental illness. IPS needs to function and possibly adapt to conditions where labour rights are high. We acknowledge that the labor markets work quite differently across countries, and the hypothesis that the efficacy of IPS should vary between labor and welfare systems has face validity. The lack of clear effect moderation is perhaps reassuring from an implementation perspective, though still somewhat surprising. This analysis did not find an association between the efficacy of IPS and GDP growth, in contrast to a previous meta-analysis (18). Further we found no association with disability welfare benefit rate, unemployment rate or employment by educational attainment compared to traditional vocational rehabilitation.

The main aim of this study is if IPS efficacy can safely be generalized between countries and contexts with rather different policies and welfare systems. We believe our study strongly supports generalization. We have used a whole range of highly relevant indexes developed by the OECD, and we have investigated how different policies may challenge the efficacy of IPS. We are thankful to the OECD for enabling this analysis by making available a whole range of relevant indexes for topics here investigated which have previously not been available for IPS meta analyses. Our nil finding on generosity and active state integration differs from the results of a recent meta-analysis addressing some of the same questions (17). Our meta-analysis has included 6 more trials, included two trials from Scandinavia which expands the variation on key indexes on the "left" side of policies. We also included populations of patients with moderate mental illness. Our study included only the index on regulation on individual dismissals, not collective dismissals that we believe would affect all employees, not only those with mental illness. We have also included an index describing regulations on temporary contracts.

Our analysis concludes that concerns over reduced IPS efficacy in more generous and active welfare states may be dismissed. Although IPS seems to become less effective under stricter employment regulations relating to flexibility of 'hiring and- firing', IPS still remains more than twice as effective as traditional vocational rehabilitation even in generous welfare states. This is an important nil finding because it means the requirement to conduct efficacy randomized trials before implementation within a country is unnecessary as the efficacy of IPS is generalizable to very different welfare states.

We found evidence of some associations between IPS efficacy and single indicators in indexes in our secondary analysis. These findings could be a result of Type I error (chance findings as a result of a high number of analyses). The number of positive findings among secondary analyses are not higher than what could be expected as chance findings, and should be interpreted with caution. Still, the findings underline that legal protections against dismissals have a small and negative association with IPS efficacy. The procedures for notification of dismissals and the definition of justified or unfair dismissals indicates that more restrictions on employer's flexibility to fire, reduces IPS' relative efficacy.

Strengths and limitations

There are two main strengths to this systematic review and meta-analysis that enhance its validity. First, it covers more studies and more diverse welfare contexts than previous reviews and included a search of trial registries in order to reduce, but not eliminate, publication bias. All studies were examined regarding the fidelity of the IPS intervention and reviewed by two independent researchers. Secondly, indexes and variables used to compare disability policies, employment regulations and labour market variables are gathered from the OECD and World Bank, and provide good internal and external validity. We believe this provides robust and objective data on the efficacy of IPS over traditional vocational rehabilitation across very different welfare states.

All reviews of IPS efficacy are limited by the variation in definitions of outcomes in different RCTs. In the IPS literature competitive employment is defined differently between studies, some define it as 1 day's work (62), and others as a month (44, 63) during varying time frames. The way in which this outcome is measured also differs across studies. Two studies used national registry data for all employment outcomes (46, 55) providing a more reliable and accurate source of employment than self-reporting and log-books which have been used in all other IPS

trials. This more robust data appears to reduce the observed effect. To account for the reduced effect estimate in registry studies, we adjusted all analyses for a binary registry study covariate. As there are only two registry studies, the distribution of this covariate is highly skewed. The meta-regressions are performed on a small sample, so the introduction of an additional variable will increase uncertainty and reduce power for statistical inference. As the main results for our indexes change from significant to nonsignificant with the introduction of the additional covariate in our meta-regressions, we have chosen to include all unadjusted and adjusted analyses in the Supplementary material. However, we believe the inclusion of the additional covariate reduces the problem of confounding, thereby providing more precise estimates for the indexes than the unadjusted models do. A related issue is whether competitive employment is the best occupational outcome to examine. Traditional vocational rehabilitation schemes may be more likely to lead to subsidized employment than competitive employment, but for many this may be a satisfying and potentially more stable than competitive employment.

The variation in control conditions in the included trials is another limitation. The control conditions are all labelled as traditional vocational rehabilitation, but there is diversity between high quality supported TAU (46) and possibility of vocational support (47).

In all meta-analyses, publication bias in favour of positive findings may inflate observed effects. Our funnel plot (Supplementary Figure S1-S3) showed some asymmetry that could be explained by a small study effect. However, publication bias analysis and imputation using the trim-and-fill method did not alter our main conclusion on the efficacy of IPS.

The lack of blinding of participants, clinicians and evaluators is a limitation across all the literature which cannot be safeguarded against as in a traditional RCT. This is difficult in all research relating to all psychosocial interventions and may increase the efficacy of the intervention under investigation.

Conclusion

IPS is now well established as a more effective vocational rehabilitation for severe mental illness than more traditional train and place approaches. This result is consistent across countries with very different disability policies, employment regulations and labour conditions. There are now 27

randomized trials confirming this. Further trials are not necessary as the IPS efficacy may now be safely generalized between countries and contexts. When it comes to new populations in need of effective vocational rehabilitation like IPS, more trials are needed (64). Our conclusion stands for severe and moderate mental illness.

This should inspire both further implementation and funding of IPS across different countries, but also move research and evaluation from efficacy to effectiveness. The pressing issue now is how to make IPS replace current practices, and create infrastructure that supports implementation (65). We are yet to see large trials testing the effectiveness of high fidelity IPS, when implemented in larger scale, in regular clinical practice, and with more diverse populations. We also need more implementation and evaluation research to understand the barriers and factors that hamper the implementation or make it less successful. The current expansion of services in various countries (including Norway and the UK) provides an opportunity to explore implementation issues.

IPS is an intervention that operates in the crossover between mental healthcare and welfare commissioners. It challenges attitudes and traditional ways of working. The sectorial responsibility for IPS must also be addressed more clearly as it sits between public sectors responsible for welfare services and health services, which may confuse issues of ownership and responsibility.

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Table 1. Studies, year of publication, and moderators

Study	Year	<i>n</i> (IPS)	Country	Generosity of disability benefits	Integration policies	Legal protection against dismissals	Regulation of temporary employment	Unemployment rate (%)	Employment by educational attainment (%)	GDP growth (annual %)	Disability welfare benefit rate (%)
North America											
Drake	1996	143	USA	20	25	0.26	0.25	6.1	55	4.03	5.84
Drake	1999	152	USA	20	25	0.26	0.25	5.7	55	2.7	5.84
Lehman	2002	219	USA	20	25	0.26	0.25	4.5	55	4.5	5.84
Gold	2006	143	USA	20	25	0.26	0.25	4.5	55	4.5	5.84
Latimer	2006	149	Canada	16	23	0.92	0.25	7.7	56	3.0	4.30
Mueser	2004	204	USA	20	25	0.26	0.25	4.5	55	4.5	5.84
Bond	2007	187	USA	20	25	0.26	0.25	4.7	55	1	5.84
Twamley	2008	30	USA	20	25	0.26	0.25	4.6	55	2.9	5.84
Davis	2012	42	USA	20	25	0.49	0.33	9.3	55	-2.5	5.84
Drake	2013	2055	USA	20	25	0.49	0.33	8.9	55	1.6	5.84

Bond	2015	43	USA	20	25	0.49	0.33	8.1	55	2.3	5.84
Davis	2018	271	USA	20	25	0.49	0.33	5.2	55	2.9	5.84
Asia and Australia											
Killackey	2008	41	Australia	21	28	1.42	0.88	4.8	60	2.8	5.40
Wong	2008	92	Hong Kong	20				7.3		1.7	
Tsang	2009	163	Hong Kong	20	25	0.26		4.8		7.0	5.84
Oshima	2014	37	Japan	21	27	1.37	0.88	3.9		1.7	1.97
Waghorn	2014		Australia	21	28	1.13	0.79	5.6	60	1.9	5.4
Zhang	2017	54	China			3.26	1.75	4.6		6.9	
Killackey	2018	73	Australia	21	28	1.57	1.04	5.7	58	2.8	5.40
Europe											
Burns	2007	156	Germany	32	35	2.68	1	10.7	58	1.7	4.44
			UK	21	28	1.26	0.38	4.6	61	2.3	7.0

			Italy	26	18	2.76	2	7.7	50	1.6	3.25
			Switzerland	37	23	1.6	1.13	4.4	68	2.8	5.38
			Netherlands	28	34	2.88	0.94	4.6	59	2.0	8.27
			Bulgaria	25				10.1		6.4	
Heslin	2011	188	UK	21	29	1.26	0.38	5.3	61	2.5	7.0
Hoffmann	2014	100	Switzerland	32	27	1.5	1.38	4.8	68	3	5.38
Michon	2014	71	Netherlands	24	35	2.84	1.17	3.4	59	-3.7	8.27
Bejerholm	2015	41	Sweden	30	36	2.52	0.79	8	66	-5.2	10.84
Viering	2015	127	Switzerland	32	27	1.5	1.38	4.5	69	1.0	5.38
Reme	2019	227	Norway	33	37	2.23	3.42	4.3	61	2.0	10.31
Christensen	2019	243	Denmark	28	37	2.1	1.79	6.2	61	2.3	7.16

1 Note: Study: First author, Publication Year: Year of publication. Country: Study site. 1. Generosity of disability benefits: Higher scores indicate more generous benefits, on
2 an index ranging from 0 to 50. 2. Integration policies: Higher scores indicate more integrative policies, on an index ranging from 0 to 50. The employment protection
3 regulation against dismissals for individual contracts (regular contracts), and employment protection regulation for temporary contracts indexes ranges from 0 to 6, with
4 higher scores indicating stronger employee protections. Unemployment rate at time of the study. Employment by educational attainment: Employment rate (percent) among
5 people with low formal education. GDP growth: Gross domestic product growth rate, annual, at time of the study (time of study = two years before publication date to
6 account for publication time). Disability benefit rate: Percent of working-age population in the country receiving long-term disability benefits. Generosity of disability =
7 Compensation index: Hong Kong from Metcalfe et al. 2018 (19)



PRISMA 2009 Flow Diagram

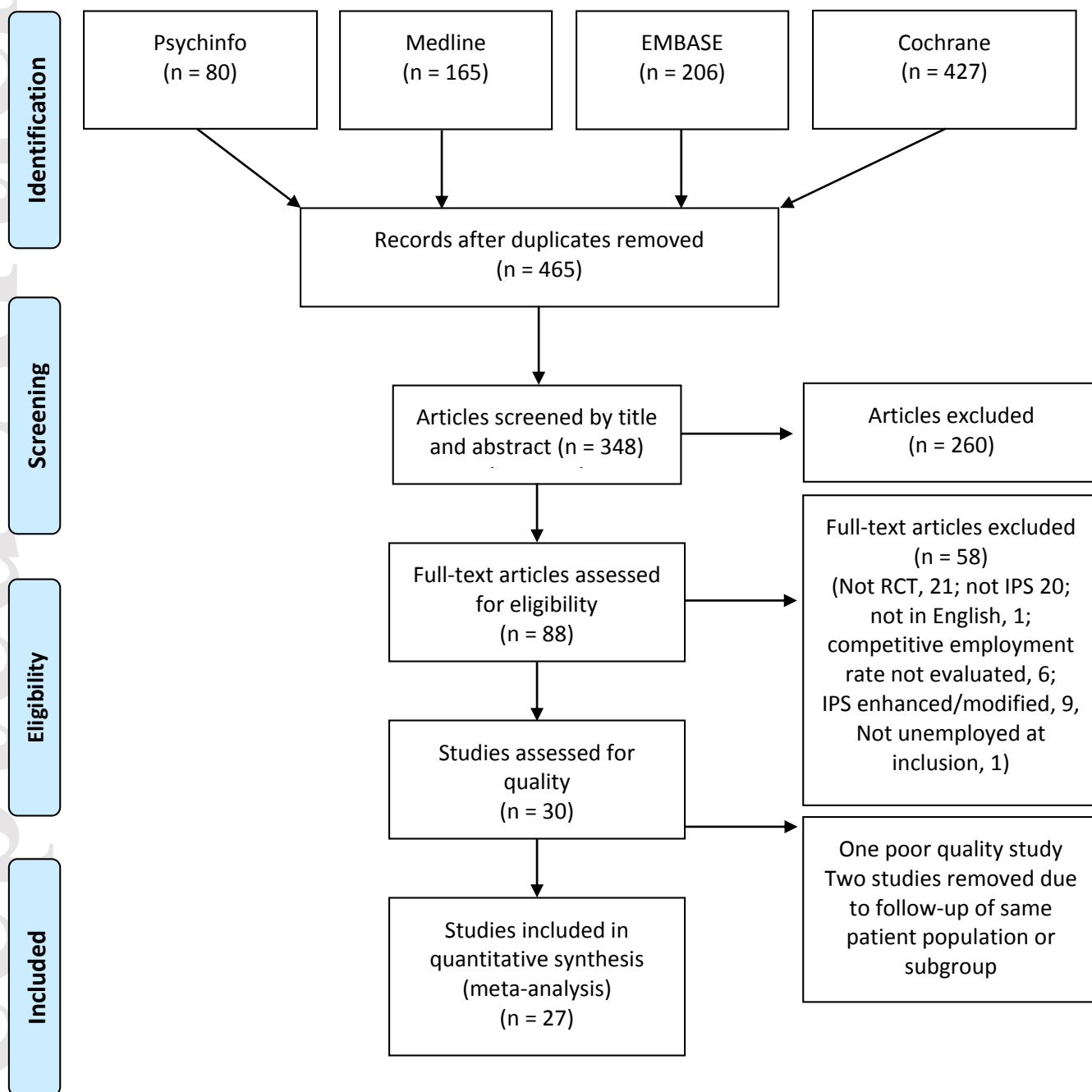
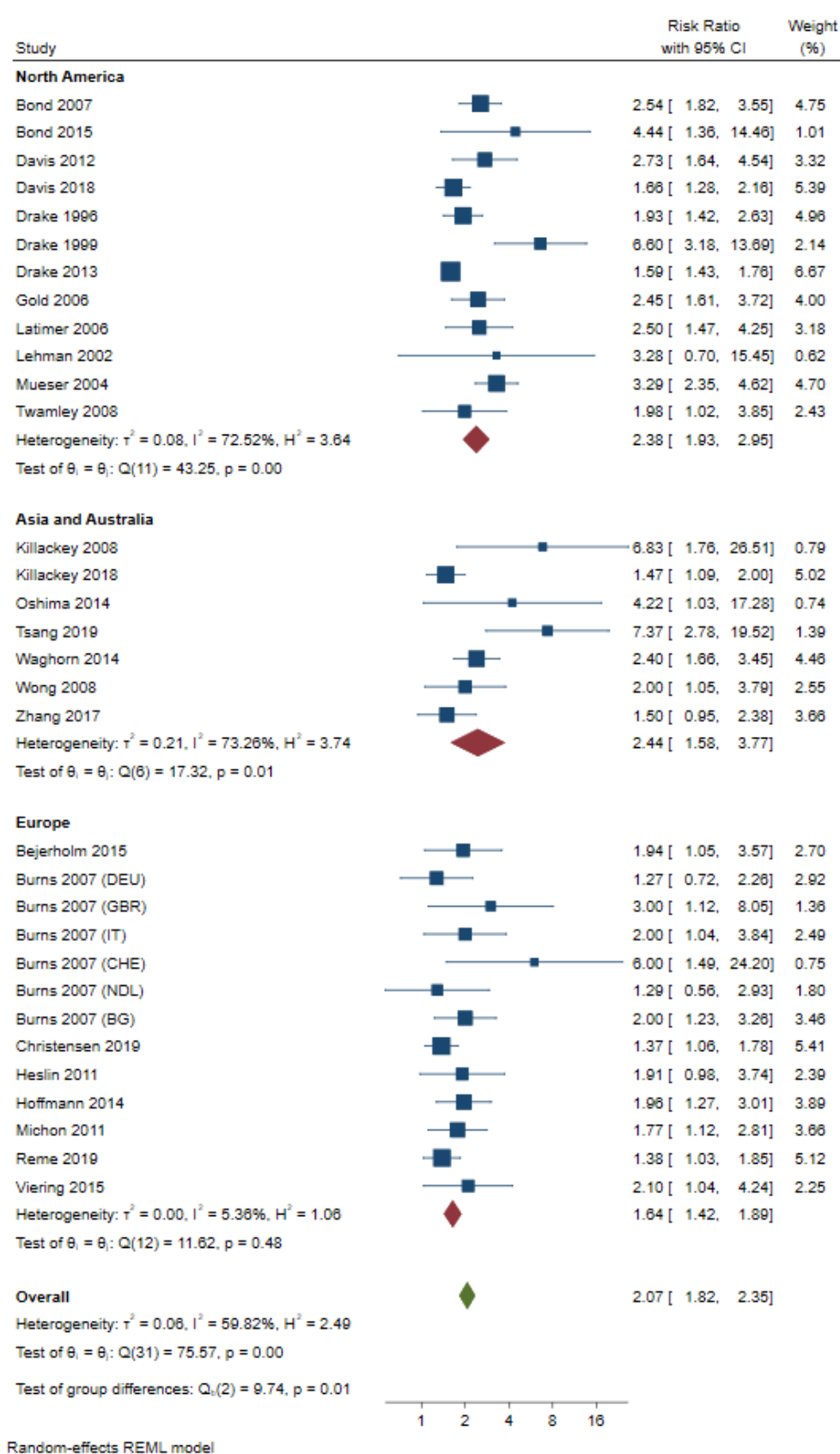


Figure 1. Systematic literature search and quality assessment. Individual placement and support; randomized controlled trial, mental illness.

Fig 2. Relative risk of competitive employment comparing IPS to the control condition



Note: Total number of sites: 32.

Figure 3. Meta-regression for indexes

