

# Health effects of employment: a systematic review of prospective studies

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## ABSTRACT

**Objectives** The purpose of this review was to systematically summarise the literature on the health effects of employment.

**Methods** A search for prospective studies investigating the effect of employment on health was executed in several electronic databases, and references of selected publications were checked. Subsequently, the methodological quality of each study was assessed by predefined criteria. To draw conclusions about the health effect of employment, a best evidence synthesis was used, and if possible, data were pooled.

**Results** 33 prospective studies were included, of which 23 were of high quality. Strong evidence was found for a protective effect of employment on depression and general mental health. Pooled effect sizes showed favourable effects on depression (OR=0.52; 95% CI 0.33 to 0.83) and psychological distress (OR=0.79; 95% CI 0.72 to 0.86). Insufficient evidence was found for general health, physical health and mortality due to lack of studies or inconsistent findings.

**Conclusions** This systematic review indicates that employment is beneficial for health, particularly for depression and general mental health. There is a need for more research on the effects of employment on specific physical health effects and mortality to fill the knowledge gaps.

## INTRODUCTION

Western societies are trying to get as much people into employment as possible<sup>1</sup> and promote sustained employability.<sup>2</sup> This is important to counteract the (financial) problems associated with demographic changes, such as the ageing population caused by the rise in life expectancy, and the shrinking working population due to people having fewer children.<sup>3</sup> To illustrate, in 1950 there were worldwide 12 people in the age category 15–64 years old per older person aged 65 years or older. In 2000, this number was 9, and in 2050, this number is expected to be only 4.<sup>4</sup>

Since the beginning of the financial crisis at the end of 2007, global unemployment rates have increased significantly. The global unemployment rate was 5.4% in 2007, increased to 5.9% in 2011 and is expected to remain stuck at around 6.0% until at least 2017.<sup>5</sup> This increase has negative effects on the economy as unemployment causes loss of income for individuals as well as reduced collection of taxes and increased spending on social benefits for governments.<sup>6</sup>

In the last decades, a lot of research has been done on the health effects of unemployment. In the mid-1990s, for example, two reviews have shown that unemployment leads to adverse mental health effects,<sup>7</sup> which are usually associated with

somatic complaints.<sup>8</sup> A more recent review of Wanberg describes the mechanisms that link unemployment with mental and physical health.<sup>9</sup> In doing so, she presented the results of McKee-Ryan *et al*<sup>10</sup> and Korpi,<sup>11</sup> who concluded that poor core self-evaluations, financial strain, strong stress appraisal, social undermining from significant others and work role centrality of the unemployed were the five strongest mechanisms leading to adverse mental health.<sup>10</sup> Adverse physical health effects were explained by poor living standards and unhealthy behaviour.<sup>11</sup>

It can, however, be questioned whether employment or the transition to employment will yield positive health effects. According to Dodu,<sup>12</sup> employment can cause both positive and negative health effects. Positive health effects were explained by structure of the day, financial security, opportunities to increase skills, interaction with others, meaningful life goals, and purpose and providing a sense of personal achievement. Mechanisms causing negative health effects were heavy physical work, stressors and exposure to radiations, vibration, high noise levels and polluted air.<sup>12</sup>

So far, a few reviews have been conducted on the health effects of employment, including the possible mechanisms. These reviews did, however, not use a systematic approach. Dodu,<sup>12</sup> for example, did neither describe the search strategy nor assessed the methodological quality of the included studies. Waddell and Burton<sup>13</sup> employed a systematic search strategy, but selected various types of studies like systematic or narrative reviews, policy papers and individual longitudinal or cross-sectional studies; hence, it was not possible to summarise the literature in a systematic way. As far as the authors are aware, the literature of the health effects of employment have not been systematically assessed yet. Therefore, the aim of this review was to systematically summarise the best available evidence on the health effects of employment by including longitudinal studies and considering the methodological quality.

## METHODS

### Literature search

In March 2012, a search strategy was developed and executed by a librarian in five electronic databases: MEDLINE, PsycINFO, SciSearch, Social SciSearch and EMBASE. The search strategy focused on key words related to employment or re-employment combined with health outcomes and was initially not limited to a specific study design. The search strategy is presented in online supplementary appendix A. In addition to the search in electronic databases, references from

previous reviews and all the relevant articles were checked, as well as the expert's personal database.

### Inclusion and exclusion criteria

Studies were included if they were written in the English, German or Dutch language published between 1990 and March 2012. Multiple longitudinal studies were identified, therefore studies with another (eg, cross-sectional) design were excluded. Further, the studies had to involve the adult population, and to describe the longitudinal relationship between employment and a health outcome or the health effects of the transition from unemployment to employment. 'Artificial employment', such as vocational training programmes, was not the scope of this review. All prevailing health outcomes were included; however, studies evaluating the effect of employment on intermediate variables, such as lifestyle behaviour, social support or self-esteem, were excluded. Studies showing health effects of exit from work, unemployment and retirement were also excluded because it is assumed that different mechanisms are at play linking unemployment and health.

### Study selection

First, two reviewers (MvdN and KIP) independently selected publications based on title and abstract. Only articles that met the inclusion criteria and articles with uncertainty regarding the inclusion criteria were selected. Second, the full texts of the selected articles were retrieved and read carefully to assess whether the inclusion criteria were actually met. Subsequently, the two reviewers compared their results and attempted to achieve consensus. In case of disagreement, a third reviewer (MD) was consulted to decide.

### Data extraction

Data were extracted from all selected studies regarding the country, study population, follow-up time, definition of (un)employment, type and measurement of the health outcome,

statistical analysis, employment status at baseline and follow-up, and the results. One reviewer (MvdN) executed the data extraction, followed by a check of approximately 20% of the articles by a second reviewer (KIP).

### Methodological quality assessment

The studies were assessed on methodological quality using a checklist with predefined criteria presented in table 1. Criteria were adapted from internationally published systematic reviews.<sup>14 15</sup> An operationalisation of the items can be found in online supplementary appendix B. The criteria list consisted of 14 items, of which 4 items were about informativeness and 10 items about validity/precision. The list had a 'yes' (+), 'no' (–) or 'unclear' (?) format. A positive score was given if the study met the criterion, a negative score if the study did not and a question mark if the study did not describe the item at all or the description was incomplete. Two reviewers (MvdN and HIJ) assessed the methodological quality independently, compared their results and attempted to achieve consensus. In case of disagreement, a third reviewer (KIP) was consulted to decide.

In case of a question mark, the authors of the studies were contacted by email. To calculate the methodological quality of the studies, only the positive scores of the items regarding validity/precision (n=10) were summed. Despite the lack of official guidelines for cut-off points for high-quality versus low-quality studies,<sup>16</sup> a commonly used cut-off point of >50% was applied.<sup>17</sup> This means that at least six items were supposed to be rated positively to achieve a high-quality status. Otherwise, the study was considered to be of low quality.

### Best evidence synthesis

To draw a conclusion about the strength of the evidence on the effect of employment on each health outcome, a best evidence synthesis was executed in December 2012. All results were categorised by health outcome for which the following conclusions

**Table 1** Criteria list for assessment of the methodological quality of prospective cohort studies<sup>14 15</sup>

Criteria*	I, V/P	Per cent of studies meeting the item
Study population and participation (baseline)		
1. Adequate description of sampling frame, recruitment methods, period of recruitment and place of recruitment	I	76
2. Participation rate at baseline at least 80%, or if the non-response was not selective	V/P	45
3. Adequate description of baseline study sample for key characteristics	I	61
Study attrition		
4. Provision of the exact <i>n</i> at each follow-up measurement	I	70
5. Provision of exact information on follow-up duration	I	100
6. Response at short-term follow-up was at least 80% of the <i>n</i> at baseline, and response at long-term follow-up was at least 70% of the <i>n</i> at baseline	V/P	48
7. Information on not selective non-response during follow-up measurement	V/P	33
Data collection		
8. Adequate measurement of employment status	V/P	18
9. Employment status was assessed at a time prior to the measurement of the health outcome	V/P	100
10. Adequate measurement of the health outcome	V/P	97
Data analyses		
11. The statistical model used was appropriate and point estimates with measures of variability must have been provided	V/P	42
12. The number of cases was at least 10 times the number of the independent variables	V/P	94
13. Important confounders were identified and these have been adjusted for	V/P	79
14. No selective reporting of results	V/P	100

\*Rating of criteria: + = yes; – = no; ? = unclear.

I, criterion on informativeness; V/P, criterion on validity/precision.

## Review

**Figure 1** Flowchart of study selection.

were made: strong evidence, moderate evidence and insufficient evidence for an effect of employment.<sup>17</sup>

1. Strong evidence when consistent findings in two or more high-quality studies were found.
2. Moderate evidence when consistent findings in one high-quality study and at least one low-quality study was found, or consistent findings in two or more low-quality studies were found.
3. Insufficient evidence when only one study was found or inconsistent findings in two or more studies were found.

The outcomes of the studies were considered inconsistent if less than 75% of the studies reported the same conclusion, that is, based on statistical significance. If there were two or more high-quality studies, the low-quality studies were excluded from the evidence synthesis.

### Pooling

Data were pooled if at least three studies per health outcome were available presenting comparable outcome measures and study groups. Both high-quality and low-quality studies could be included to increase the possibility of having a sufficient number of studies. Statistical heterogeneity was tested by  $\chi^2$  analyses with p values to decide whether fixed or random effects models should be used to calculate the pooled effect sizes and CIs. The studies were weighted based on the effect sizes and number of participants. Review Manager 5.1 was used to do so and to create forest plots.

## RESULTS

### Study selection

The digital literature search resulted in 2999 references in PubMed, 1097 in EMBASE, 171 in PsycINFO, 136 in SciSearch

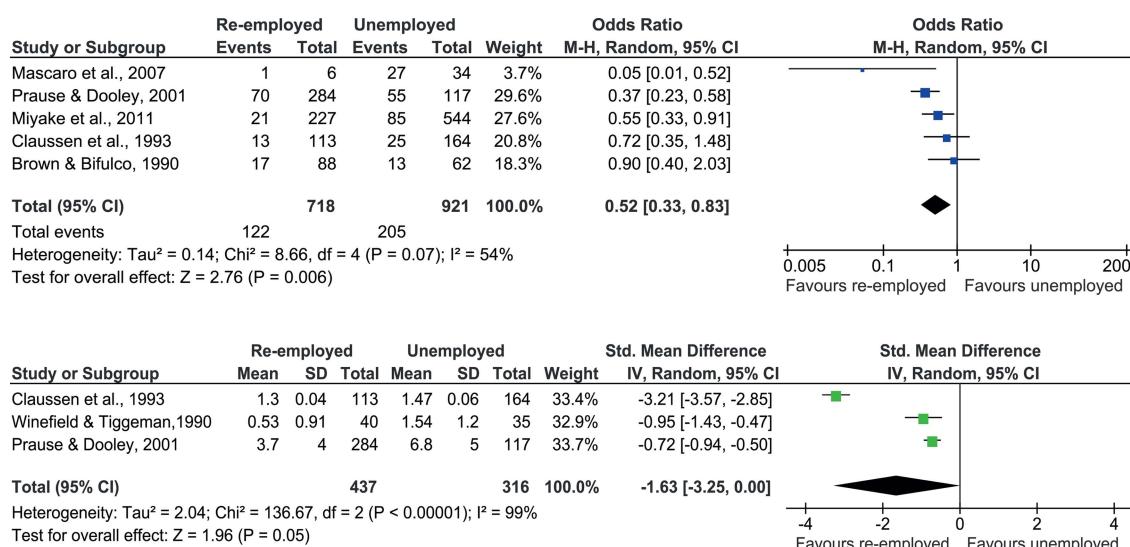
and 48 in Social SciSearch (duplicated references excluded). Two reviewers read a total of 4451 titles and abstracts and selected 79 references to retrieve the full texts. After reading the full texts, the reviewers excluded 40 studies because of their cross-sectional design and 19 studies because they examined the effect of unemployment. Nine studies were found in the authors' personal databases, of which two met the inclusion criteria. Twenty relevant studies remained to be included, and after a references check from these relevant studies, 13 extra studies were included. Thus, 33 studies were included for this review. The study selection is presented in figure 1.

### Study characteristics

The characteristics of the studies can be found in online supplementary tables 2–5. The sample sizes ranged from 45 to 8744 participants. Follow-up time used in the analyses varied from 3 months to 21 years. Twenty health outcomes were examined, which can be categorised into four groups: mental health, physical health, general health and mortality. Types of jobs performed by the study population differed between the studies, but most included all different kinds of jobs (n=19).

### Methodological quality assessment

The assessment of the methodological quality led to a disagreement between the two reviewers on 23.6% of the items. The majority of the disagreements could be solved by consensus and the third reviewer judged 11 items (10%). Seventeen studies received a question mark for one or two items. Contact information was available for 14 authors, and 10 of them replied. The methodological quality assessment resulted in 23 high-quality studies and 10 low-quality studies. Table 1 shows the



**Figure 2** Forest plots based on number of events and mean scores of depression among re-employed versus unemployed persons.

criteria used for the methodological quality assessment with the percentages of the studies that met these criteria. Common limitations were lacking information on the measurement of employment status, the non-response at baseline and follow-up, and inappropriate statistical analyses. The first column of online supplementary tables 2–5 presents the methodological quality of each study.

### Pooling

For depression and psychological distress, at least three studies were available that contained comparable study groups and outcome measures. These studies compared re-employed persons versus continually unemployed persons, and the effect measures under study were the number of adverse events that occurred and the mean scores with SDs. Based on the available data, two forest plots were created for both depression and psychological distress, one presenting pooled ORs and the other pooled standardised mean differences (SMDs). Random effects models were used after the heterogeneity turned out to be high in three of the four forest plots (see figures 2 and 3). For all other health outcomes, pooling was not possible because of the

limited number of studies available or different outcome measures used.

### Mental health effects

Twenty-eight studies focused on one or more aspects of mental health (online supplementary table 2). The mental health outcomes reported were depression,<sup>18–27</sup> psychological distress,<sup>20 21 28–34</sup> general mental health,<sup>35–40</sup> anxiety,<sup>20 21</sup> psychiatric morbidity,<sup>41–44</sup> stress,<sup>24</sup> psychological symptoms,<sup>45</sup> negative mood<sup>26</sup> and emotional role functioning.<sup>35</sup>

### Depression

Ten studies reported the effect of employment on depression, of which six studies were of high quality<sup>18 20 21 23 25 26</sup> and four studies of low quality.<sup>19 22 24 27</sup> All six high-quality studies (100%) found a significant protective effect of employment on depression, that is, ‘strong evidence’. To measure depression, the high-quality studies used the Hopkins Symptom Checklist,<sup>20 21</sup> Beck Depression Inventory,<sup>18</sup> CES-Depression Scale,<sup>25</sup> Rosenberg’s Depressive Affect Scale<sup>26</sup> and the Edinburgh Postnatal Depression Scale.<sup>23</sup> Despite some



**Figure 3** Forest plots based on number of events and mean scores of psychological distress among re-employed versus unemployed persons.



differences in methodology between the high-quality studies, all found a significant decreased risk of depression of employment. Claussen and colleagues<sup>20 21</sup>, for example, found a relative risk (RR) of 0.45 ( $p<0.05$ ) and an OR of 0.26 (95% CI 0.10 to 0.64) after a follow-up of 2 and 5 years, respectively, for the risk on depression for re-employed compared with still unemployed people. Figure 2 shows forest plots based on data from studies with comparable effect measures and study groups. Heterogeneity was high in both forest plots according to the  $\chi^2$  analyses ( $p<0.07$  and  $p<0.00001$ ), presumably due to the different measurement tools that were used in these studies. The forest plots show that re-employment decreases the risk of depression (pooled OR=0.52; 95% CI 0.33 to 0.83) and leads to lower depression scores on various scales (pooled SMD=−1.63; 95% CI −3.25 to 0.00).

### Psychological distress

Nine studies, of which seven were of high quality,<sup>20 21 28 30–32 34</sup> examined the effect of employment on psychological distress. To measure psychological distress, the General Health Questionnaire (GHQ),<sup>20 21 31 32</sup> CES-Depression Scale<sup>28 34</sup> and a self-constructed questionnaire<sup>30</sup> were used by the high-quality studies. Four of the seven high-quality studies (57%) found a significant protective effect on psychological distress<sup>30–32 34</sup> and three found insignificant effects,<sup>20 21 28</sup> resulting in insufficient evidence. Although three high-quality studies<sup>20 21 28</sup> did not find a significant effect of employment on psychological distress, all showed consistently that employment did not yield harmful effects (eg, by effect sizes (RR and OR) of 0.80 and 0.76, respectively). This is also shown in the forest plots of figure 3. These show that re-employment decreases the risk of psychological distress (pooled OR=0.79; 95% CI 0.72 to 0.86) and leads to lower psychological distress scores on various scales (SMD=−0.80; 95% CI −1.52 to −0.09). Heterogeneity was low in the forest plot presenting a pooled OR ( $p>0.68$ ), presumably because all included studies used the GHQ-12 tool to measure psychological distress. Heterogeneity was high in the forest plot presenting a pooled SMD ( $p<0.00001$ ) because those studies used different measurement tools.

### General mental health

Six studies examined the relationship between employment and general mental health, and all four high-quality studies<sup>35 36 39 40</sup> (100%) found a positive effect of employment, leading to strong evidence. For example, Lahelma<sup>39</sup> found a significant effect (OR=3.8) for improved mental well-being for re-employed compared with constantly unemployed people.

### Psychiatric morbidity

Psychiatric morbidity was examined by four studies, of which two<sup>41 44</sup> were of high quality, showing a positive effect. Thereby strong evidence for a positive effect of employment on psychiatric morbidity was found. The high-quality study of Llena-Nozal *et al*<sup>41</sup> reported that employed persons have lower psychiatric morbidity scores than the unemployed, suggesting that employment prevents psychiatric morbidity. In addition, the high-quality study of Morrell *et al*<sup>44</sup> showed that re-employed persons are more likely to recover from psychiatric morbidity than the unemployed.

### Physical health effects

Nine studies focused on one or more aspects of physical health (online supplementary table 3). The physical health outcomes were general physical functioning,<sup>34 35 46–48</sup> somatic

symptoms,<sup>20 21</sup> respiratory and cardiovascular symptoms and illnesses,<sup>49</sup> musculoskeletal symptoms,<sup>30</sup> bodily pain,<sup>35</sup> vitality<sup>35</sup> and physical role functioning.<sup>35</sup>

### General physical functioning

Five high-quality studies examined the effect of employment on general physical functioning.<sup>34 35 46–48</sup> Instruments to measure general physical functioning all focused on daily life activities, such as walking, climbing stairs or carrying groceries. Three out of five high-quality studies (60%) found a significant positive effect of employment on general physical health, leading to insufficient evidence.

### General health

General health was examined by four high-quality studies<sup>30 35 46 47</sup> (online supplementary table 4) and measured by a valid measurement tool (SF-36) or by one or two questions regarding people's subjective health. One study<sup>47</sup> found a significant negative effect of employment on general health, another study<sup>46</sup> found a significant positive effect for full-time employment and no effect for part-time employment. Two studies<sup>30 35</sup> showed no effect of employment on general health. Based on these findings, there is insufficient evidence for an effect of employment on general health.

### Other health outcomes

Next to the health outcomes presented above, two studies were found on anxiety<sup>20 21</sup> and somatic symptoms.<sup>20 21</sup> However, due to inconsistent findings, insufficient evidence was concluded for these health outcomes. For mortality, only one study was identified,<sup>50</sup> consequently leading to insufficient evidence. See online supplementary tables 2–5 for more information on these and other studies.

## DISCUSSION

There is strong evidence that employment reduces the risk of depression and improves general mental health. Insufficient evidence was available for the effect on other health outcomes due to a lack of studies or inconsistent findings of the studies. Overall, beneficial, though not consistently statistically significant, effects were found of employment on health.

As far as we know, there are no other systematic reviews about the health effects of employment. However, the study of Waddell and Burton<sup>13</sup> comes close to a systematic review, and the results of this review can therefore be compared with their results. Waddell and Burton concluded moderate evidence for lower mortality rates for employed people based on five studies, while we found insufficient evidence for lower mortality rates due to the availability of only one single longitudinal study. That study was, however, of high quality and found a significant protecting effect for mortality. Waddell and Burton<sup>13</sup> further reported strong evidence for positive effects for re-employment on physical health, psychological distress and minor psychiatric morbidity, while the present review concluded that the present evidence was insufficient. This discrepancy may be explained by the different methods used in both reviews. In their review, Waddell and Burton<sup>13</sup> included also study designs other than longitudinal studies, and evidently more studies with positive outcomes. In our review, we more strictly adhered to methodological high-quality studies and ignored studies with a lower quality in the best evidence synthesis. Nevertheless, an important similarity between the two reviews is that both found either beneficial or null effects of employment on all four health outcomes.

This systematic review shows that employment is generally beneficial for health. We have to refine this a little since the relationship between employment and health can be bi-directional. This means that the positive health effects of employment can be affected by the fact that healthier people are more likely to get and stay in employment. This shows that the relationship between employment and health is very complex. Even though only longitudinal studies were included, the results have to be interpreted carefully.

We report that, based on the best evidence synthesis, employment significantly reduces the risk of depression, but that there is insufficient evidence for an impact of employment on psychological distress, though the latter is not corroborated by the calculated pooled effect sizes on psychological distress. These different results of the best evidence synthesis are remarkable since the two health outcomes are related. Psychological distress has been defined as a state of emotional suffering characterised by depression and anxiety,<sup>51</sup> and some of the studies examining depression and psychological distress used the same measurement instrument (CES-D). Presumably, different cut-off points were used; however, that was not described clearly in the studies. An explanation for the differences in the strength of the conclusions may be the severity of the health problem. According to Horwitz<sup>52</sup>, depression is a mental disorder defined as a condition that is disproportionate to external stressful situations, while psychological distress is a natural human emotion and is in proportion with external stressful situations. Possibly both unemployed and employed people experience symptoms of psychological distress because it is a natural human emotion, while more severe depression symptoms are more dependent on employment status.<sup>53</sup>

Another striking result was the discrepancy between the conclusions of the best evidence synthesis and the meta-analyses, with the latter showing a significant decreased risk of psychological distress and lower psychological distress scores. A possible explanation for this may be the different data used for the best evidence synthesis and forest plots. To illustrate, in the best evidence synthesis we included the RR of 0.45 ( $p < 0.05$ ) on depression that Claussen *et al*<sup>21</sup> presented in their paper. The forest plot, however, was based only on the number of events of depression, which resulted in an OR of 0.72 (95% CI 0.35 to 1.48). Moreover, different studies were included in the qualitative and quantitative analyses: the best evidence syntheses included only high-quality studies, while the meta-analyses included both high-quality and low-quality studies but were restricted to comparative data of the studies. Therefore, caution is advised in the interpretation of the meta-analyses.

Differences in follow-up time between the studies may explain the inconsistent findings of studies examining the effect of employment on the same health outcome. For example, as to follow-up time, Claussen *et al*<sup>21</sup> observed insignificant effects of employment for anxiety and somatic symptoms after 2 years, while significant protective effects were detected for the same study population after a follow-up period of 5 years by Claussen.<sup>20</sup> Inconsistencies may also be explained by the different countries with different characteristics, such as the unemployment rate, prevalence of (mental) health problems,<sup>54</sup> cultural differences in reference levels of health<sup>55</sup> or social security systems.<sup>56</sup>

Insignificant and inconsistent results may also be explained by the differences in the specification of employment, including the quality of employment. Low-quality jobs can lead to reduced health, while high-quality jobs can lead to improved health, which was confirmed by a study of Grzywacz and Dooley.<sup>57</sup> Although

most studies adjusted for socioeconomic status, which can be considered as a proxy for quality of work, no adjustments were made for quality of employment nor a stratified analysis was executed. In addition, all kinds of jobs were included in the studies, such as part-time employment, full-time employment, self-employment, blue-collared jobs and white-collared jobs. It is plausible that these different forms of employment have different health effects. In most studies and in this review, no adjustments were made for this.

This review has certain strengths and limitations that are worthwhile mentioning. The strength of this review is the systematic approach to summarising the literature. First, we only selected studies with a longitudinal study design and excluded cross-sectional evidence. Second, a methodological quality assessment of the studies contributed to insight into the quality of each study, which was incorporated in the evidence rating. Third, the external validity of this review is considered high. The inclusion of all types of participants, such as men, women, pregnant women, people from different ages and different countries, ensures that the results are very broadly applicable. In addition, by including all available health outcomes in the literature, the results are applicable to all kinds of health outcomes. A disadvantage is the possibility that some relevant studies were missed. Although the literature was searched in a systematic way, the high number of initial references ( $n=4359$ ) made it difficult to trace all relevant studies. To solve this problem, references of key publications and those included were checked. Publication bias and selection bias may also have occurred. Although we found a fair amount of studies that presented insignificant results, there is still a chance that publication bias resulted in overestimated effects. With respect to selection bias, the healthy worker effect may have occurred, in which relatively healthy persons are more likely to enter in the workforce, whereas those with health problems are at increased risk to withdraw from the labour force.<sup>58</sup> This selection process excluding unhealthy individuals from the workforce may have caused an overestimation of the findings, especially in the forest plots, where we could not adjust for health before the transition. A final limitation of this review was the heterogeneity of the studies. Meta-analyses have been performed, but caution regarding their interpretation is recommended. Different follow-up durations, measurement tools, cut-off points and the impossibility to include confounders in the forest plots have led to some uncertainty regarding the results. The limitations of the included studies were related to the methodological quality of the studies, with common limitations as self-reported measurement of employment status, lack of information about the non-response at baseline and follow-up, and the lack of measures of variability in the statistical analyses. The majority of the studies were of high quality though, that is, 23 of the 33 studies. Finally, we have to keep in mind that we were not able to include randomised controlled trials. Performing such trials would be unethical, and logically there are no such trials available in the literature. This left us with observational longitudinal studies in order to give an indication of the direction of the health effects of employment.

In conclusion, this systematic review indicates that employment is beneficial for health, and particularly for depression and general mental health. For other health outcomes, there was insufficient evidence due to either inconsistency between the studies available or a lack of studies. Future research on the effects of employment is therefore recommended, especially on physical health and mortality. In doing so, we hope this review encourages researchers in the field to adopt a more standardised approach to their reporting to permit more detailed systematic reviews in the future.

## Review

**Contributors** All authors meet the criteria for authorship by contributing to the following: conception and design, acquisition of data or analysis and interpretation of data; drafting the article or revising it critically for important intellectual content; and final approval of the version published.

**Competing interests** None.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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## Health effects of employment: a systematic review of prospective studies

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