

Original Article

Job Stressors and Employment Precarity as Risks for Thoughts About Suicide: An Australian Study Using the Ten to Men Cohort

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Abstract

Aims: Past research suggests that adverse experiences at work (such as job stressors and precarious employment) are associated with thoughts about suicide, especially among males. A limitation of this research is that it is largely cross-sectional. Thus, it is unknown whether job stressors are a prior cause of thoughts about suicide. This study examined the baseline association between adverse experiences at work and thoughts about suicide at follow-up in a large nationally representative cohort of employed men.

Methods: We used data from the Australian Longitudinal Study on Male Health (*Ten to Men*). The outcome was thoughts about suicide in the prior 12 months (reported in wave 2) and the key exposure variables were: high job demands, low job control, job insecurity, perceived unfairness of pay, occupational skill level, and employment arrangement (all reported in wave 1). We adjusted for possible confounders, including mental health and suicidal thoughts (wave 1).

Results: In a sample of 8379 and after adjustment, job insecurity (OR 1.35, 95% CI 1.13–1.61, $P = 0.001$), low job control (OR 1.19, 95% CI 1.06–1.33, $P = 0.004$), and employment on a casual or on a fixed term basis (OR 1.30, 95% CI 1.01–1.67, $P = 0.041$) were associated with a greater odds of thoughts about suicide at follow up. Results for all by job control were maintained after removing those who reported thoughts of suicide at baseline.

Conclusion: This study suggests that experiences at work may be risk factors for thoughts about suicide among employed men. More research is needed to unpack the complex associations between, employment, and experiences of suicide.

Keywords: job stressors; suicide ideation; employment; work; males

Introduction

There is a long history of research linking employment-related factors to suicidal behaviours in males. Durkheim (1897/1960) was among the first to note that, at an ecological level, male suicide appeared to increase in response to various economic stressors. Specifically, male suicide increased during times of economic recession when jobs were scarce, and declined in during times of economic prosperity (as reviewed in Oyesanya *et al.* 2015). Since this time, there has been a great deal of research on the link between employment and suicide (Shepherd and Barraclough 1980; Stack 2000). The bulk of this research has focused on the adverse effects of unemployment (Morrell *et al.* 1993; Blakely *et al.* 2003; Milner *et al.* 2013b) or rates of suicide in different occupational groups (Boxer *et al.* 1995; Milner *et al.* 2013c).

Alongside this body of work, suicide researchers have increasingly recognized that employment-related psychosocial job stressors constitute important risk factors for suicide (Milner *et al.* 2017c). Psychosocial job stressors are typically defined as the aspects of the work design and/or social and organizational structure that have the potential to influence employees' behaviour and affect their mental and physical health (Cox *et al.* 2004). To illustrate, studies have shown that people employed in jobs characterised by low control over how, when and where they work have elevated thoughts about suicide (Fridner *et al.* 2011; Sugawara *et al.* 2013; Loerbroks *et al.* 2016; Yoon *et al.* 2016). Similarly, workers in psychologically demanding jobs (Byun *et al.* 2016; Loerbroks *et al.* 2016) have been reported to be particularly at risk of suicide. These stressors are included in the well-established Demand-Control model, as described by Karasek (1979). The effort-reward imbalance model is another common model in the area. This hypothesises particularly poor health outcome in situations where employees have a high amount of effort (either intrinsic or extrinsic) relative to the rewards they receive (whether these rewards be in terms of remuneration, respect, or career advancements) (Siegrist 1996). A recent body of work has particularly highlighted the adverse effect of employment precarity (temporary work or work without a contract) and job insecurity as risk factors for suicidality (Min *et al.* 2015; Milner *et al.* 2017c).

The majority of research in the above areas has been based on cross-sectional designs (see Milner *et al.* 2017c for a review). This limits the ability to draw conclusions

about the extent to which job stressors and employment precarity are a cause of suicidality because of the potential for reverse causality. In the present study, we sought to assess this gap by using a cohort design, where employment and working conditions were measured at baseline (wave 1) and thoughts about suicide were measured between 1 and 2 years follow-up (the average length of follow up was 22 months). We hypothesised that greater exposure to job stressors would be associated with higher odds of thoughts about suicide at follow up among a sample of employed men.

Method

Sample

We used data from wave 1 (baseline) and wave 2 of the Australian Longitudinal Study on Male Health (*Ten to Men*). *Ten to Men* is a national longitudinal study of boys and men aged 10–55 years at wave 1 (although in this study, only adult males who were employed were considered eligible). The study collects data on a range of life domains, including demographic and socio-economic characteristics, physical and mental health and wellbeing, health behaviours, and use and knowledge of health services. Sampling, recruitment, and data collection methods are described in detail elsewhere (Pirkis *et al.* 2017). But, as a brief overview, there were 104 884 households contacted by fieldworkers for the wave 1 survey. Contact was made with 81 400 households (78%) of which 33 724 (42%) were confirmed to be in-scope. Within these households, contact was made with 45 510 eligible males of whom 16 021 returned a wave 1 survey and were included in the study (a response rate of 35%) (Currier *et al.* 2016a). Wave 1 was conducted between October 2013 to July 2014. Wave 2 was conducted between November 2015 and May 2016 with 76% of the original cohort participating. *Ten to Men* received approval from the University of Melbourne Human Research Ethics Committee and conformed to the principles embodied in the Declaration of Helsinki.

Outcome variable

We assessed thoughts about suicide, specifically in the past 12 months, with the question: *Have you seriously thought about killing yourself in the past 12 months?* (Currier *et al.* 2016b). This was coded as a binary variable (yes/no) and collected at wave 2 only. We

were particularly interested in assessing this within a 12-month timeframe in order to assess thoughts of suicide since the baseline survey. As discussed below, we were able to use the Patient Health Questionnaire-9 (PHQ-9) to capture thoughts of suicide at baseline (in a 2-week timeframe) (Kroenke *et al.* 2001)

Main exposure variables at wave 1

We assessed four psychosocial job stressors: high job demands, low job control, job insecurity, and perceived fairness of pay. Job insecurity represented a sum of the three Likert scales (Cronbach's $\alpha = 0.67$): 'I have a secure future in my job' (reverse coded, so higher scores were associated with less security); 'I worry about the future of my job', and; 'My company will still be in business five years from now' (reverse coded, so higher scores associated with less security). Job control comprised the sum of the following Likert scales: 'I have the freedom to decide how I do my own work' (reverse coded, so higher scores associated with less control); 'I have a lot of say about what happens on my job' (reverse coded, so higher scores associated with less control), and; 'I have lot of freedom to decide when I do my work' reverse coded, so higher scores associated with less security) ($\alpha = 0.83$). Job demands and complexity comprised the sum of the three Likert scales: 'I use many of my skills in my current job'; 'My job is complex and difficult', and; 'my job requires learning new skills' ($\alpha = 0.72$). Fairness of pay was measured using a single item: 'I get paid fairly for the things I do in my job'. This was reverse coded so that higher scores were associated with lower fairness of pay. The four job stressors were rescaled based on the 0–25th, 25–50th, 50–75th, and 75th–100th percentiles, so that each contained four levels (1 = low exposure and 4 = high exposure). These have been described in a previous study of the baseline data (Milner *et al.* 2017a). Other employment related predictors included: Occupational skill level [high skill (managers and professionals), high to medium skill (technicians and trades workers and community and personal safety workers), medium to low skill (clerical and administrative workers and sales workers) and low skill (machinery operators and drivers and labourers), classified according to the Australian and New Zealand Standard Classification of Occupation (ABS 2009)], and; employment arrangement (permanent, casual/fixed term, self-employed).

Confounders

We adjusted for variables that could plausibly considered as prior causes of both employment and thoughts about

suicide that are not possible mediators (Glymour 2008). These included: age (18–24, 25–34, 35–44, 45–54, 55 years), relationship status (never married, widowed, divorce, separated but not divorced, married/default), education level as assessed by completion of year 12 (yes, no), and country of birth (1 = Australia, 0 = other countries). As it is impossible to determine whether possible mental health problems preceded or occurred after experiencing adversities at work, mental health at wave 1 [using the Mental Component Summary (MCS) score, as derived from the Short Form 12 (SF-12) health survey (Ware *et al.* 1996)] was assessed as a possible confounder in a later model.

Analytic approach

We assessed all exposures and confounders at baseline (wave 1) and thoughts of suicide at follow-up (wave 2). A descriptive analysis of exposures, confounders, and outcomes was conducted. Following this, we conducted a logistic regression with coefficients transformed into odds ratios (OR) for interpretation. We first assessed the exposures and outcome in univariate analysis. We then conducted an adjusted model including all covariates and confounders at the same time. We then conducted an analyses assessing wave 1 mental health as a confounder, while mutually adjusting for all other variables. Following this, we excluded people who reported suicide ideation in the first wave of study ('Thoughts better

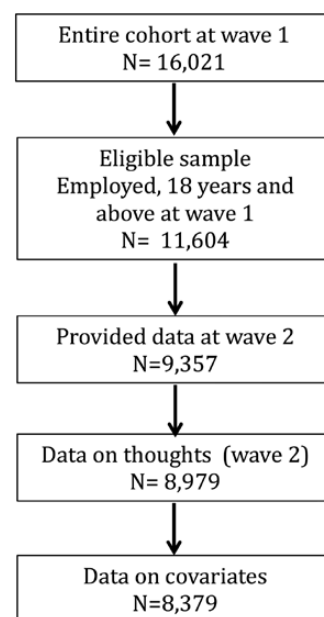


Figure 1. Sample included in analytic models.

dead/self harm in the past 2 weeks') using the Patient Health Questionnaire (PHQ-9) (Kroenke *et al.* 2001).

Results

The sample flow into the study can be seen in Fig. 1. Only adult males who were employed were considered eligible for the study. Of those adult participants retained at Wave 2 (77%), 8979 provided data on the

outcome variable. There was a further drop-off of 595 people who did not report data on confounders.

At wave 1, there was relatively lower exposure to job insecurity, but higher exposure to job demands and unfair pay (on a scale from 1 to 4). About 6% of the sample reported thoughts of suicide at wave 2 (Table 1).

Most of the men included in the sample had obtained year 12 (high school) education and were employed permanently. The majority of participants were employed in medium to high skill occupations. Over 70% of the sample were either married or in a defacto relationship.

Table 2 shows the results of the logistic regression. The unadjusted results represent the individual associations between the exposures and confounders with the outcome, while the adjusted results provide information on the outcome following mutual adjustment. Focusing on the most adjusted results (including for mental health at baseline), those who were exposed to job insecurity had 1.35 (95% CI 1.13–1.61, $P = 0.001$) times higher odds of reporting thoughts of suicide at follow-up compared to those with job security. Low job control was associated with 1.19 (95% CI 1.06–1.33, $P = 0.004$) times higher odds of reporting thoughts of suicide, compared to people with high job control. The results suggested that being employed casually or on a fixed term basis was associated with a 1.30 (95% CI 1.01–1.67, $P = 0.041$) higher odds of thoughts about suicide at follow up, relative to people who were employed permanently. After we excluded people who reported thoughts of suicide in wave 1 ($n = 860$), the ORs between job stressors and suicide ideation were 1.27 for job insecurity (95% CI 1.03–1.57, $P = 0.024$), 1.13 for low job control (95% CI 0.98–1.31, $P = 0.098$), 1.10 for high job demands (95% CI 0.94–1.27, $P = 0.229$), and 1.12 for unfair pay (95% CI 1.01–1.25, $P = 0.027$). Those who were working casually or on a fixed-term basis also had higher odds of suicide than those who were employed permanently (OR 1.38, 95% CI 1.02–1.88, $P = 0.039$).

Discussion

The current analysis showed that casual and fixed term work, job insecurity, and low job control were prospectively associated with thoughts about suicide. When we controlled for baseline mental health, many of these associations weakened. However, we are unable to tell the temporal ordering of the relationship between psychosocial job stressors and possible mental health problems because these were measured in the same (baseline) wave. Hence, it could be that job stressors caused poorer mental health, which was then predictive of thoughts of suicide at follow up. Alternatively, it could be that

Table 1. Description of sample ($n = 8379$)

	Mean (std. error)	
Job insecurity	1.70 (0.01)	
Low job control	2.07 (0.01)	
High demands	2.10 (0.01)	
Unfair pay	2.16 (0.01)	
SF-12 MCS	50.66 (0.09)	
	%	N
Thoughts of suicide (wave 2)		
No	93.71	7852
Yes	6.29	527
Education		
High school or less	37.34	3129
Trade certificate or above	62.66	5250
Employment arrangement		
Permanent	70.71	5924
Casual/fixed term	13.61	1141
Self-employed	15.68	1314
Occupation		
High skill	41.03	3438
High to medium skill	29.17	2444
Low to medium skill	11.02	923
Low skill	18.79	1574
Age group		
18–24 years	9.63	807
25–34 years	21.35	1789
35–44 years	32.27	2704
45–54 years	34.48	2889
55 years	2.27	190
Relationship status		
Never married	18.84	1579
Widow/div/sep	5.84	489
Married/de facto	75.32	6311
Country of birth		
Not-Aust.	21.74	1822
Aust.	78.26	6557

Thoughts of suicide reported at wave 2, and all other variables reported at wave 1. Aust. = born in Australia; Not-Aust. = not born in Australia; std. error = standard error; widow/div/sep = widowed, divorced, or separated.

Table 2. Logistic regression, prospective relationships between employment factors at wave 1 and thought about suicide at wave 2, people = 8379

	Unadjusted			Adjusted			Adjusted, including wave 1 mental health		
	OR	95% CI	P value	OR	95% CI	P value	OR	95% CI	P value
SF-12 MCS							0.92	0.91–0.93	<0001
Job insecurity									
Low	1			1			1		
High	1.51	1.26–1.78	<0.001	1.39	1.17–1.66	<0.001	1.35	1.13–1.61	0.001
Low job control									
Low	1			1			1		
High	1.3	1.17–1.43	<0.001	1.19	1.06–1.34	0.003	1.19	1.06–1.33	0.004
High demands									
Low	1			1			1		
High	0.95	0.85–1.06	0.336	1.09	0.97–1.23	0.146	1.09	0.97–1.23	0.154
Unfair pay									
Low	1			1			1		
High	1.16	1.07–1.26	<0.001	1.11	1.02–1.21	0.014	1.08	0.99–1.17	0.086
Education									
<High school	1			1					
>High school	0.88	0.73–1.05	0.156	0.84	0.69–1.02	0.085	0.86	0.70–1.05	0.143
Employment arrangement									
Permanent	1			1			1		
Casual/FT	1.57	1.25–1.98	<0.001	1.32	1.03–1.70	0.027	1.30	1.01–1.67	0.041
Self-employ	0.86	0.66–1.12	0.253	1.03	0.77–1.38	0.858	1.04	0.78–1.40	0.776
Occupation									
High skill	1			1			1		
High to med	1.15	0.93–1.44	0.205	0.95	0.75–1.20	0.663	0.95	0.75–1.21	0.701
Low to med	1.58	1.20–2.09	0.001	1.31	0.98–1.76	0.073	1.29	0.96–1.74	0.087
Low skill	1.32	1.03–1.68	0.025	1.01	0.77–1.34	0.926	0.96	0.73–1.28	0.803
Age group									
18–24 years	1			1			1		
25–34 years	0.70	0.52–0.95	0.021	0.97	0.69–1.36	0.701	0.92	0.65–1.30	0.63
35–44 years	0.64	0.48–0.85	0.002	0.95	0.66–1.36	0.648	0.89	0.62–1.28	0.525
45–54 years	0.55	0.41–0.74	<0.001	0.79	0.55–1.15	0.143	0.74	0.51–1.08	0.118
55 years	0.54	0.27–1.07	0.078	0.73	0.35–1.50	0.336	0.65	0.31–1.35	0.25
Relationship status									
Never mar	1			1			1		
Wid/div/sep	0.89	0.62–1.29	0.543	1.06	0.70–1.61	0.818	1.03	0.68–1.57	0.874
Mar/de facto	0.6	0.49–0.74	<0.001	0.74	0.57–0.96	0.014	0.79	0.60–1.02	0.074
Country of birth									
Not-Aust.	1			1			1		
Aust.	1.63	1.34–1.98	<0.001	1.43	1.13–1.86	<0.001	1.47	1.14–1.89	<0.003

Thoughts of suicide reported at wave 2, and all other variables reported at wave 1. Aust. = born in Australia; FT = fixed-term contract; Mar/de facto = married or in a defacto relationship; med = medium skill; Not-Aust. = not born in Australia; Never mar = never married; Wid/div/sep = widowed, divorced, or separated.

people with poorer mental health were selected into jobs with poorer psychosocial job quality. Both of these scenarios are further discussed below.

A recent methodological paper comparing the Ten to Men sample to an Australian national survey suggests that the cohort is broadly comparable to the Australian

age-matched male population (Currier *et al.* 2016a). Regardless, there are still some notable differences; including the Ten to Men cohort being older, more likely to be Australian-born, and more likely to live in regional areas (Currier *et al.* 2016a) than the Australian population. While this limits generalisability, representativeness of a cohort is less important to the value of such a longitudinal study, which is more focused on unpacking the associations between exposures and outcomes over time. Another limitation of this paper was retention into the study from waves 1 to 2; which, while similar to other cohort studies (Bauman *et al.* 2016; Wilkins 2017), may have resulted in selection bias. Another limitation is that our outcome and exposures were self-reported, resulting in possible dependent misclassification. There may also be some misclassification of the outcome, given that we used a single item measure of suicide ideation. Related to this, we cannot rule out the possibility of recall bias affecting the cause–effect relationship between job stressors and thoughts of suicide observed in this paper.

The results we present above suggest that indicators of precarious employment (such as casual or fixed-term employment) and self-reported job insecurity were risk factors for thoughts about suicide among men. Conceptually, indicators of precarious employment arrangement and job insecurity are distinct (Benach *et al.* 2014). However, both these indicators appear to be associated with worse outcomes. The results regarding job insecurity aligns with that of a recent meta-analysis (Milner *et al.* 2017c) on the relationship between employment and suicide, which also found that job insecurity was one of the strongest predictors of thoughts about suicide. It is worth noting that most of the research included in this review was based on cross-sectional data. Thus, the current paper represents a considerable advancement in knowledge as it demonstrates temporal associations between job stressors and thoughts of suicide. Although of slightly lesser magnitude, we also found that low job control was associated with elevated odds of thoughts about suicide. This aligns with a substantial body of cross-sectional research supporting the argument that job control is a risk factor for both suicide (Loerbroks *et al.* 2016; Yoon *et al.* 2016; Milner *et al.* 2017b) and common mental health problems (Harvey *et al.* 2017). In terms of our other results, there has been a large amount of research on the protective effects of education and relationships (Qin *et al.* 2000; Ugglä and Mace 2015) for suicide.

We conducted an analysis to assess the influence of mental health on the relationship between employment factors and suicide. We noted that we were unable to assess the temporal ordering of this relationship as both

mental health conditions and job stressors were measured in the same wave. However, there is evidence to suggest that people with poor mental health are experience social disadvantages and exclusion from a range of domains, including employment (Morgan *et al.* 2007; Mackenzie *et al.* 2013). At the same time, there is also evidence to suggest that employment in a poor-quality job (characterized by high exposure to job stressors) can lead to a decline in mental health (Butterworth *et al.* 2011; Milner *et al.* 2016). It is also possible that both of these circumstances occur, in that people with mental health problems are selected into jobs with a great number of psychosocial job stressors, and this leads to further declines in health. We will be able to fully explore these possibilities when future waves of data become available in Ten to Men.

In conclusion, this study supports the hypothesis that adverse working conditions are risk factors for thoughts about suicide among males. Males may be particularly sensitive to work related stressors, as suggested in the introduction of this paper (Bedeian 1982; Morrell *et al.* 1993; Boxer *et al.* 1995; Stack 2001; Blakely *et al.* 2003; Milner *et al.* 2013b; Milner *et al.* 2013c; Milner *et al.* 2014). This suggests that policy and practice efforts to improve these working conditions may reduce thoughts of suicide as well as conveying various other mental health, physical health, and productivity benefits (WHO 2006). At the same time, we would encourage further research seeking to unpack the complex associations between experiences of suicide (including thoughts, attempts, and deaths), poor mental health, gender, and employment.

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References

- ABS. (2009) ANZSCO - Australian and New Zealand Standard Classification of Occupations. 1st Ed, Revision 1. Cat. No. 1220.0. Canberra: Australian Bureau of Statistics.
- Bauman A, Phongsavan P, Cowle A *et al.* (2016) Maximising follow-up participation rates in a large scale 45 and Up Study in Australia. *Emerg Themes Epidemiol*; 13: 6.
- Bedeian, AG. (1982) Suicide and occupation: a review. *J Vocat Behav*; 21: 206–23.
- Benach J, Vives A, Amable M *et al.* (2014) Precarious employment: understanding an emerging social determinant of health. *Annu Rev Public Health*; 35: 229–53.

- Blakely TA, Collings SC, Atkinson J. (2003) Unemployment and suicide. Evidence for a causal association? *J Epidemiol Commun Health*; 57: 594–600.
- Boxer PA, Burnett C, Swanson N. (1995) Suicide and occupation: a review of the literature. *J Occup Environ Med*; 37: 442–52.
- Butterworth P, Leach LS, Strazdins L *et al.* (2011) The psychosocial quality of work determines whether employment has benefits for mental health: results from a longitudinal national household panel survey. *Occup Environ Med*; 68: 806–12.
- Byun J, Kim HR, Lee HE *et al.* (2016) Factors associated with suicide ideation among subway drivers in Korea. *Ann Occup Environ Med*; 28: 31.
- Cox T, Griffiths A, Randall R. (2004) A risk management approach to the prevention of work stress. In Schabracq MJ, Winnubst JAM, Cooper CL, editors. *The Handbook of Work and Health Psychology*. Chichester, UK: John Wiley & Sons, Ltd. 191–206.
- Currier D, Pirkis J, Carlin J *et al.* (2016a) The Australian longitudinal study on male health-methods. *BMC Public Health*; 16(Suppl 3): 1030.
- Currier D, Spittal MJ, Patton G *et al.* (2016b) Life stress and suicidal ideation in Australian men - cross-sectional analysis of the Australian longitudinal study on male health baseline data. *BMC Public Health*; 16: 43–49.
- Durkheim E. (1897) *Le suicide: étude de sociologie*, translated by John A. Spaulding and George Simpson (1951). Glencoe, Ill: Free Press.
- Fridner A, Belkić K, Minucci D *et al.* (2011) Work environment and recent suicidal thoughts among male university hospital physicians in Sweden and Italy: the health and organization among university hospital physicians in Europe (HOUPE) study. *Gen Med*; 8: 269–79.
- Glymour MM. (2008) Causal diagrams. In Rothman K, Greenland S, Lash TL, editors. *Modern epidemiology*. Philadelphia: Lippincott Williams and Wilkins.
- Harvey SB, Modini M, Joyce S *et al.* (2017) Can work make you mentally ill? A systematic meta-review of work-related risk factors for common mental health problems. *Occup Environ Med*; 74: 301–10.
- Karasek RA. (1979) Job Demands, Job Decision Latitude, and Mental Strain: implications for Job Redesign. *Admin Sci Q*; 24: 285–308.
- Kroenke K, Spitzer RL, Williams JB. (2001) The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*; 16: 606–13.
- Loerbroeks A, Cho SI, Dollard MF *et al.* (2016) Associations between work stress and suicidal ideation: individual-participant data from six cross-sectional studies. *J Psychosom Res*; 90: 62–9.
- Mackenzie CR, Keuskamp D, Ziersch AM *et al.* (2013) A qualitative study of the interactions among the psychosocial work environment and family, community and services for workers with low mental health. *BMC Public Health*; 13: 796.
- Milner A, Currier D, LaMontagne AD *et al.* (2017a) Psychosocial job stressors and thoughts about suicide among males: a cross-sectional study from the first wave of the Ten to Men cohort. *Public Health*; 147: 72–6.
- Milner A, Krnjacki L, Allisey A, Lamontagne AD. (2016) Entry into work and changes in mental health among young workers: a fixed effects regression analysis using 12 waves of annual data. *Scand J Work Environ*; 43(1): 50–58.
- Milner A, Page A, LaMontagne AD. (2013a) Duration of unemployment and suicide in Australia over the period 1985–2006: an ecological investigation by sex and age during rising versus declining national unemployment rates. *J Epidemiol Commun Health*; 67: 237–44.
- Milner A, Page A, LaMontagne AD. (2013b) Long-term unemployment and suicide: a systematic review and meta-analysis. *PLoS One*; 8: e51333.
- Milner A, Page A, LaMontagne AD. (2014) Cause and effect in studies on unemployment, mental health and suicide: a meta-analytic and conceptual review. *Psychol Med*; 44: 909–17.
- Milner A, Spittal MJ, Pirkis J *et al.* (2017b) Low control and high demands at work as risk factors for suicide: an Australian national population-level case-control study. *Psychosom Med*; 79: 358–64.
- Milner A, Spittal MJ, Pirkis J *et al.* (2013c) Suicide by occupation: systematic review and meta-analysis. *Br J Psychiatry*; 203: 409–16.
- Milner A, Witt K, Lamontagne AD, Niedhammer I. (2017c) Psychosocial job stressors and suicidality: a meta-analysis and systematic review. *Occup Environ Med*. doi:10.1136/oemed-2017-104531.
- Min KB, Park SG, Hwang SH *et al.* (2015) Precarious employment and the risk of suicidal ideation and suicide attempts. *Prev Med*; 71: 72–6.
- Morgan C, Burns T, Fitzpatrick R *et al.* (2007) Social exclusion and mental health: conceptual and methodological review. *Br J Psychiatry*; 191: 477–83.
- Morrell S, Taylor R, Quine S *et al.* (1993) Suicide and unemployment in Australia 1907–1990. *Soc Sci Med*; 36: 749–56.
- Oyesanya M, Lopez-Morinigo J, Dutta R. (2015) Systematic review of suicide in economic recession. *World J Psychiatry*; 5: 243–54.
- Pirkis J, Currier D, Carlin J, *et al.* (2017) Cohort profile: ten to men (the Australian longitudinal study on male health). *Int J Epidemiol*; 46(3): 793–794.
- Qin P, Agerbo E, Westergaard-Nielsen N *et al.* (2000) Gender differences in risk factors for suicide in Denmark. *Br J Psychiatry*; 177: 546–50.
- Shepherd DM, Barraclough BM. (1980) Work and suicide: an empirical investigation. *Br J Psychiatry*; 136: 469–78.
- Siegrist J. (1996) Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol*; 1: 27–41.
- Stack S. (2000) Suicide: a 15-year review of the sociological literature. Part I: cultural and economic factors. *Suicide Life Threat Behav*; 30: 145–62.
- Stack S. (2001) Occupation and suicide. *Social Science Quarterly*; 82: 384–96.

- Sugawara N, Yasui-Furukori N, Sasaki G *et al.* (2013) Gender differences in factors associated with suicidal ideation and depressive symptoms among middle-aged workers in Japan. *Ind Health*; 51: 202–13.
- Ugla C, Mace R. (2015) Someone to live for: effects of partner and dependent children on preventable death in a population wide sample from Northern Ireland. *Evol Hum Behav*; 36: 1–7.
- Ware J Jr, Kosinski M, Keller SD. (1996) A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Med Care*; 34: 220–33.
- WHO. (2006) *Preventing suicide—a resource series*. Geneva, Switzerland: WHO.
- Wilkins R. (2017) *The household, income and labour dynamics in australia survey: selected findings from waves 1 to 15*. Melbourne: Melbourne Institute: Applied Economic & Social Research.
- Yoon JH, Jeung D, Chang SJ. (2016) Does high emotional demand with low job control relate to suicidal ideation among service and sales workers in Korea? *J Korean Med Sci*; 31: 1042–8.