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The association between employment and the health of people with intellectual disabilities: a systematic review

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Declaration of Interest

The authors report no conflicts of interest

The association between employment and the health of people with intellectual disabilities: a systematic review

Abstract

Background. There is strong evidence indicating that paid employment is generally good for the physical and mental health of the general population. This systematic review considers the association between employment and the health of people with intellectual disabilities.

Method. Studies published from 1990 to 2018 were identified via electronic literature databases, email requests, and cross-citations. Identified studies were reviewed narratively.

Results. Twelves studies were identified. Studies were generally consistent in reporting an association between being in paid employment and better physical or mental health status

Conclusion. This review supports the view that the well-established association between employment and better health is similar for adults with and without intellectual disabilities. However, evidence establishing causality is lacking and further research to determine specific health benefits attributable to employment for people with intellectual disabilities and the causal pathways that operate is required.

Keywords: employment; health; intellectual disabilities

4,805 words not including appendix, references or table

Introduction

There is strong evidence to show that paid employment is generally good for people's physical and mental health (NICE, 2015, van der Noordt et al., 2014). Evidence demonstrates that having a job is associated with a greater sense of autonomy, improved self-reported well-being, reduced depression and anxiety symptoms, increased access to resources to cope with demands, enhanced social status and unique opportunities for personal development and mental health promotion (Modini et al., 2016). Findings from longitudinal studies suggest that employed persons, compared to unemployed persons, have lower anxiety, lower levels of depression, lower depressive affect, better mood, lower psychological distress, fewer psychological symptoms, higher perceived quality of life (Hergenrather et al., 2015a), and better physical health (Hergenrather et al., 2015b). Whilst establishing a clear causal direction in the relationship between employment and health is difficult due to health being potentially both a cause and a consequence of employment status, the latter two systematic reviews' focus on longitudinal studies provides stronger evidence for a causal link between being in employment and better health.

The benefits of work are most apparent when compared with the detrimental effects of becoming unemployed on physical and mental health, with almost all studies on the effect of unemployment on health concluding that unemployment is bad for your health (Norström et al., 2014) and the detrimental mental health effects of unemployment being well-documented (Modini et al., 2016). Unemployment is also associated with increased rates of limiting long-term illness, mental illness and cardiovascular disease, an increase in overall mortality, in particular due to suicide (Roelfs et al., 2011, Milner et al., 2013), much higher use of medication and much worse prognosis and recovery rates (Marmot Review, 2010).

Typical forms of activity and employment opportunities for people with intellectual disabilities include segregated day programs and sheltered workshops, and supported employment in competitive settings with typical wages and ongoing individualized support services (Owen et al., 2015). In view of the impact of employment on health and well-being, internationally policy concerning people with intellectual disabilities has been directed towards improving the employment opportunities of people with intellectual disabilities (Blamires, 2015, Siperstein et al., 2014), with policy favouring community-based employment (Beyer et al., 2010). It has been estimated that 65% of people with intellectual disabilities in England without a job would like one (Emerson et al., 2005). However, despite a succession of English Government initiatives relating to the employment of people with intellectual disabilities (Blamires, 2015) employment rates remain extremely low. The overall paid/self-employment rate for working age adults with intellectual disabilities in England receiving long-term support from social care agencies was 5.7% in 2016/17 (NHS Digital, 2017). Similarly, in the United States, despite substantial investment to promote employment for people with intellectual disabilities, the employment rate showed no improvement over the period of a decade (Siperstein et al., 2014).

A review on the impact of supported employment on the socio-emotional well-being of people with intellectual disabilities found that overall outcomes for people with intellectual disabilities entering employment were positive, particularly in terms of quality of life (QoL), well-being and autonomy (Jahoda et al., 2008). Subsequent studies have also found that people with intellectual disabilities in employment report better QoL (Memisevic et al., 2016) and that QoL is higher for those in open employment compared to sheltered employment (Kober and Eggleton, 2005). A more inclusive setting (e.g. competitive/integrated employment) is also generally associated with higher levels of job satisfaction for people with intellectual disabilities (Kocman and Weber, 2018, Akkerman et al., 2016). Conversely,

people with intellectual and developmental disabilities who lack productivity more broadly describe a significant void in their life due to the absence of both meaningful activity and social connections (Lysaght et al., 2017). Overall life satisfaction has been found to be lowest for people with developmental disabilities (60% of whom had intellectual disabilities) who were 'idle' (non-student with no paid work, volunteer work, or housework) or who only reported housework as an activity (Salkever, 2000).

However there are some mixed findings, with studies finding no association between employment status and overall life happiness (Blick et al., 2016) or QoL (Verdugo et al., 2006) for people with intellectual disabilities. Indeed, for some people with intellectual disabilities in employment there may be a lack of perceived social acceptance (Jahoda et al., 2008) and for some it may serve to highlight the limits of their competence and marginal social status (Jahoda et al., 2009). Those in integrated employment can feel lonely (Gascon, 2009), with some people with intellectual disabilities feeling alienated or left out from the rest of the workforce (Wistow and Schneider, 2003, Petrovski and Gleeson, 1997). Further, employment for people with intellectual disabilities can also be tenuous with high rates of job loss (Jahoda et al., 2009, Howarth et al., 2006, Lemaire and Mallik, 2008).

There is, then, some evidence that employment can promote the QoL, well-being and autonomy of people with intellectual disabilities, although it is important to be mindful of potential negative effects of employment (Gascon, 2009). Less attention has been paid to the issue of whether employment can promote the physical and mental health of people with intellectual disabilities. As yet, no review has addressed the question of whether or not the potential benefits of employment are translated into improved physical and mental health for people with intellectual disabilities. In this review, we consider the association between employment and the physical and mental health (including challenging behaviour as an indicator of mental health) of people with intellectual disabilities. Employment is taken to

mean paid employment (e.g. competitive employment, supported employment) and does not include sheltered workshops, day services, and forms of occupation where no remuneration is received or remuneration is below the appropriate minimum wage. The aim of the review is to summarise existing international research, published in the English language, on the association between employment and outcomes for people with intellectual disabilities in relation to direct measures of physical or mental health, including challenging behaviour as an indicator of mental health.

Method

The review was conducted in accordance with PRISMA guidelines (Moher et al., 2009). Electronic database searches were conducted using Medline, PsycINFO, and Cinahl (all on EBSCO) and Web of Science. In addition, a request for information on research relevant to the review was sent to the Intellectual Disability UK Research mailing list, the International Association for the Scientific Study of Intellectual and Developmental Disabilities (IASSIDD) Health Special Interest Research Group (July 2017), and members of the European Union of Supported Employment (EUSE; September 2017). In addition, the reference lists of studies meeting the inclusion criteria were searched (see Fig. 1).

Word search terms relating to employment and health were collated by examining terms occurring in existing systematic reviews relating to employment and physical or mental health in the general population (Hergenrather et al., 2015b, Hergenrather et al., 2015a, Modini et al., 2016) and other relevant literature reviews (Kocman and Weber, 2018, Lysaght et al., 2012, Beyer and Robinson, 2009). Word search terms were used to identify relevant MeSH/Cinahl headings and Index terms in PsycINFO. Three blocks of search terms were developed and combined with the Boolean operator 'and': i. terms for employment; ii, terms for physical or mental health; and iii. terms for intellectual disabilities which have been used

in previous systematic reviews (e.g. Robertson et al., 2017b, Robertson et al., 2017a).

Searches were initially run in June 2017 and subsequently updated in May 2018. An example of a database specific search strategy (Medline) is given in Appendix 1.

Inclusion/Exclusion Criteria

Articles were required to meet all the following inclusion criteria: peer reviewed; English language full text; published from 1990 to 2018; quantitative research, qualitative research, evaluation or audit; samples where 75% or more have intellectual disabilities or mixed samples where results are disaggregated for people with intellectual disabilities; study has participants aged 18 years or more; includes quantitative or qualitative data regarding the association between paid employment (as the independent variable), and the physical or mental health (including challenging behaviour) of people with intellectual disabilities (as the dependent variable).

The following exclusion criteria were applied: not peer reviewed or peer review status unclear; any study employing any research design with a sample size of less than 10 for participants in employment (i.e. excluding controls not in employment); reviews, letters, commentaries, editorials, meeting or conference abstracts; studies on conditions where intellectual disabilities cannot be assumed (e.g. cerebral palsy) where results not disaggregated for people with intellectual disabilities; studies on specific syndromes associated with intellectual disabilities with the exception of Down syndrome which is the most common genetic cause of intellectual disabilities (Sherman, Allen, Bean, & Freeman, 2007); studies where reported outcomes are not direct indicators of physical or mental health e.g. general morale, self-esteem, QoL (unless specific health related QoL domain reported), suboptimal mood, loneliness, independence, social inclusion, sense of identity; studies on

forms of occupation where no remuneration is received; studies on sheltered workshops or forms of day service provision.

Initially, titles and abstracts were used to exclude studies which were obviously not within scope (first author). A random sample of 20% of all search results (264 articles) was assessed by a second reviewer. There were three instances of disagreement, and in all cases articles were not ultimately included in the final review (overall agreement 98.9%; Kappa .818). Those retained for further screening were those for which relevance could not be assessed without accessing full text, or those that were chosen as potentially within scope. These studies were screened by the first and last author and discussed until consensus was reached on whether or not they met the inclusion criteria. All relevant studies were included in the review regardless of methodological quality. Study data were extracted from full text articles and entered into an Excel database with regard to: authors, year, country, main focus of study, study design, sample source, key sample features, sample size, sample age range (mean, SD and median), sample living situation, percentage of sample male, measures employed, and main findings.

Quality Assessment/Risk of Bias

Study quality was assessed using the Mixed Methods Appraisal Tool (MMAT) which was designed for the appraisal stage of systematic reviews that include qualitative, quantitative and mixed method studies and allows reviewers to concomitantly appraise most common types of study methodology and design (Pluye et al., 2011). In the MMAT, primary studies (or mixed method study components) are rated in relation to four specific methodological quality criteria depending on study type: qualitative; quantitative randomized controlled (trials); quantitative non-randomized; or quantitative descriptive studies. The number of the criteria met is reported in the form of an asterix (*) for each criterion met. The MMAT is an efficient tool, but reliability needs further improvement, particularly for two

items relating to qualitative studies including the sentence ‘appropriate consideration’ (Souto et al., 2015).

MMAT scores were entered into the Excel database. All extracted data in Excel were subsequently checked for accuracy and completeness by the last author. Whilst a third reviewer was available to resolve any disagreements, none arose. Results were collated, summarised and reported via a tabulation of key data, descriptive numerical summary of included studies (e.g. number with particular research designs) and a descriptive narrative summary of the results in relation to mental and physical health outcome measures. Due to variation in the methodology of included studies, meta-analysis was not appropriate.

Results

Electronic database searches identified a total of 2,059 records, with 1,318 remaining following the removal of 741 duplicate records. Following screening by title and abstract, 1,292 were excluded, leaving 26 for consideration of full text, of which 10 were included in the review along with 2 additional articles identified via other sources (cross-citations/email requests) giving a total of 12 articles (12 individual studies) (see Fig. 1). Studies are summarised in Table 1 and described narratively below.

Figure 1 Here

Geographical spread & study design

All studies were from high income Anglophone countries: three from the UK generally, plus one each from Scotland, Wales, and England. There were three from Australia, and one each from Canada, Ireland, and the US. Nine of the studies were cross-sectional (three of which were based on secondary analysis of large scale study data), and three were longitudinal.

Table 1 Here

MMAT Quality Appraisal

Information on MMAT study types and scores is given in the first column of table 1. With the exception of one mixed methods (MM) study, all studies, and the MM study quantitative component, fell within the MMAT category ‘quantitative non-randomized’. Four studies met all MMAT criteria. Only two studies, and the quantitative component of the MM study, did not meet the QNR criterion one ‘are participants recruited in a way that minimizes selection bias?’. All studies met the criterion two ‘are measurements appropriate?’. Four studies, and the quantitative component of the MM study, did not meet criterion three ‘In the groups being compared are the participants comparable or do research control for differences between groups?’ (e.g., did not control for level of intellectual disabilities or gender). Three studies did not meet criterion four ‘are there complete outcome data/acceptable response rate?’. The qualitative component of the MM study did not meet the criteria for appropriate consideration given to ‘how findings relate to the context’ and ‘how findings relate to researchers’ influences’.

Employment and Physical Health

Self-rated health

Most commonly, studies included self-rated health as an outcome measure. For people with intellectual disabilities living in general households in the UK, being employed for 16 or more hours per week was associated with more positive self-rated health (OR 4.31, 95% CI [1.64-11.31]) (Emerson et al., 2014). For people with mild/moderate intellectual disabilities living in private households in the UK, those in paid employment had significantly better self-rated health than those who were unemployed (Emerson and Hatton,

2008). Those not in paid employment were more likely to have 'not good' versus 'fairly good/very good' self-rated health (OR 1.31, 95% CI not stated, $p < .001$; by gender interaction (stronger association for women)). However, hardship (OR 2.57, $p < .001$) was more strongly associated with health status than employment status. For people with intellectual disabilities aged 40 to <65 eligible to receive services in Ireland, employment status was significantly associated with self-rated health (fair/poor health: paid employment 8.3%, sheltered employment 10.8%, 'perceived employment' 7.7% and unemployment 14.7%) (McGlinchey et al., 2013). However, this was not statistically significant once age, level of intellectual disabilities, gender, type of residence and level of education were controlled for.

Two studies were based on secondary analysis of data from a cohort born in 1970 in the UK with intellectual disabilities, borderline intellectual functioning (BIF) or no intellectual disability (ND). Economically inactive participants had a greater prevalence of poor self-rated health compared to participants in full-time employment across age and participant groups, with prevalence increasing in a dose-dependent relationship with number of exposures to economic inactivity (Emerson et al., 2018a). Overall, the results suggest that the nature of the well-established association between employment and better health is similar for British adults with and without intellectual impairments although the magnitude of effect sizes involved differed. The second analysis, based on data from the same cohort at ages 30, 34 and 42, found that cohort members with intellectual disabilities or BIF were more likely to be exposed to non-standard employment (NSE) and job insecurity than other cohort members (Emerson et al., 2018b). At all three ages and for all three groups, those exposed to NSE or job insecurity were more likely to have poorer self-rated health status. In general, those who transitioned out of economic inactivity (EI) to either NSE or standard employment had significantly better self-rated health than those who remained economically inactive. The

strength of this association was generally weaker for participants with intellectual impairments and for those transitioning into NSE (when compared to standard employment). However, the latter effect was more commonly seen among other participants rather than participants with intellectual impairments. In all analyses, transitioning from NSE to EI was associated with significantly poorer health (when compared to remaining in NSE), while there were no significant differences in health status between those transitioning from NSE to standard employment (when compared to remaining in NSE).

Other physical health outcomes

One study reports health related QoL data for people with intellectual disabilities in Wales in supported employment (SE), day services (DS) and employment enterprises (EE) (Beyer et al., 2010). Overall, supported employees reported better health than people with intellectual disabilities in EE or DS, and this was statistically significant for objective health QoL scores (mean (SD) scores: SE 13.2 (1.8), EE 11.2 (2.4), DS 10.1 (2.3), ND co-workers 14.2 (0.8)), but not for subjective health QoL scores. One study on factors associated with polypharmacy in people with intellectual disabilities in Australia found that polypharmacy was less likely in those who were employed (9.1%, 95% CI [3.6–21.1]) compared to those who were unemployed (24.3%, 95% CI [19.9–29.3]) when adjusted for age, sex, and severity of intellectual disabilities (OR 2.72, 95% CI [1.26–5.87]) (Haider et al., 2014). Finally, one Canadian study found that for people with intellectual disabilities who had experienced a behavioural crisis, being unemployed for more than one month was associated with use of an emergency department in response to crisis (absolute risk increase 0.37, 95% CI [0.21, 0.51]) (Lunsky and Elserafi, 2011). This was the second largest absolute risk increase after having a drug or alcohol problem (0.38, 95% CI [0.19, 0.56]). Being laid off or fired from work was not significant.

Mental Health

A range of mental health outcome measures were used, with the same measure being used across only two studies. These two studies were based on UK data from the same cohort (both also reported in the self-rated health section above) and looked at scores on the Malaise Inventory, with the results mirroring those for self-rated health reported above. Firstly, economically inactive participants had greater prevalence of poor mental health compared to participants in full-time employment, with prevalence increasing in a dose-dependent relationship with number of exposures to economic inactivity (Emerson et al., 2018a). Secondly, cohort members were more likely to have poorer mental health if exposed to NSE or job insecurity (Emerson et al., 2018b). In general, those who transitioned out of EI to either NSE or standard employment had significantly better mental health than those who remained economically inactive (Emerson et al., 2018b).

Three studies included outcomes related to depression. A study in Ireland found that those in paid employment were less likely to have a doctor's diagnosis of depression than those in sheltered employment, 'perceived' employment or unemployment, although this was not significant once age, level of intellectual disabilities, gender, type of residence and level of education were controlled for (McGlinchey et al., 2013). An Australian study of a total of 44 people with intellectual disabilities found that scores on Rosenberg's Depressive Affect Scale indicated lower depressive affect for people with intellectual disabilities who were competitively employed than those in sheltered employment or unemployment, but this was not statistically significant (Jiranek and Kirby, 1990). One longitudinal study found no differences in scores on a measure of depression and anxiety for those who did and did not stay in supported employment (Banks et al., 2010). However, the study may have been underpowered with only nine people included in the 'job breakdown' group. Further, the authors suggest that the scale used may have lacked sensitivity. Indeed, qualitative

interviews with those who did experience job breakdown suggest some experienced feelings of failure and hopelessness. For example, comments included: "Ach, I'm bored shitless... I've just got too much time on my hands...", "I didn't have a job to go to and I only had benefits ... I felt really useless", "[She was] quite broken up when she had to leave... just the suddenness of it. So she's been sort of down at times because she's sitting about doing nothing".

Two studies reported outcomes in relation to behaviour problems. A longitudinal study from Australia looked at changes in behaviour problems for young people with Down syndrome who remained in the same post-school day occupation for two years (Foley et al., 2014). Those in open employment experienced a decline in range, intensity and overall behaviour problems after adjusting for known confounding variables, whilst those in day recreation programs experienced significant worsening in behaviour. A longitudinal study in the US found that whilst there was a strong relationship between level of integrative employment (competitive, supported, sheltered and none) and adaptive skills, this was not evident for two challenging behaviour scale factors analysed (Stephens et al., 2005). However, the authors were unable to use the total scale in analyses and they note insufficient numbers of cases for one factor and suggest the two factors may have been weak measures.

Discussion

Despite the use of multiple methods of ascertainment, few studies on the association between employment and the health of people with intellectual disabilities were identified. However the available studies are generally consistent in reporting an association between being in paid employment and better physical or mental health status. This association is demonstrated in all of the four studies receiving the highest possible MMAT score (Emerson and Hatton, 2008, Emerson et al., 2018a, Emerson et al., 2018b, Foley et al., 2014). Where

studies report non-significant findings, in some cases this may be because studies are underpowered with insufficient cases, or use measures which may be insensitive to change (Banks et al., 2010, Stephens et al., 2005).

This review has included studies which consider health as an outcome of employment. However, it is also the case that health conditions can restrict opportunities for people with intellectual disabilities to participate in employment (Pikora et al., 2014). Additional support for a general association between health and employment comes from studies which identify health as a predictor of employment status for people with intellectual disabilities. Lower emotional and/or behavioural problems have been associated with the employment status of people with intellectual disabilities (McInnes et al., 2010, Siperstein et al., 2014, McDermott et al., 1999, Martorell et al., 2008), as have absence of psychiatric symptoms (Martorell et al., 2008) and having fewer health problems (McDermott et al., 1999). Whilst some studies have found no association between health and/or mental health and employment outcomes (Faubion and Andrew, 2000, White and Weiner, 2004, Moore et al., 2002), in two of these studies receipt of employment related services or training predicted employment (White and Weiner, 2004, Moore et al., 2002) suggesting that health related barriers to obtaining employment may be addressed through appropriate service provision or training.

The majority of the studies in this review are cross-sectional and as such it is not possible to attribute causality. Even in the best quality longitudinal study identified, the authors note that they cannot confirm the direction of the relationship between change in behaviour and day occupation (Foley et al., 2014). Indeed, the association between health and employment appears to be accounted for by two distinct processes; health selection (healthier people are more likely to gain and retain employment), and specific health benefits associated with employment (van Rijn et al., 2014, Bartley et al., 2006, Avendano and

Berkman, 2014, van der Noordt et al., 2014, Bartley, 1994). ‘Health selection’ in relation to people with disabilities is likely to encompass discriminatory biases resulting from the barriers adults with disabilities face in securing and retaining employment (Office for Disability Issues, 2011, Equality and Human Rights Commission, 2017). For health benefits, for example, people with intellectual disabilities working in community jobs are less likely to be sedentary (Bodde et al., 2013).

Only one study in this review suggests possible mechanisms behind health benefits (reduced behavioural problems) associated with employment (Foley et al., 2013). The authors suggest improved behaviour could be attributed to factors such as modelling the positive behaviours of typically developing peers (in line with social learning theory) or the satisfaction of participation in a meaningful, mainstream occupation. Conversely, an increase in behavioural problems in those attending day recreation programs could be attributed to modelling undesirable behaviours of their peers, lack of choice-making opportunities, isolation and segregation from the community and lack of meaningful and challenging activities within the day recreation programs (Foley et al., 2013).

Limitations

There are a number of limitations to this review. First, the studies included employ a disparate range of measures of physical or mental health, some of which may have limitations as direct measures of health status (e.g. health related component of QoL (Beyer et al., 2010); Rosenberg’s Depressive Affect Scale (Jiranek and Kirby, 1990)). Second, in some instances sample sizes are small, with one issue being the small number of people with intellectual disabilities in paid employment, with for example only 6.6% of 753 participants in one study being in paid employment (McGlinchey et al., 2013). Third, whilst multiple methods were used to identify studies, only one study was identified from the US when it is apparent that

there is certainly non-peer reviewed information available. For example, a presentation based on National Core Indicators indicates that for 2012-2013, the reported health status of people with intellectual/developmental disabilities was 'excellent' for 21.6% of those in integrated employment compared to 11.3% for those without an integrated job (Butterworth et al., 2014). However, the only peer reviewed publication identified in relation to this was an exploratory analysis of data for 2015-2016 which found that those who needed support for self-injurious behaviour were less likely to have a paid job in the community, although the analysis did not adjust for differences in personal characteristics between those who did and did not need support (Bradley et al., 2018). Finally, whilst in some studies the level of intellectual disabilities of participants is not stated, given the low employment rates of people with intellectual disabilities it is likely that the results mostly relate to people with less severe intellectual disabilities in employment.

Conclusion

This review supports the view that the well-established association between employment and better health is similar for adults with and without intellectual impairments (Emerson et al., 2018a). In the UK, the consensus on pursuing a 'welfare to work' agenda for people with disabilities generally (Department for Work and Pensions and Department of Health, 2017) has been underpinned in part by the rhetoric of better health and mortality outcomes associated with employment (Black, 2008). While the causal pathways between employment and health have been reasonably well-established in the general population (Bartley, 1994, Krug and Eberl, 2018, Janlert and Hammarström, 2009), at present, there is insufficient evidence to determine causality in relation to the association between employment and health for people with intellectual disabilities. Further research to determine specific health benefits attributable to employment for people with intellectual disabilities is

required, as well as research to elucidate the causal pathways that operate with reference to existing models on the relationship between (un)employment and health in the general population (e.g. Janlert and Hammarström, 2009, Paul and Moser, 2006). Such evidence would have important implications. Firstly, it would support the argument that health outcomes should become a driver for pursuing employment for people with intellectual disabilities as well as financial cost-benefit issues and an equality agenda. Secondly, it would support the argument that investment in employment support may be cost effective in view of the higher lifetime cost for people with intellectual disabilities in relation to health care, mental health and other services that may be reduced through the protective effects of having a paid job. Internationally, policy should continue to be directed towards improving what are currently extremely low employment rates for people with intellectual disabilities, for example via supported employment programs. Whilst supported employment programs can be expensive, they can be cost effective due to reducing cost for day activity services (Tholen et al., 2017), cost-efficient regardless of severity and number of disabilities (Cimera, 1998), and lead to work in integrated settings for people traditionally thought of as unemployable due to the severity of their intellectual disabilities (Walsh et al., 1994).

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Appendix 1: Example of Database Specific Search Terms (Medline)

Limiters: English language, 1990-2017, Age Related: Adolescent: 13-18 years, Young Adult: 19-24 years, Adult: 19-44 years, Middle Aged: 45-64 years, Middle Aged + Aged: 45 + years, Aged: 65+ years, Aged, 80 and over, All Adult: 19+ years

(AB (“Affective disorder” OR Anxiety OR “Behaviour* problems” OR “behavior* problems” OR “Challenging behaviour*” OR “challenging behaviour*” OR “Chronic disease*” OR “Days in bed” OR Depress* OR Disease* OR “Emotional disorder*” OR “emotional problems” OR Health OR Hospitalization OR hospitalisation OR “ill-health” OR “ill health” OR illness OR “Medical diagnoses” OR Medication* OR “Mental disorder*” OR “Mental health” OR “Mental illness” OR “Mood disorder*” OR Mortality OR “Nervous complaints” OR “nervous symptoms” OR Neurosis OR neuroses OR “neurotic disorder*” OR “Physical limitations” OR “Physician visits” OR psychiatric OR “Psychological distress” OR “Psychological symptoms” OR “Risk of death” OR Sickness OR “Somatic symptoms” OR Stress) OR (MH "Health Status+") OR (MH "Health+/TD/SN") OR (MH "Morbidity+") OR (MH "Mortality+") OR (MH "Mental Disorders+/EP/ET") OR (MH "Disease+") OR (MH "Behavioral Symptoms+/EP/ET") OR (MH "Health Services+/UT"))

AND

(((MH "Occupations+" OR MH "Work+" OR MH "Employment+") OR AB (Apprenticeship* OR Career OR “Economically active” OR “economically inactive” OR Employee OR Employment OR Income OR Job* OR “Labour force” OR “labor force” OR “Labour participation” OR “labor participation” OR “labor market” OR “labour market” OR “micro enterprise*” OR NEET OR “not in education employment or training” OR

Occupation OR Productiv* OR "seeking work" OR "social enterprise*" OR "social firm*" OR Unemployed OR Unemployment OR Vocation* OR workless*) OR TI (work*) OR TI (employed)))

AND

(((TI (learning N1 (disab* or difficult* or handicap*)) OR TI (mental* N1 (retard* or disab* or deficien* or handicap*)) OR TI (intellectual* N1 (disab* or impair* or handicap*)) OR TI development* N1 disab* OR TI (multipl* N1 (handicap* or disab*)) OR TI "Down* syndrome" OR (MH "Developmental Disabilities") OR (MH "Intellectual Disability+") OR (MH "mentally disabled persons"))))

Figure 1

Flowchart of Study Identification

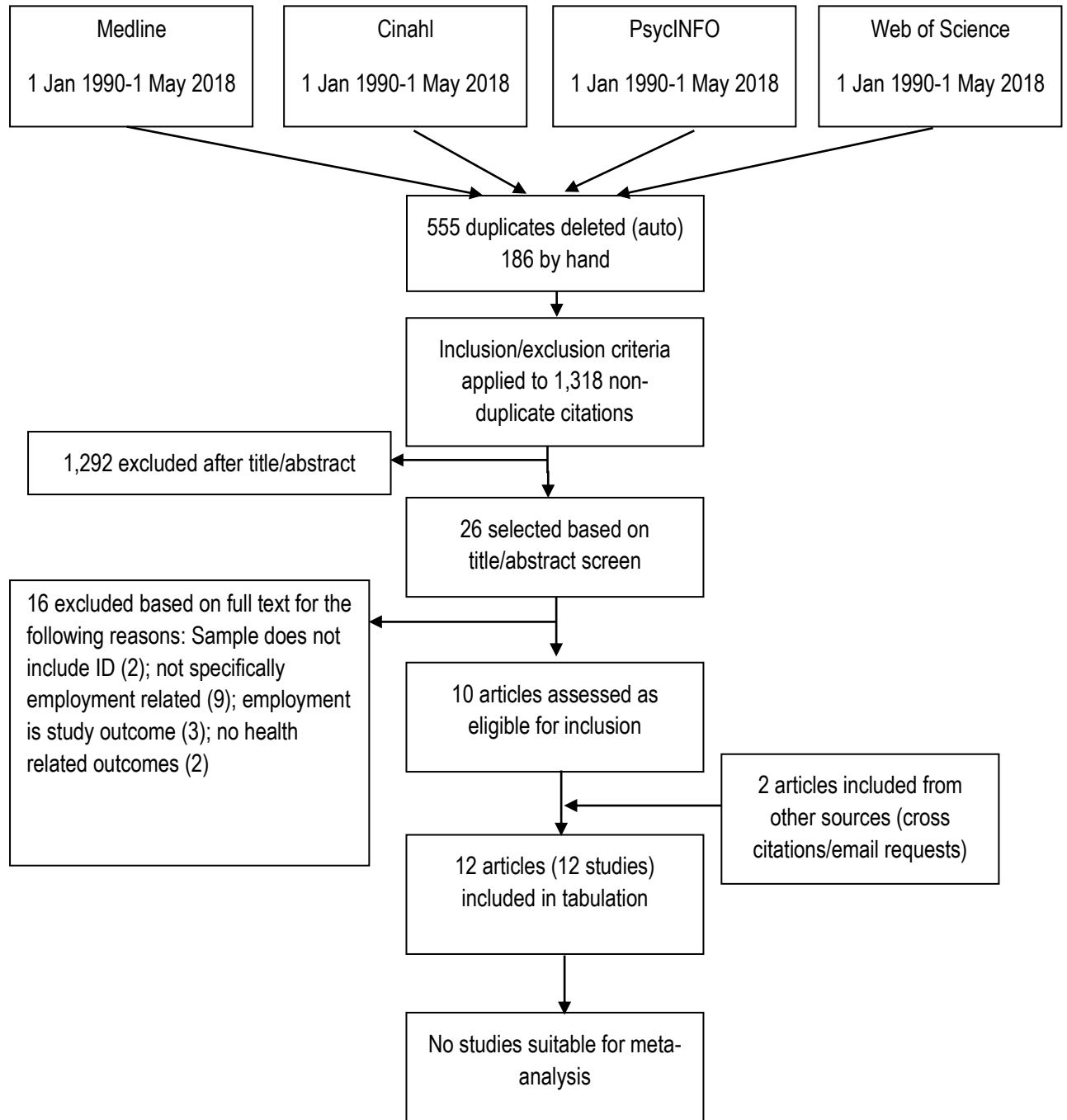


Table 1: Summary of studies regarding the association between employment & health (see bottom of table for list of abbreviations)

MMAT Type & Rating ¹	First Author & year	Country	Focus	Design	Key sample features	Sample size	Age range (mean (SD); median)	% male	Relevant Outcome measures	Results
MM**	Banks 2010	Scotland	Job breakdown & psychological well-being	Longitudinal. Semi-structured interviews time 1 (entered employment for at least 3hrs a week within the previous 3 months) & time 2 (9-12 months later)	People with intellectual disabilities (ID) who had secured supported employment (SE) in the previous 3 months	49	16-53 (31.2 (11.1); ns)	61.2	Self-report measure of depression & anxiety (adapted form of the Hospital Anxiety & Depression Scale (HADS)); themes from qualitative responses	By time 2, 13 of 49 jobs had broken down, 4 of whom secured another job so left out of quantitative analysis. No differences on HADS between participants who did & did not stay in employment. However, qualitative interviews with participants whose jobs were not sustained suggest the majority were left with reduced income, too much time on their hands, & some experienced feelings of failure & hopelessness
QNR**	Beyer 2010	Wales	Comparison of quality of life (QoL) outcomes for people with ID in SE, day services (DS) & employment enterprises (EE)	Interviews to collect questionnaire & scale data	Adults with ID in SE, EE, DS, or non-disabled co-workers (ND) of those in SE	SE 17 EE 10 DS 10 ND 17	SE ns (34 (ns); ns); EE ns (39 (ns); ns); DS ns (42 (ns); n); ND ns (38 (ns); ns)	SE 76 EE 40 DS 90 ND 41	Objective & subjective scores for health domain of Comprehensive Quality of Life Scale (ID or adult version)	Significant difference for objective health (mean (SD) scores: SE 13.2 (1.8), EE 11.2 (2.4), DS 10.1 (2.3), ND co-workers 14.2 (0.8)). No significant difference across groups for subjective health. Overall, supported employees reported better health than people with ID in EE or DS
QNR***	Emerson 2014	UK	Perceptions of neighbourhood quality, social & civic participation & the self-rated health of adults with ID	Secondary analysis of cross-sectional data from Understanding Society	People with ID living in general households	299 with ID ²	16-49 (ns (ns); ns)	38	Self-rated health; recoded into binary variable: 'excellent/very good/good' versus 'fair/poor'	More positive self-rated health was statistically uniquely associated with being employed for 16 or more hours per week (OR 4.31, 95% CI [1.64-11.31])
QNR****	Emerson 2008	England	Socio-economic disadvantage & self-rated health of adults with ID	Cross-sectional survey	Adults with mild/moderate ID, 26% in paid employment	1,273	16-55+ (ns (ns); ns)	58	Self-rated health; recoded into binary variable 'Not good' versus 'fairly good/very good'	Significant difference in self-rated health for those in paid employment (very good 48%, fairly good 44%, not good 9%) versus unemployed (41%, 41% & 18%). For those not in paid employment 'Not good vs fairly good/very good' OR 1.31, 95% CI not stated, p < .001 (by gender interaction with stronger association for women)

MMAT Type & Rating ¹	First Author & year	Country	Focus	Design	Key sample features	Sample size	Age range (mean (SD); median)	% male	Relevant Outcome measures	Results
QNR ****	Emerson 2018a	UK	Association between employment status & health in people with ID & people with borderline intellectual functioning (BIF)	Secondary analysis (cross-sectional analyses) of population based cohort study	Children born during one week in the UK in 1970, identified as having ID or BIF	15,453 (ID 426, BIF 2,108, non-ID 12,919)	Analyses at age 26, 30, 34, 38, 42 (mental health measure n/a at age 38)	ns	Binary measure of self-reported health ('excellent/very good/good' versus 'fair/poor/very poor'). Malaise Inventory for measure of mental health	People with ID & BIF had markedly lower employment rates & poorer health than other participants at all waves of data collection. Prevalence of both poor self-rated health & mental health was greater in every analysis across age and participant groups for economically inactive participants & participants in part-time employment compared to participants in full-time employment (statistically significant in 51 of the 54 comparisons). For all three groups the prevalence of poor health increased with number of exposures to economic inactivity
QNR ****	Emerson 2018b	UK	Association between non-standard employment (NSE), job insecurity & health among adults with & without intellectual impairments	Secondary analysis (cross-sectional analyses) of population based cohort study	Children born during one week in the UK in 1970, identified as having ID or BIF	15,453 (ID 426, BIF 2,108, non-ID 12,919)	Analyses at age 30, 34 & 42	ns	Binary measure of self-reported health ('excellent/very good/good' versus 'fair/poor/very poor'). Malaise Inventory for measure of mental health	At all three ages & for both health indicators cohort members in all three groups were more likely to have poorer health status if exposed to NSE or job insecurity. In general, those who transitioned out of economic inactivity to either NSE or standard employment had significantly better general & mental health than those who remained economically inactive. In all analyses transitioning from NSE to economic inactivity was associated with significantly poorer health (when compared to remaining in NSE), while there were no significant differences in health status between those transitioning from NSE to standard employment (when compared to remaining in NSE)
QNR ****	Foley 2014	Australia	Relationship between post-school day occupations of people with Down syndrome & change in behaviour	Longitudinal. Questionnaires completed in 2009 & 2011; questionnaire completed 2004 used to adjust for prior behaviour	Young people with Down syndrome from population-based database covering Western Australia who were in the same post-school day occupation from 2009 to 2011	103	10-24 (17.2 (4.3); ns) ¹	56.8 ³	Behavioural & emotional problems measured using the Developmental Behaviour Checklist (DBC). Main outcome change in behavioural problems 2009-2011	Those in open employment experienced a decline in range, intensity & overall behaviour problems after adjusting for known confounding variables. Those in sheltered employment also experienced a decline but this was less marked than for those in open employment. Those in day recreation programs experienced an increase in range, intensity & overall behaviour problems. In comparison to those in open employment, those in day recreation programs experienced significant worsening in behaviour both in the unadjusted (effect size -0.14, 95% CI [-0.24, -0.05]) & adjusted models (effect size -0.15, 95% CI [-0.29, -0.01])
QNR ***	Haider 2014	Australia	Factors associated with polypharmacy in a state-wide	Population based cross-sectional survey	People with ID on state-wide administrative database	897	18-82 (41.6 (ns); 41)	55.5	Polypharmacy: use of 5 or more prescribed medicines in past	Polypharmacy rates were: employed 9.1%, 95% CI [3.6-21.1], unemployed 24.3%, 95% CI [19.9-29.3], crude OR 3.51, 95% CI [1.67-7.40], adjusted OR 2.72, 95% CI [1.26-5.87] (adjusted for age, sex, & severity of ID)

MMAT Type & Rating ¹	First Author & year	Country	Focus	Design	Key sample features	Sample size	Age range (mean (SD); median)	% male	Relevant Outcome measures	Results
			representative population of adults with ID						two weeks	
QNR **	Jiraneck 1990	Australia	Psychological well-being in competitive employment, sheltered employment or unemployment	Interviews to collect questionnaire & scale data	People with borderline or mild ID in competitive employment, sheltered employment, or unemployment for at least 3 months plus ND comparison group	44 ID 29 ND	20-25 (ns (ns); ns)	56.8	Rosenberg's Depressive Affect Scale (high score=higher depressive affect)	Those competitively employed showed lower depressive affect. Those with ID in competitive employment had similar depressive affect to ND unemployed. Scores were: ID competitive employment 1.3 (0.7); sheltered employment 1.6 (1.2), unemployed 1.9 (0.9). ND employed 0.3 (0.8), unemployed 1.2 (1.9). However, ANOVA showed no significant effect by ID group for depressive affect
QNR ***	Lunsky 2011	Canada	Life events & hospital emergency department (ED) use	Standardised form including life events in past 12 months completed by staff as part of agency protocol following behavioural crisis event	People with ID who had experienced at least one behavioural crisis	746	10-82 (36.3 (14.4); ns)	62.5	Visit or no visit to ED	Being unemployed for more than one month occurred at a higher rate in the group that visited ED (15.4%) relative to the group that did not visit ED (3.2%), absolute risk increase 0.37, 95% CI [0.21, 0.51]. This was the second largest absolute risk increase after drug or alcohol problem (0.38, 95% CI [0.19, 0.56]). Laid off or fired from work was not significant
QNR ***	Mc-Glinchey 2013	Ireland	Association between employment status & health, loneliness, social activities, & depression	First wave of longitudinal study; data from interviews (proxy if necessary)	People with ID receiving or eligible to receive services. 6.6% in paid employment, 7.4% attended day service but perceived themselves as employed, 12% sheltered	753	41-65 (ns (ns); ns)	45	Self-rated health (excellent, very good, good, fair & poor), & doctor's diagnosis of depression (yes/no)	Employment status significantly associated with health status when no other variables were controlled for (fair/poor health: paid employment 8.3%, sheltered employment 10.8%, 'perceived employment' 7.7% and unemployment 14.7%). Those in sheltered or perceived employment & those unemployed more likely to have a doctor's diagnosis of depression than those in paid employment. When age, level of ID, gender, type of residence & level of education were controlled for employment status was not significantly related to self-reported health status or diagnosis of depression

MMAT Type & Rating ¹	First Author & year	Country	Focus	Design	Key sample features	Sample size	Age range (mean (SD); median)	% male	Relevant Outcome measures	Results
					employment, 73.5% unemployed.					
QNR ***	Stephens 2005	US	Adaptive skills & challenging behaviours while following individuals through movement across types of employment	Longitudinal: two consecutive points in time (1997 & 1998)	People with ID receiving services. In 1997, unemployed 48.0%, competitive employment 6.6%, SE 13.0%, sheltered employment 32.4%	2,760	16-65 (ns (ns); ns)	55.8	Abusive or sexually inappropriate challenging behaviour variables adapted from Behavior Development Survey	Whilst greater employment integration was strongly associated with greater adaptive skills, challenging behaviours appeared not to be related to moves to more or less integrative employment. There were, however, insufficient cases for inappropriate sexual behaviours and the two sub-factors analysed were possibly weak measures
<p>Notes: ¹ MMAT (mixed methods appraisal tool): MM mixed methods; QNR quantitative non-randomized. * 25% of criteria met; ** 50% of criteria met; *** 75% of criteria met; **** 100% of criteria met; ² 1.2% of the unweighted age-restricted sample; ³ Figure includes some participants who were subsequently excluded from analyses</p> <p>Abbreviations: BIF borderline intellectual functioning; DS day services; ED emergency department; EE employment enterprises; EI economic inactivity; HADS Hospital Anxiety & Depression Scale; ID intellectual disabilities; ND non-disabled; NSE non-standard employment; OR odds ratio; QoL quality of life; SE supported employment</p>										