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Associations between psychological distress, workplace accidents, workplace failures and workplace successes

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Abstract
Purpose This study investigates associations between psychological distress and workplace accidents, workplace failures and workplace successes.
Methods The Health and Work Performance Questionnaire (HPQ) was distributed to employees of 58 large employers. A total of 60,556 full-time employees were eligible for analysis. The HPQ probed whether the respondent had, in the past 30-days, a workplace accident, success or failure ("yes" or "no"). Psychological distress was quantified using the Kessler 6 (K6) scale and categorised into low, moderate and high psychological distress. Three binomial logistic regressions were performed with the dependent variables being workplace accident, success or failure. Covariates in the models were K6 category, gender, age, marital status, education level, job category, physical health and employment sector.
Results Accounting for all other variables, moderate and high psychological distress significantly ($P < 0.0001$) increased the odds ratio (OR) for a workplace accident to 1.4 for both levels of distress. Moderate and high psychological distress significantly ($P < 0.0001$) increased the OR (OR = 2.3 and 2.6, respectively) for a workplace failure and significantly ($P < 0.0001$) decreased the OR for a workplace success (OR = 0.8 and 0.7, respectively).
Conclusions Moderate and high psychological distress increase the OR's for workplace accidents work failures and decrease the OR of workplace successes at similar levels. As the prevalence of moderate psychological distress is approximately double that of high psychological distress moderate distress consequentially has a greater workplace impact.

Keywords Occupational accidents · Psychological stress · Mental health · Task performance and analysis

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Introduction

Mental ill health and its subsequent effect on employee attendance and performance have now made its way into the literature of mainstream occupational health research. Mental disorders have been shown to substantially increase employee absenteeism and presenteeism. (Reviewed in (Sanderson and Andrews 2006)) Mental health symptoms are known to impair attention, concentration, memory, motivation, decision making, visuo-motor control, attentional set-shifting, effortful information processing and slow psychomotor reaction times (Klerman and Weissman 1992; Lerner et al. 2004a, b; Haslam et al. 2005; Sabbe et al. 1999; Purcell et al. 1997; Hammar et al. 2003) Impairments in these domains can result in reduced on-the-job performance and presenteeism and have the potential to predispose employees with these symptoms to workplace accidents/incidents, workplace failures and/or a reduction in workplace successes. Workplace accidents can be associated with substantial costs to an employer from loss or damage to equipment or goods, reduced production targets, medical/insurance expenses and associated absenteeism. It has been suggested that costs associated with

workplace critical incidents such as accidents and workplace failures may outweigh those produced by absenteeism or presenteeism (Wang et al. 2003). In Australia, in the employed, (data collected 2005–2006) the 12 months prevalence of work-related injuries or illness was 6.4% (Australian Bureau of Statistics 2006). Of the injured employees, 58% had some time off work, with the remainder not requiring time off work, 28% reported five or more days off work. In the US (data collected in 2007), 4.2% of full-time employees had a non-fatal occupational injury with 30% requiring a day or more in time off work, with the median time off being 7 days (Bureau of Labor Statistics 2009).

A number of studies have examined the positive relationship between job stress and/or psychosocial distress and occupational accidents (Murata et al. 2000; Nakata et al. 2006; Salminen et al. 2003; Swaen et al. 2004) and commuting accidents (Trimpop et al. 2010). These studies do not address mental health symptoms or diagnoses directly. Several studies have addressed the relationship between mental disorders (primarily depression) and workplace accidents in specific occupations. Depression was found to be positively related to workplace critical incidents such as accidents and workplace failures for reservation agents, customer service representatives, executives and railroad engineers in the US (Wang et al. 2003). Another small US study suggested that women with an occupational injury were more likely to have symptoms of depression than those without an occupational injury (Peele and Tollerud 2005). An Australian analysis of truck drivers found that severe or very severe depression symptoms increased the odds ratios for a workplace accident/near miss to 4.5 and 5.0, respectively (Hilton et al. 2009). A study of Japanese nurses identified that mental health difficulties increased the rate of medical errors (Suzuki et al. 2004). Japanese manufacturing workers with high symptoms of depression were found to have increased job-related accidents (Nakata et al. 2006). Conversely a study of Finnish hospital workers indicates that psychological distress, as measured by the General Health Questionnaire, was not significantly related to workplace accidents (Salminen et al. 2003).

Brief screening scales for mental disorders are increasingly being used to guide clinical decision making and in population surveys. The screening scales measure levels of psychological distress which are risk factors for presence/absence of a mental disorder. The 6-item scale of non-specific psychological distress, the Kessler 6 (K6), is one such screening survey which has been shown to be sensitive screen for mental disorders (Andrews and Slade 2001; Kessler et al. 2003b; Kessler et al. 2002). The authors are aware of only one large national study, conducted in the US, that specifically deals with the association between psychological distress (measured by the K6) and workplace accidents (Kim 2008). This study found that high psychological distress increased the odds ratio (OR) of a workplace accident to 1.34. However, the study does not examine the impact of moderate psychological distress on accidents. Since moderate psychological distress has been shown to increase presenteeism in employees (Hilton et al. 2008a), it also has the potential to influence accident rates. It is reported that 50% of individuals with a moderate K6 will meet diagnostic criteria for a mental disorder (Australian Bureau of Statistics 2009). Since the prevalence of moderate levels of psychological distress is much greater than that of high psychological distress (Hilton et al. 2008b), it may contribute to adverse work outcomes as much as or even more than serious psychological distress. We are not aware of any previous research that examines the separate effects of psychological distress on work failures or workplace successes.

The aim of the current study is to investigate the role of both moderate and high psychological distress in the occurrence of workplace accidents in a wide range of occupations and industries. The relationship between workplace successes, workplace failures and categories of psychological distress will also be examined.

Methods

The information presented in this paper was collected as part of a larger study, the Work Outcomes Research Cost-benefit (WORC) Project. Detailed information on the WORC project methodology can be located at http://www.qcmhr.uq.edu.au/worc/methodology.htm.

Recruitment

A detailed description of the employer and employee recruitment procedures has been published elsewhere (Cleary et al. 2008; Hilton et al. 2008b). Two hundred and one large government and private sector employers across Australia were contacted and invited to participate in the Work Outcomes Research Cost-Benefit (WORC) Project. The project was presented to employers as a proactive health screening and treatment facilitation programme for depression in the workplace. Employers were advised that the focus of the research was to establish the economic return on investment, from the employer's perspective, of detecting undiagnosed depression in the workplace and facilitating treatment of these employees. Fifty-eight large Australian employers agreed to participate in the WORC project. During October 2004–October 2005, the World Health Organisation Health and Work Performance Questionnaire (HPQ) (Kessler et al. 2003a; Wang et al. 2003;

Yen et al. 1994; Edington et al. 1997; Kessler et al. 2004) was circulated to employees of the participating organisations via paper or the internet. Each survey was accompanied by a letter stating that the survey was a general health and emotional well-being survey. To emphasise only the mental health component would have altered response rates, particularly in men (Sigmon et al. 1997; Stanton et al. 1991). Employees were encouraged to answer surveys by at least two reminders in the one-month survey period for each company. Only employees over the age of 18 years were invited to participate. Participation was both voluntary and confidential. The University of Queensland Human Research Ethics Committee approved the study protocol.

Survey contents

The HPQ was designed to evaluate employee productivity (including workplace accidents, work successes and work failures) for physical and mental health conditions (Kessler et al. 2003a; Wang et al. 2003; Yen et al. 1994; Edington et al. 1997; Kessler et al. 2004). Broadly, it contains four sections: (1) evaluation of the presence or absence of health conditions, (2) occupational characteristics (3) employee performance at work and (4) demographics. Further information on the HPQ can be located at http://www.hcp.med.harvard.edu/hpq/.

Kessler 6

Embedded in the HPQ is the Kessler 6 (K6), a six-item scale of psychological distress with high internal consistency and reliability. It strongly discriminates between community mental health cases and non-cases (Furukawa et al. 2003; Kessler et al. 2003b). Each of the six items on the K6 is rated by the respondent on a five-point scale from "none of the time" (value = 0) to "all of the time" (value = 4) (Furukawa et al. 2003). The K6 is scored by the summation of the response values; thus, the range is 0–24. Calibration studies indicate that a score of 13–24 represents high psychological distress (mental disorder likely), 8–12 moderate psychological distress (possible mental disorder), and 0–7 low psychological distress (mental disorder unlikely) (Kessler et al. 2003b).

Workplace accidents and experiences

The HPQ probes employees about recent (past 4-weeks) experiences at work including workplace accidents, failures and successes. The specific questions are, "did you have any of the following experiences at work in the past 4 weeks? (1) Any special work success or achievement. (2) Any special work failure. (3) An accident that caused either damage, work delay, a near miss, or safety risk" (subsequently referred to in the text as workplace accident). Answers to all three questions were "yes" or "no".

Demographics

Demographics used as variables in subsequent statistical modelling include sex, age (18–24, 25–34, 35–44, 45–54, 55–64, 65 and over), marital status (married or cohabitating, separated, divorced, widowed and never married) and, education level (less than year 10, year 10, year 12, some tertiary education, degree graduate, post graduate degree) and job category (Executive, administrator or senior manager; Professional; Technical support; Sales; Clerical and administrative support; Service occupation; Precision production and crafts worker; Operator and labourer). Whether the employee was public or private sector was also recorded.

Physical health conditions

The HPQ lists 24 physical health conditions. Respondents are asked to identify the presence or absence of any physical health condition(s). Check lists of this sort have been widely used in previous population-based studies. Good concordance between checklists and medical records has been shown (Heliovaara et al. 1993; Halabi et al. 1992; Kriegsman et al. 1996). The number of physical health conditions was coded into categories of 0, 1, 2, 3, 4, 5, 6 or more. Coding the number of physical health conditions as a covariate has previously been applied by a number of researchers (Kessler et al. 2004; Hilton et al. 2008a). Controlling for the number of long-term health conditions reduced overestimations from disease-specific effects (Merikangas et al. 2007).

Statistical analyses

Statistical comparison of cross-tabulated data was made using the Pearson Chi-Square statistic. For the dichotomous variables of workplace accidents, work success or work failure (dependent variables), a binomial logistic regression was performed with the independent co-variates of psychological distress (K6: low, moderate, high), age, marital status, education level, job category, employment sector and number of physical health conditions. Statistical analyses were performed using SPSS version 15.0 for Windows.

Results

A diverse array of employer industries was recruited for the study: manufacturing ($N = 2$ employers), electricity, gas, water and waste services ($N = 3$), construction ($N = 1$),

retail trade ($N = 1$), information, media and telecommunications ($N = 3$), finance and insurance services ($N = 5$), professional, scientific and technical services ($N = 2$), administrative and support services ($N = 1$), public administration and safety ($N = 22$), education and training ($N = 6$), health care and social assistance ($N = 12$). The diversity of participating employers makes results pertinent to many industries.

Response rates and sample characteristics

The mean response rate to the HPQ survey was 24.7%. In total, 25,607 male and 34,859 female full-time employees responded to the survey (total of 60,556). Table 1, left hand column, lists the characteristics of the sample population and the percentage of respondents that fall into the K6 mental health symptom categories. In summary, (1) there was a greater number of women (57.6%) in the sample. (2) Most of the employees (83.1%) fell within the age range of 25 years to 54 years. (3) The majority (77.1%) of employees had an educational level of some tertiary or above. (4) The data was dominated by white-collar employees (93.6%) having an under-representation of service, precision production and crafts and operator or labourers. (5) 4.5% of employees had high psychological distress, 9.6% had moderate psychological distress, with the remainder having low levels of psychological distress.

Table 1 presents the unadjusted prevalence of workplace accidents, failures and successes by demographic and employment-related variables. All demographic and workplace measures in Table 1 are significantly related to at least one of the three outcome measures, justifying the inclusion of these variables in subsequent regressions. Tables 2, 3 and 4 present the results of binomial logistic regressions for workplace accidents, workplace failures and workplace successes respectively with demographic characteristics simultaneously entered into the model.

Accidents

Tables 1 and 2 show that gender and marital status have no significant influence over the occurrence of workplace accidents. Unadjusted prevalence rates in Table 1 suggest that workplace accident frequency varies by age; however, regression results in Table 2 indicate that when co-variates are accounted for age has no significant impact on workplace accident frequency. Tables 1 and 2 show that education status, job category, number of physical health conditions, employment sector and psychological distress have significant associations with workplace accidents. The only significant variable in education status is that having some tertiary education increases the OR (1.5) for a workplace accident when compared to <year 10 education. A substantial predictor of workplace accident occurrence is job category. Blue-collar employees in the categories of precision production and crafts and operator or labourer have OR's for an accident of 3.6 compared to executives. As the number of physical health conditions increases, the OR for an accident (Table 2) monotonically increases with employees experiencing six or more physical health conditions having an OR of 2.3. Moderate psychological distress and high psychological distress are significantly associated with an increase in the OR (1.4 for both) for a workplace accident once all other workplace and demographic variables are accounted for.

Workplace failures

All variables were significantly associated with prevalence (Table 1) and OR's (Table 3) for a workplace failure. Women were less likely than men to report a workplace failure, although the effect size was small (OR = 0.9). With the exception of those aged 65+ years, all aged above 18 to 24-years had elevated OR for a workplace failure, the largest being 1.6 in the 45–54-year-old bracket. Marital status had little effect in predicting workplace failure with only the never married group reaching statistical significance, and with small effect size (OR = 0.9). As the number of years of education increased the OR for a workplace failure also increases monotonically, with post graduate degree holders having the highest rate (OR = 2.4). Executives and sales staff had the largest OR's (1.0) for a workplace failure. The OR for workplace failure rose with the number of physical health conditions reported, with six or more health conditions associated with an OR of 2.1. Both moderate and high psychological distress had increased OR's (2.3 and 2.6, respectively) for a workplace failure, higher than the OR's for having 6 or more physical health conditions. Of all the predictor variables, high psychological distress had the greatest effect on the reporting of workplace failures.

Workplace successes

Table 4 shows that the only variable not associated with any special workplace success or achievement was the number of physical health conditions. Women were more likely to report successes than men, although the effect size is again small (OR = 1.1). As age increased so did the odds of having a workplace success, with the 65+ year employees having an OR of 1.5. Being widowed was associated with a significant decrease in the odds of reporting a workplace success (OR = 0.8). While education status is associated with increased work failures (noted earlier), Table 4 shows that increased educational levels is also associated with increased reports of workplace

Table 1 Population characteristics and prevalence of workplace accidents, workplace failures and workplace successes by demographic and work-related variables

	% of sample	Number (%) reporting workplace accident	Number (%) reporting workplace failure	Number (%) reporting workplace successes
Sex		NS	*	NS
Male	42.4%	852 (3.3%)	2,420 (9.5%)	7,893 (30.8%)
Female	57.6%	1,078 (3.2%)	2,963 (8.6%)	10,954 (30.5%)
Age (years)		*	*	*
18–24	6.9%	131 (3.1%)	237 (5.7%)	1,034 (24.7%)
25–34	26.1%	417 (2.7%)	1,154 (7.3%)	4,342 (27.5%)
35–44	27.5%	531 (3.2%)	1,586 (9.6%)	5,125 (30.9%)
45–54	29.5%	643 (3.6%)	1,903 (10.7%)	5,956 (33.5%)
55–64	9.6%	199 (3.5%)	497 (8.7%)	1,948 (33.8%)
65+	0.4%	9 (3.6%)	6 (2.4%)	82 (33.1%)
Mean age (SE)	41 (0.05)			
Marital status		NS	*	*
Married or cohabiting	69.2%	1,350 (3.3%)	3,823 (9.2%)	13,086 (31.4%)
Separated	3.4%	69 (3.4%)	214 (10.6%)	642 (31.8%)
Divorced	6.5%	126 (3.2%)	375 (9.6%)	1,246 (31.8%)
Widowed	0.8%	13 (2.6%)	50 (9.9%)	134 (26.6%)
Never married	20.1%	367 (3.0%)	897 (7.4%)	3,333 (27.5%)
Education status		†	*	*
<year 10	2.1%	46 (3.7%)	67 (5.3%)	279 (22%)
Year 10	10.9%	210 (3.2%)	356 (5.5%)	1,473 (22.5%)
Year 12	9.9%	144 (2.4%)	359 (6.0%)	1,364 (22.9%)
Some tertiary	26.7%	533 (3.4%)	1,269 (7.9%)	4,536 (28.3%)
Degree graduate	30.3%	581 (3.2%)	1,755 (9.7%)	5,944 (32.7%)
Post graduate degree	20.1%	399 (3.3%)	1,555 (12.9%)	4,801 (39.8%)
Job category		*	*	*
Executive	13.1%	204 (2.6%)	970 (12.3%)	3,335 (42.1%)
Professional	48.4%	1,088 (3.7%)	3,002 (10.3%)	9,836 (33.7%)
Technical support	6.1%	95 (2.6%)	239 (6.6%)	975 (26.7%)
Sales	3.3%	37 (1.9%)	188 (9.4%)	606 (30.1%)
Clerical/admin	22.7%	259 (1.9%)	776 (5.7%)	2,869 (20.9%)
Service occupation	3.5%	100 (4.8%)	104 (5.0%)	448 (21.5%)
Precision and crafts	1.2%	59 (8.4%)	42 (5.9%)	184 (26.0%)
Operator or labourer	1.8%	88 (8.4%)	62 (5.9%)	234 (22.3%)
Number of physical health conditions		*	*	NS
0	13.0%	174 (2.2%)	451 (5.8%)	2,430 (30.9%)
1	16.6%	232 (2.3%)	644 (6.5%)	3,020 (30.2%)
2	16.8%	256 (2.5%)	781 (7.7%)	3,056 (30.1%)
3	14.4%	262 (3.0%)	712 (8.2%)	2,680 (30.8%)
4	11.5%	238 (3.4%)	687 (9.9%)	2,148 (30.8%)
5	8.5%	186 (3.6%)	569 (11.1%)	1,588 (30.8%)
6+	19.2%	582 (5.1%)	1,539 (13.4%)	3,565 (31.0%)
Employment sector		*	*	*
Public	69.7%	1,573 (3.8%)	3,961 (9.4%)	13,247 (31.5%)
Private	30.3%	357 (2.0%)	1,422 (7.8%)	5,237 (28.7%)
Kessler 6 categories		*	*	*
Low (0–7)	85.9%	1,536 (3.0%)	3,897 (7.5%)	16,368 (31.6%)
Moderate (8–12)	9.6%	271 (4.7%)	998 (17.2%)	1,499 (25.8%)
High (13–24)	4.5%	123 (4.6%)	488 (18.0%)	620 (22.8%)

* Pearsons χ^2 for category $P < 0.001$. † = χ^2 $P < 0.02$. NS is $P > 0.05$

Table 2 Odds ratio (OR) for workplace accidents by demographic employment and psychological distress levels

	Reference category			*P*
	OR	95.0% CI		
		Lower	Upper	
Sex				
Male				
Female	0.98	0.88	1.08	0.67
Age				
18–24				0.42
25–34	0.84	0.68	1.03	0.09
35–44	0.90	0.73	1.11	0.33
45–54	0.93	0.75	1.15	0.49
55–64	0.83	0.65	1.07	0.16
65+	0.91	0.45	1.83	0.78
Marital status				
Married or cohabiting				0.64
Separated	0.94	0.73	1.21	0.64
Divorced	0.92	0.76	1.11	0.40
Widowed	0.71	0.40	1.24	0.23
Never Married	1.03	0.90	1.17	0.68
Education status				
<year 10				0.01
Year 10	1.32	0.94	1.84	0.11
Year 12	1.23	0.86	1.76	0.25
Some tertiary	1.52	1.10	2.10	0.01
Degree graduate	1.27	0.91	1.78	0.16
Post graduate degree	1.25	0.89	1.76	0.19
Job category				
Executive				<0.0001
Professional	1.43	1.23	1.67	<0.0001
Technical support	1.01	0.78	1.29	0.96
Sales	0.99	0.68	1.44	0.95
Clerical/admin	0.66	0.54	0.81	<0.0001
Service occupation	1.66	1.28	2.14	<0.001
Precision and crafts	3.55	2.58	4.89	<0.0001
Operator and labourer	3.58	2.70	4.75	<0.0001
Number of physical health conditions				
0				<0.0001
1	1.07	0.87	1.30	0.53
2	1.19	0.98	1.45	0.09
3	1.41	1.16	1.72	<0.001
4	1.59	1.30	1.95	<0.0001
5	1.66	1.34	2.06	<0.0001
6+	2.25	1.88	2.69	<0.0001
Employment sector				
Private				
Public	1.85	1.63	2.10	<0.0001
Kessler 6 categories				
Low (0–7)				<0.0001
Moderate (8–12)	1.40	1.22	1.61	<0.0001
High (13–24)	1.36	1.12	1.65	<0.0001

successes, with an OR of 1.9 for post graduate degree holders. Executives had the largest OR for a workplace success (OR = 1; being the reference category), while clerical and administrative staff, service occupation staff and operators and labourers had the lowest. (OR range of 0.4–0.5) Moderate and high levels of psychological distress were both associated with a reduction in reporting workplace successes (OR = 0.8 and 0.7, respectively).

Discussion

The results of this study strongly support the proposition that both moderate and high levels of psychological distress impact workplace accidents. In line with previous research reporting an OR of 1.3 for an occupational accident in those with high psychological distress (Kim 2008), we found that high psychological distress increases the OR for an occupational accident to 1.4. Importantly, our study shows that the OR for an accident in employees with moderate distress is also 1.4. It is also evident that both moderate and high psychological distress increases the OR for a workplace failure and decrease the OR for workplace successes.

Our current analyses examines the effects of both moderate and high employee psychological distress on self-reported occupational accidents, adjusting for demographic and work-related variables. Previous research has shown that 50% of individuals with moderate psychological distress have a diagnosable mental disorder (Australian Bureau of Statistics 2009) and that moderate psychological distress has an effect on work performance (Hilton et al. 2008a) which may elevate the propensity for workplace accidents. We conclude that both moderate and high psychological distress need to be considered as factors important in managing workplace accidents. Also, since moderate psychological distress has more than double the prevalence (9.6%) of high psychological distress, its impact on workplace accidents is substantially greater than the impact of high psychological distress. The message from these results is clear: future research and occupational health and safety programmes should not focus just on those employees with the most severe symptoms of mental ill health. The scope of studies or interventions should also extend to those with moderately high levels of symptoms. This perspective is also important for early intervention as many individuals with moderate levels of psychological distress may be on a trajectory to higher levels of distress without some intervention to assist them.

Our results show that moderate and high psychological distress increase the OR for a workplace failure to similar

Table 3 Odds ratio (OR) for workplace failures by demographic employment and psychological distress levels

	Reference category			*P*
	OR	95.0% CI		
		Lower	Upper	
Sex				
Male				
Female	0.87	0.82	0.93	<0.0001
Age				
18–24				<0.0001
25–34	1.14	0.98	1.32	0.09
35–44	1.48	1.27	1.72	<0.0001
45–54	1.60	1.37	1.87	< 0.0001
55–64	1.29	1.08		< 0.005
65+	0.38	0.17	0.88	0.02
Marital status				
Married or cohabiting				0.15
Separated	1.08	0.93	1.26	0.30
Divorced	1.01	0.90	1.13	0.88
Widowed	1.15	0.85	1.55	0.38
Never Married	0.91	0.84	0.99	0.04
Education status				
<year 10				< 0.0001
Year 10	1.08	0.82	1.42	0.60
Year 12	1.28	0.97	1.69	0.08
Some tertiary	1.65	1.26	2.14	< 0.001
Degree graduate	2.01	1.54	2.62	< 0.0001
Post graduate degree	2.44	1.87	3.19	< 0.0001
Job category				
Executive				< 0.0001
Professional	0.84	0.77	0.91	< 0.0001
Technical support	0.57	0.49	0.67	< 0.0001
Sales	1.01	0.85	1.21	0.89
Clerical/admin	0.55	0.49	0.61	< 0.0001
Service occupation	0.48	0.38	0.59	< 0.0001
Precision and crafts	0.62	0.45	0.86	< 0.005
Operator and labourer	0.63	0.48	0.84	< 0.005
Number of physical health conditions				
0				< 0.0001
1	1.12	0.99	1.27	0.08
2	1.34	1.19	1.52	< 0.0001
3	1.38	1.22	1.57	< 0.0001
4	1.68	1.48	1.90	< 0.0001
5	1.84	1.62	2.11	< 0.0001
6+	2.11	1.88	2.37	< 0.0001
Employment sector				
Private				
Public	1.15	1.07	1.23	< 0.001
Kessler 6 categories				
Low (0–7)				< 0.0001
Moderate (8–12)	2.34	2.16	2.54	< 0.0001
High (13–24)	2.55	2.29	2.84	< 0.0001

Table 4 Odds ratio (OR) for workplace successes by demographic employment and psychological distress levels

	Reference category			*P*
	OR	95.0% CI		
		Lower	Upper	
Sex				
Male				
Female	1.08	1.04	1.12	<0.001
Age				
18–24				<0.0001
25–34	1.02	0.94	1.11	0.66
35–44	1.21	1.11	1.32	<0.0001
45–54	1.35	1.24	1.47	<0.0001
55–64	1.39	1.26	1.54	<0.0001
65+	1.48	1.11	1.97	<0.01
Marital status				
Married or cohabiting				0.02
Separated	1.08	0.98	1.19	0.13
Divorced	1.01	0.94	1.08	0.85
Widowed	0.78	0.64	0.96	0.02
Never Married	0.96	0.91	1.00	0.07
Education status				
<year 10				<0.0001
Year 10	1.03	0.89	1.20	0.68
Year 12	1.11	0.95	1.29	0.18
Some tertiary	1.39	1.20	1.60	<0.0001
Degree graduate	1.54	1.34	1.79	<0.0001
Post graduate degree	1.90	1.64	2.20	<0.0001
Job category				
Executive				<0.0001
Professional	0.69	0.65	0.73	<0.0001
Technical support	0.57	0.53	0.63	<0.0001
Sales	0.79	0.70	0.88	<0.0001
Clerical/admin	0.44	0.41	0.47	<0.0001
Service occupation	0.47	0.42	0.53	<0.0001
Precision and crafts	0.62	0.52	0.75	<0.0001
Operator and labourer	0.51	0.44	0.61	<0.0001
Number of physical health conditions				
0				<0.01
1	0.95	0.89	1.01	0.09
2	0.95	0.89	1.01	0.13
3	0.98	0.92	1.05	0.64
4	1.00	0.93	1.08	0.99
5	1.01	0.93	1.09	0.88
6+	1.06	0.99	1.13	0.09
Employment sector				
Private				
Public	1.06	1.02	1.11	<0.01
Kessler 6 categories				
Low (0–7)				<0.0001
Moderate (8–12)	0.77	0.72	0.82	<0.0001
High (13–24)	0.66	0.60	0.72	<0.0001

levels (OR = 2.3 and 2.6, respectively). The effect of high psychological distress on the OR for a workplace failure was the largest effect size across the other demographic and work related variables quantified. While research indicates that psychological distress and mental disorders increase presenteeism and absenteeism (Sanderson and Andrews 2006), costs due to work failures are likely additional to those due to presenteeism. Work failures can have psychological effects that add further to the downward spiral of work performance, e.g. lower morale, lower self-esteem, and low self-efficacy for the work to be performed. While difficult to cost in financial terms, these lead to changed workplace behaviour that particularly affects the interpersonal domain of workplace operations, e.g. relationships with co-workers and clients. Selected examples of reported work failures by our survey respondents are: "not performing duties correctly", "workplace conflict", "failed deadlines", "unable to complete task required", "failure to meet standards", "gave wrong advice", "made some bad decisions" and "difficulty with interpersonal issues".

Our data indicate that moderate and high psychological distress reduce the chance of employees reporting a workplace success (OR = 0.77 and 0.66, respectively). To date research into the effect of mental health on employee and employment outcomes has focussed on negative consequences. There has been little data to examine the effect of psychological distress on positive work experiences, even though they are an important characteristic of employed life. Our findings further the understanding of the impact of psychological distress on employees. It illustrates that not only are there negative implications in terms of increased absenteeism, decreased work performance, increased workplace accidents and increased work failures, but also that it leads to fewer positive work experiences which further adds to employee distress and non-productivity.

Positive experiences can improve employee satisfaction which translates to increased employee performance (Petty et al. 1984), employee retention (Hom and Griffeth 1991; Mobley et al. 1979) and customer retention (Schneider and Bowen 1985). Positive work experiences may also improve work-related self-efficacy leading to improved employee motivation and performance (Stajkovic and Luthans 1998; Gist and Mitchell 1992). Thus, while mental health factors that impinge on workplace failure are often identified to improve performance, those that impinge on workplace success need also to be identified so that they may be addressed by future interventions.

It has been shown that workplace stress being due to long working hours or high job demand, low job control, low co-worker support, high variance in workload, low job satisfaction increases workplace accident frequency (Johnston 1995; Murata et al. 2000; Nakata et al. 2006; Salminen et al. 2003; Swaen et al. 2004; Trimpop et al. 2010). It is probable that some individuals with high job stress go onto report psychological distress. A small component of the increased risk for an occupational accident due to moderate or high psychological distress may be due to job stress. However, psychological distress and mental health disorders occur irrespective of workplace stress. It may also be the case that psychological distress causes some individuals to stress about their job. Although the current report did not quantify job stressors, it is likely the case that job stress is a risk factor for occupational accidents and psychological distress is a separate risk factor. More work needs to be done on the link between job stress and propensity for psychological distress.

Our data also reports the impact of physical health on workplace accidents and workplace failures. Having physical health conditions is a significant contributor to these domains, with impact increasing with the number of conditions reported increases. This highlights that addressing physical health problems is also important in reducing occupational accidents and in lessening workplace failures. While the data presented is a count of conditions and not a measure of condition severity, it is likely that the interaction between condition severity and number of physical health conditions impacts occupational outcomes. Interestingly, unlike psychological distress, the number of physical health conditions is not related to positive work outcomes. Thus, psychological distress may play a larger role in determining overall work outcomes than physical health, since it impacts both success and failure work experiences.

The findings presented in this paper add to the accumulating weight of evidence that mental disorders are costly, and that workplace interventions to ameliorate them may produce positive outcomes in terms of cost benefit to the employer. Some investigation of this area has been done. For example research has suggested that the cost of a proactive depression outreach and care management programme in employees is less than the productivity losses that would have been incurred without the care management programme (Wang et al. 2007). Some effects of interventions are readily measured and costed (e.g. absenteeism, presenteeism) but these often represent only a portion of the total cost of productivity loss caused by factors such as psychological distress and mental disorders. Costing the impact of workplace accidents, workplace failures, workplace successes, and the benefit of interventions to remedy them is problematic and beyond the scope of this paper. For example: how do you put a price on a teacher who failed to teach a child to read? What is the cost to an employer of an employee who disturbs the well-being of others, or lowers workplace morale? These are cost/benefit questions yet to be answered by future research.

Limitations

The sample of employees was not randomly selected. Companies (employers) self-selected as to whether they would participate in the project. Employees from the companies self-selected as to whether they would respond to the survey. However, self-selection biases in the current data are representative of those inherent in any employee health–screening survey. Companies self-select as to whether the run a HRA survey and employees are free to choose whether they respond. Consequentially the current paper represents real world methodology. The response rate of 25% to the HPQ survey is low in epidemiological terms. However, this is the typical response rate obtained when health questionnaires are sent to employees in multiple large employers (Ryder 1999; Wang et al. 2002; Wang et al. 2007; Munir et al. 2007). Comparison of responders to non-responders, to a questionnaire containing mental health questions, showed no statistical difference in the Hamilton Depression Scale (Eyers et al. 1994). Previous studies indicate that a variation in the response rate is not related to prevalence of chronic conditions (including depression) or employee performance (Wang et al. 2002). Additionally in the data set we present here we have previously shown that response rates are not predictive of prevalence of psychological distress (Hilton et al. 2008b).

As the data presented is cross-sectional, causality between psychological distress and workplace accidents, work successes and failures cannot be definitively established. For example it is possible that a workplace failure resulted in a degree of psychological distress. Both the K6 scale of psychological distress and measures of accidents, successes and failures were both conducted over a recall period of the past 4-weeks. Mental disorders and the resulting psychological distress are likely to be chronic while workplace accidents, failures and successes are recent acute events. It is therefore more probable that psychological distress is a precursor to the workplace outcome variables.

There was an under-representation of employers from blue-collar industries (e.g. mining, manufacturing). In an effort to obtain a balanced sample of employees, a purposeful intense effort was made to engage employers of blue-collar workers. Thirty-seven employers, in blue-collar industries, were approached to participate of which only one agreed. The majority of blue-collar workers were therefore obtained from organisations with a diverse array of employee types. However, there are a total of 1,411 blue-collar workers in the sample, sufficient numbers to include in the analyses.

Conclusions

Moderate and high psychological distress increase the risk of workplace accidents (OR = 1.4 for both), increase the risk of work failures (OR = 2.3 and 2.6 for moderate and high distress, respectively) and decrease the occurrence of workplace successes (OR = 0.8 and 0.7, respectively). Moderate psychological distress has similar consequences to high psychological distress in the prevalence and OR's of workplace accidents, failures and successes. The prevalence of moderate psychological distress is approximately double that of high psychological distress and consequentially has a greater impact in terms of workplace accidents, failures and successes. Therefore, both researchers and employers should consider both moderate as well as high levels of mental health symptoms when implementing or evaluating work programmes for employees.

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Conflict of interest The authors declare that they have no conflict of interest.

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