Received: 16 May 2023 | Revised: 4 September 2023 | Accepted: 16 September 2023

DOI: 10.1002/1348-9585.12428

Journal of Occupational Health Open Access WILEY

ORIGINAL ARTICLE

Industry differences in psychological distress and distress-related productivity loss: A cross-sectional study of Australian workers

Kristy Burns[1] | **Elizabeth-Ann Schroeder**[1,2] | **Thomas Fung**[1] | **Louise A. Ellis**[1] | **Janaki Amin**[1]

[1]Department of Health Systems and Populations, Faculty of Medicine and Health Sciences, Macquarie University, Sydney, New South Wales, Australia

[2]Nuffield Department of Primary Care Services, University of Oxford, Oxford, UK

Correspondence
Kristy Burns, Department of Health Systems and Populations, Faculty of Medicine and Health Sciences, Macquarie University, Balaclava Rd, Sydney, NSW 2119, Australia.
Email: kristy.burns@hdr.mq.edu.au

Abstract

Objective: This research uses Australian survey data to identify industries with high rates of psychological distress, and to estimate productivity impacts in the form of work loss and cutback days.

Methods: Analyzing cross-sectional data from the 2017/2018 National Health Survey, industry prevalence of psychological distress (Kessler Screening Scale) was compared using ordered logistic regression. Productivity outcomes were distress-related work loss days and work cutback days in the previous 4 weeks. Losses were analyzed using zero-inflated negative binomial regression.

Results: The sample consisted of 9073 employed workers [4497 males (49.6%), 4576 females (50.4%)]. Compared to the reference industry, *Health*, the odds of very high distress for males were highest in *Information media and telecommunications* (OR 2.4; 95% CI 1.2–4.6) and *Administrative and support services* (OR 2.5; 95% CI 1.2–5.0), while for females the odds were highest in *Accommodation and food services* (OR 2.0; 95% CI 1.5–2.8) followed by *Retail* (OR 1.6; 95% CI 1.2–2.0). Very high distress was associated excess productivity losses. Industry of occupation did not impact on productivity loss over and above distress.

Conclusions: Substantial psychological distress was reported which impacted on productivity. High-risk industries included *Information media and telecommunications, Accommodation and food services,* and *Retail.*

KEYWORDS

cross-sectional study, distress, industry, mental health, occupational health

1 | INTRODUCTION

Industry and policymakers are increasingly recognizing that poor psychological health at work is a pervasive and expensive problem.[1] In Australia, it is estimated that mental ill-health costs workplaces approximately $17 billion per year, with much of this cost attributed to reduced workplace productivity via absenteeism and

presenteeism.[1] While workplace risks are known to impact mental health,[2] such research is limited in its ability to direct specific attention to high-prevalence workforces for prevention efforts. Identifying workforces where rates of psychological distress among workers are elevated is an important step toward improving worker mental health by allowing for targeted interventions.

Studies examining the relationship between occupations, industries and psychological distress have shown mixed results. Policymakers typically rely on evidence from compensation claims data to identify high-risk workforces,[3] but barriers to claim acceptance[4] and lack of eligibility in some industries means workers' compensation data is unlikely to provide a true indication of rates of psychological distress across industry workforces. Population-based survey data can provide a more comprehensive perspective when comparing prevalence of distress across occupational groups; however, the limited Australian research undertaken of this kind has found no evidence of an association between specific occupations (i.e., teachers, nurses) and either mental disorders[5] or psychological distress.[6] Among Australian studies that have examined the association between industry groups and psychological distress, one found a higher prevalence of distress in the communication industry among full-time workers,[6] while another found no difference in mental health status by industry.[7] International research is scarce.[8] While Canadian research has found higher rates of poor mental health in the manufacturing; wholesale; retail, and transportation and warehousing industries,[8] differences in industry coding make cross-country translations difficult.

In this exploratory study, we analyze Australian data from the National Health Survey (NHS) 2017–2018, a population-based study with validated measures of psychological distress and distress-related productivity impacts to determine the relationship between industry and psychological distress, and estimate the productivity losses associated with workforce distress. Given the consistent gender disparity found in mental health research,[9,10] this analysis is stratified by sex, allowing for the possibility that the relationship between industry of occupation and psychological distress is different for males and females.

The aim of this study was to determine priority industries for intervention support: industries with the highest prevalence of workers experiencing poor mental health from any cause (work and non-work related), reflecting the greatest potential to benefit from industry-wide intervention. In addition, we aimed to estimate the productivity losses associated with this psychological distress in terms of work loss and cutback days.

2 | METHODS

2.1 | Study design

Data for this study were obtained from the National Health Survey (NHS) 2017–2018 Confidentialised Unit Record File (CURF) dataset. The NHS are a series of cross-sectional surveys conducted by the Australian Bureau of Statistics (ABS). Data extraction via ABS Microdata download occurred in June 2021. A comprehensive description of the study participants, survey, and sampling design for the 2017–2018 NHS can be found elsewhere.[11]

2.2 | Sample

The NHS was conducted across Australia using a stratified multistage area sample of private dwellings (excludes very remote areas and those living in non-private dwellings).[11] Information was collected through face-to-face interview. Data collection took place between July 2, 2017 and June 30, 2018. The final sample contains 16 376 dwellings (76.0% response rate) yielding a total sample size of 21 315 persons. For this study, the sample was limited to working adults aged 18–65 years.

Access to the confidentialized data were granted under an agreement between Universities Australia and the ABS.

2.3 | Measures

2.3.1 | Psychological distress

Psychological distress was measured using the Kessler Psychological Distress Scale-10 (K10).[12] The K10 questionnaire yields a global measure of psychological distress based a 10-item Likert format scale measuring level of nervousness, agitation, psychological fatigue, and depression in the past 4 weeks in a single composite score. The scores range from 10 to 50. The K10 score was categorized as low (10–15), moderate (16–21), high (22–29), and very-high (30–50), in accordance with ABS category parameters.[11] A high K10 score is highly associated with the presence of an anxiety and/or affective disorder and is a commonly used component of international health surveys.[12] K10 data were only collected from persons aged 18 or over. As the interpretation of the K10 for those aged over 65 requires specific consideration,[13] analysis was limited to working adults aged <65 years.

2.3.2 | Productivity

Consistent with previous research[5,14] productivity loss associated with distress was measured by two items which immediately follow the K10 items. The first asks the number of days the respondent was *unable to work, study, or carry out day-to-day activities because of feelings in the last 4 weeks* (distress-related work loss days), and the second asks the number of days they *cut down on work, study, or day-to-day activities as a result of feelings in the last 4 weeks* (distress-related work cutback days). In line with previous research,[1,15] given this analysis is restricted to employed persons these days are assumed to impact on work for this population.

2.3.3 | Independent variables

Industry of occupation was coded for participants main job according to the Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006.[16] Multivariate models included covariates with known or suspected associations with distress that were available in the ABS microdata: age (three categories: 18–29 years, 30–49 years, and 50–64 years), socioeconomic status (using the Socio-Economic Indicators for Areas [SEIFA] produced by the ABS, analyzed in quintiles), employment status (employee, owner manager with employees, or owner manager without employees), and usual hours of work per week.

2.4 | Statistical analysis

Replicate weighting variables in the ABS-provided CURF were used throughout to account for the complex sample design. The standard error (SE) of estimated prevalence rates and confidence intervals around odds ratios (derived from regression models) were estimated using the delete-one jackknife technique.[17] All analyses were performed using STATA 17 (Stata Corp LP).

2.4.1 | Psychological distress

Descriptive statistics for mean K10 score (SE) and prevalence of high/very high distress (K10 score ≥ 22) were tabulated by industry, age, work hours, employment type, and socioeconomic variables. All analyses were stratified by sex. Differences in K10 distress category (low, moderate, high, and very high) by industry were investigated by ordered logistic regression models to determine odds ratios (ORs), with the industry category with the largest number of workers used as the reference: *Health care and social assistance*. Model 1 was unadjusted, Model 2 was age adjusted only, and Model 3 included all measured potential confounders: age, work hours, employment type, and socioeconomic variables.

2.4.2 | Distress-related productivity impacts

Descriptive statistics for the prevalence of distress-related work loss and work cutback days were tabulated by K10 category, industry, age, work hours, employment type, and socioeconomic variables, stratified by sex. Annual loss/cutback days were reported for ease of interpretation (Annual days = 4-week rate × 12, to allow for 48 working weeks and 4 weeks annual leave) in line with previous research.[1]

The association between psychological distress (K10 category), and the outcomes of work loss and work cutback days were analyzed using zero-inflated negative binomial regression to account for the excessive zero counts for both productivity measures (91% and 93% reported no distress-related work cutback days and work loss days, respectively) with the measure of association reported as odds ratios (ORs). For each outcome variable, three models were produced: Model 1 was unadjusted, Model 2 was adjusted for age and sex, and Model 3 included all potential confounders: age, sex, work hours, employment type, and socioeconomic variables.

3 | RESULTS

The dataset consisted of 9365 employed individuals aged 18–65 years. K10 score was unavailable for 284 individuals (questions not asked: $n = 267$, could not be determined: $n = 17$), and a further 8 cases were removed due to inadequately described industry, leaving a final sample of $n = 9073$ individuals (4497 males [49.6%], 4576 females [50.4%]). The sample distribution of distress was 2.7% ($n = 248$) very highly distressed, 8.2% ($n = 743$) highly distressed, 23.2% ($n = 2109$) moderately distressed, and 65.8% ($n = 5973$) lowly distressed.

3.1 | Prevalence of psychological distress

Table 1 displays summary statistics for mean K10 score and prevalence of high/very high distress (K10 score ≥ 22) by industry and covariates, stratified by sex. The proportion of female workers experiencing high/very distress was higher than males (9.7% of males, vs. 13.5% of females). For males, the *Information media and telecommunications*

TABLE 1 Distress status by industry and relevant covariates for working Australians aged 18–64 years.

	Males ($n = 4497$)					Females ($n = 4576$)				
	n	Mean K10	95% CI	High/V. high distress (%)[a]	95% CI	*n*	Mean K10	95% CI	High/V. high distress (%)[a]	95% CI
Total sample		14.7	14.5–14.9	9.7	8.7–10.9		15.4	15.2–15.6	13.5	12.1–14.9
Industry										
Agriculture, forestry, and fishing	124	13.9	12.9–14.9	7.2	2.7–18.0	51	13.6	12.3–14.9	2.1	0.3–14.9
Mining	169	13.2	12.5–14.0	6.5	3.0–13.5	30	14.8	12.8–16.8	12.5	3.2–37.8
Manufacturing	424	14.6	14.0–15.2	7.4	5.1–10.5	154	14.4	13.7–15.1	6.3	3.1–12.2
Electricity, gas, water, and waste services	86	15.3	13.9–16.6	9.9	4.7–19.6	23	15.1	13.5–16.6	8.4	2.1–27.7
Construction	624	14.3	13.9–14.6	8.0	5.3–11.7	105	15.0	13.9–16.0	10.8	5.2–21.1
Wholesale trade	163	14.5	13.6–15.3	8.7	4.9–15.2	74	15.6	14.2–17.0	10.0	3.8–23.9
Retail trade	316	14.9	14.1–15.7	9.4	6.1–14.3	450	16.4	15.7–17.0	17.3	14.0–21.3
Accommodation and food services	196	15.6	14.5–16.6	15.7	9.4–25.2	302	16.8	15.9–17.6	23.2	17.1–30.6
Transport, postal, and warehousing	355	14.3	13.6–15.0	9.8	6.5–14.5	108	15.3	13.5–17.0	13.8	5.7–29.5
Information media and telecommunications	85	16.8	14.8–18.8	19.7	11.0–32.8	79	16.2	14.4–18.1	16.4	8.3–30.1
Financial and insurance services	144	14.2	13.4–14.9	6.5	3.2–12.9	155	15.3	14.2–16.4	13.3	7.9–21.5
Rental, hiring and real estate services	74	15.2	13.9–16.5	11.1	5.3–22.0	68	15.2	13.8–16.7	9.1	4.1–19.2
Professional, scientific, and technical services	397	15.1	14.4–15.8	9.7	6.2–14.8	321	15.1	14.2–16.0	14.4	9.3–21.7
Administrative and support services	124	16.7	14.9–18.5	17.1	9.0–30.1	179	15.8	14.8–16.8	14.4	9.6–21.0
Public administration and safety	462	13.8	13.4–14.2	6.0	4.1–8.7	494	15.3	14.6–16.0	11.3	7.9–15.9
Education and training	216	15.8	14.7–16.9	15.6	9.0–25.5	611	15.3	14.8–15.8	14.4	11.5–17.8
Health care and social assistance	274	14.6	13.7–15.5	10.5	6.4–16.8	1092	14.9	14.5–15.3	10.8	8.4–13.7
Arts and recreation services	87	15.3	13.6–17.1	10.9	4.9–22.4	92	16.0	14.3–17.6	15.3	8.0–27.3
Other services	177	14.6	13.7–15.5	9.6	5.6–16.0	188	15.1	14.3–16.0	9.4	5.8–14.7
Age group										
18–29 years	857	15.3	14.9–15.8	12.3	9.5–15.8	881	16.5	16.0–17.2	18.7	14.9–23.3
30–49 years	2298	14.7	14.4–15.0	9.5	8.2–11.0	2317	15.1	14.9–15.4	11.4	10.1–12.8
50–64 years	1342	14.1	13.7–14.4	7.5	5.8–9.8	1378	14.9	14.6–15.2	12.2	10.2–14.5
SEIFA quintile										
1 (most disadvantaged)	690	15.1	14.5–15.6	11.9	9.3–15.1	677	16.1	15.5–16.7	15.6	12.4–19.6
2	919	14.7	14.3–15.2	10.0	7.6–13.1	858	15.8	15.3–16.4	15.8	13.0–19.2

TABLE 1 (Continued)

	Males ($n = 4497$)					Females ($n = 4576$)				
	n	Mean K10	95% CI	High/V. high distress (%)[a]	95% CI	n	Mean K10	95% CI	High/V. high distress (%)[a]	95% CI
3	1013	14.6	14.2–15.0	9.1	7.0–11.8	1047	15.1	14.7–15.5	12.3	9.9–15.3
4	973	15.0	14.7–15.3	11.1	9.1–13.6	1044	15.6	15.2–16.1	16.5	13.2–20.5
5 (least disadvantaged)	902	14.3	13.9–14.7	7.5	5.6–10.0	950	14.8	14.4–15.1	8.0	5.7–11.1
Employment type										
Employee	3665	14.7	14.5–15.0	9.9	8.7–11.2	3987	15.5	15.3–15.8	14.0	12.5–15.6
Owner manager with employees	314	13.9	13.3–14.6	7.5	4.6–12.0	215	14.6	13.7–15.5	8.4	4.6–14.9
Owner manager without employees	518	14.9	14.3–15.6	10.4	7.7–13.8	374	14.7	14.1–15.4	10.9	7.5–15.5
Usual hours of work										
1–15 h	241	16.6	15.6–17.6	15.7	10.3–23.1	579	16.3	15.7–16.9	16.9	13.4–21.1
16–24 h	181	15.8	14.9–16.6	14.0	9.0–21.3	682	15.2	14.8–15.6	12.9	10.1–16.2
25–34 h	318	15.1	14.4–15.7	11.5	7.8–16.6	817	15.4	14.9–16.0	13.0	9.7–17.0
35–39 h	981	14.5	14.1–15.0	9.3	7.1–12.0	1078	15.2	14.7–15.7	11.9	9.2–15.3
40 h	1005	14.1	13.7–14.5	7.6	5.6–10.2	638	14.6	14.2–15.1	10.6	7.8–14.3
41–49 h	632	14.6	14.1–15.1	8.5	6.0–12.0	315	16.3	15.3–17.2	17.9	12.3–25.3
50 h and over	1139	14.7	14.2–15.2	9.9	7.6–12.9	467	15.5	14.8–16.2	14.8	10.7–20.0

[a]% high or very high distress.

industry had the highest proportion of workers with high/very high psychological distress, at almost one in five workers (19.7%), followed by *Administrative and support services* (17.1%). Males working in *Public administration and safety* reported the lowest proportion of high/very high distress scores (6.0%). For females, *Accommodation and food services* had the highest rate of workforce distress, with almost one quarter of females reporting high/very high levels of distress (23.2%), followed by *Retail* (17.3%). Females working in *Agriculture* had the lowest proportion of high/very high distress scores (2.1%).

Younger workers (18–29 years) had the highest prevalence of high/very high distress for both genders (12.3% of males, 18.7% of females). Psychological distress prevalence also varied by hours of work, with the proportion of distressed workers lowest among those working 40 hours per week for both genders (7.6% for males, 10.6% for females); however, the group with the highest proportion of distressed workers differed by gender, occurring among those working 1–15 h (15.7%) for males, and among those working 41–49 h (17.9%) for females.

Unadjusted and adjusted odds ratios from a multivariable ordered logistic regression analysis of psychological distress are presented in Table 2. Obtaining a very high distress score (as opposed to a low/moderate/high score) is more than twice as probable for males working in *Information media and telecommunications, Administrative and support services*, and *Education and training* compared to the reference industry of *Health care and social assistance*. These differences remained significant even with age (Model 2) and other covariates (Model 3) in the model. For females, obtaining a very high distress score (vs. a low/moderate/high score) was twice as probable for workers in *Accommodation and food*, and 50% more likely in *Retail*, compared to the reference industry of *Health care and social assistance*. Adding age (Model 2) and other covariates (Model 3) marginally attenuated the odds ratios, however they remained significant.

3.2 | Productivity loss due to distress

Table 3 outlines the prevalence of work loss days (of at least one day), and the mean annual distress-related loss days, by industry, K10 category, and other covariates. For males, the mean distress-related work loss days was 3.5 days/year, ranging from 13.7 days in the *Information media and telecommunications* workforce to 0.5 days in *Mining*. For females, the mean distress-related work loss days was 3.8 days/year, ranging from 8.3 days in the *Mining* industry to 0.8 days in *Agriculture, forestry and fishing*.

Table 4 outlines the prevalence of work cutback days (of at least one day), and the mean annual distress-related cutback days, by industry, K10 category, and other covariates. For males, the mean distress-related work cutback days was 4.3 days/year, ranging from 10.6 days in the *Administrative and support services* workforce to 0.9 days in *Mining*. For females, the mean distress-related work cutback days was 7.0 days/year, ranging from 18.3 days in *Electricity, gas water and waste* to 0.8 days in *Agriculture, forestry and fishing*.

For both genders, prevalence of work loss and work cutback days increased with increasing severity of K10 distress category and decreased with increasing age. For both genders, the highest prevalence of work loss and work cutback days were seen in those who worked 1–15 h in a usual week.

Unadjusted and adjusted odds ratios from zero-inflated negative binomial regression analyses of work loss and work cutback days by K10 category are shown in Table 5.

For the distress-related work loss models, K10 category was significantly associated with both the presence of loss days, and the number of loss days. From the binomial part of the models, the odds of experiencing zero distress-related work loss days decreased with increased distress (OR moderate: 0.16, high: 0.04, and very high: 0.01 [reference: low], P for trend <.001). From the count part of the models, there was a positive relationship between increasing K10 category and work loss days per month (P for trend <.001). Workers in the highest K10 category were estimated to take 5.5 times more distress-related loss days per month when compared to those in the low K10 category.

For the work cutback models, K10 category was similarly associated with the presence of cutback days, and the number of cutback days. The odds of experiencing zero distress-related work cutback days decreased with increased distress (OR moderate: 0.14, high: 0.05, and very high: 0.02 [reference: low], P for trend <.001). Monthly work cutback days also increased with increasing K10 category (P for trend <.001). Workers in the highest K10 category were estimated to experience more than four times the distress-related cutback days per month than those in the low K10 category. The associations between distress and productivity measures were not markedly affected by adjustment for potential confounders (Models 2 and 3).

4 | DISCUSSION

The prevalence of workforce psychological distress varies substantially by industry and gender. Males working in the *Information media and telecommunications* and *Administrative and support* industries and females working in the *Accommodation and food* and *Retail* industries were found to be at greatest risk of experiencing very high psychological distress. The relationship between industry membership and distress was largely unaffected

TABLE 2 Odds ratios from ordered logistic regression models for very high psychological distress.

	Males			Females		
Industry[a]	**OR**	**95% CI**	***P***	**OR**	**95% CI**	***P***
Model 1: Industry only						
Agriculture, forestry, and fishing	0.82	0.43–1.57	.54	0.70	0.37–1.3	.26
Mining	0.82	0.47–1.44	.49	1.34	0.65–2.74	.42
Manufacturing	1.34	0.84–2.14	.22	0.93	0.59–1.47	.77
Electricity, gas, water, and waste services	1.55	0.74–3.24	.24	1.47	0.50–4.29	.48
Construction	1.10	0.77–1.57	.59	1.19	0.73–1.93	.49
Wholesale trade	1.03	0.58–1.83	.92	1.43	0.85–2.42	.18
Retail trade	1.26	0.82–1.94	.29	1.57	1.24–1.98	.00***
Accommodation and food services	1.57	0.95–2.59	.08^	2.04	1.46–2.85	.00***
Transport, postal, and warehousing	1.01	0.63–1.60	.98	1.08	0.57–2.08	.82
Information media and telecommunications	2.36	1.21–4.58	.01**	1.01	0.50–2.02	.98
Financial and insurance services	0.96	0.54–1.68	.88	1.10	0.70–1.72	.67
Rental, hiring, and real estate services	1.80	0.96–3.38	.06^	1.17	0.61–2.24	.63
Professional, scientific, and technical services	1.38	0.88–2.15	.16	1.03	0.71–1.48	.89
Administrative and support services	2.47	1.23–4.97	.01**	1.43	0.91–2.24	.12
Public administration and safety	0.85	0.57–1.25	.39	1.14	0.86–1.52	.35
Education and training	2.00	1.19–3.34	.01**	1.17	0.92–1.48	.20
Arts and recreation services	1.90	0.87–4.12	.11	1.16	0.63–2.15	.63
Other services	1.29	0.78–2.14	.32	1.39	0.87–2.21	.16
Model 2: Age adjusted[b]						
Agriculture, forestry, and fishing	0.83	0.43–1.62	.58	0.75	0.40–1.43	.38
Mining	0.82	0.47–1.45	.50	1.32	0.66–2.66	.42
Manufacturing	1.34	0.84–2.13	.22	0.93	0.60–1.45	.74
Electricity, gas, water, and waste services	1.64	0.79–3.40	.18	1.33	0.54–3.24	.53
Construction	1.06	0.74–1.52	.75	1.19	0.72–1.96	.49
Wholesale trade	1.01	0.55–1.84	.98	1.48	0.87–2.52	.14
Retail trade	1.15	0.74–1.78	.53	1.37	1.07–1.74	.01**
Accommodation and food services	1.37	0.82–2.29	.22	1.72	1.22–2.42	.00***
Transport, postal, and warehousing	1.02	0.64–1.63	.93	1.11	0.59–2.09	.75
Information media and telecommunications	2.33	1.19–4.55	.02*	0.97	0.48–1.96	.94
Financial and insurance services	0.95	0.54–1.66	.85	1.08	0.70–1.67	.73
Rental, hiring, and real estate services	1.73	0.92–3.23	.09^	1.21	0.62–2.37	.57
Professional, scientific, and technical services	1.35	0.87–2.11	.18	0.98	0.68–1.42	.91
Administrative and support services	2.34	1.15–4.75	.02*	1.36	0.89–2.09	.16
Public administration and safety	0.85	0.58–1.25	.40	1.20	0.90–1.59	.22
Education and training	2.10	1.26–3.49	.01**	1.17	0.92–1.48	.19
Arts and recreation services	1.78	0.83–3.83	.13	1.08	0.60–1.94	.79
Other services	1.29	0.78–2.15	.32	1.29	0.85–1.95	.23

(Continues)

TABLE 2 (Continued)

	Males			Females		
Industry[a]	OR	95% CI	*P*	OR	95% CI	*P*
Model 3: Fully adjusted						
Agriculture, forestry, and fishing	0.85	0.43–1.68	.63	0.77	0.39–1.52	.44
Mining	0.84	0.45–1.56	.57	1.16	0.57–2.37	.67
Manufacturing	1.46	0.88–2.41	.14	0.93	0.59–1.47	.75
Electricity, gas, water, and waste services	1.84	0.86–3.90	.11	1.30	0.51–3.30	.57
Construction	1.17	0.77–1.79	.45	1.25	0.76–2.06	.37
Wholesale trade	1.07	0.56–2.04	.83	1.51	0.90–2.51	.11
Retail trade	1.13	0.73–1.75	.58	1.30	1.02–1.65	.04*
Accommodation and food services	1.30	0.76–2.23	.33	1.59	1.12–2.26	.01**
Transport, postal, and warehousing	1.01	0.63–1.64	.95	1.03	0.56–1.89	.92
Information media and telecommunications	2.57	1.30–5.09	.01**	0.97	0.47–2.00	.94
Financial and insurance services	1.10	0.61–1.96	.75	1.11	0.72–1.70	.63
Rental, hiring, and real estate services	1.76	0.91–3.42	.09^	1.28	0.65–2.51	.48
Professional, scientific, and technical services	1.52	0.94–2.45	.09^	1.03	0.69–1.54	.87
Administrative and support services	2.25	1.07–4.70	.03*	1.36	0.86–2.16	.19
Public administration and safety	0.94	0.63–1.43	.78	1.21	0.92–1.59	.18
Education and training	2.04	1.22–3.41	.01**	1.13	0.89–1.43	.32
Arts and recreation services	1.73	0.80–3.73	.16	1.10	0.61–2.00	.74
Other services	1.35	0.81–2.25	.25	1.37	0.86–2.17	.19

[a]Reference group is health care and social assistance industry.

[b]Model 1: unadjusted, Model 2: age adjusted only, Model 3: adjusted for age, work hours, employment type, and socioeconomic variables.

P value cutoffs: ***$P < .000$, **$P < .01$, *$P < .05$, ^$P < .1$.

by age, socioeconomic quintile, usual hours of work and employment type. There was a strong association between psychological distress and productivity loss, with distress-related loss and cutback estimates mostly following industry patterns of distress prevalence, and this was significantly predicted by K10 score (and gender for absenteeism).

4.1 | Psychological distress

From an industry perspective, *Information media and telecommunications*, and *Accommodation and food* have very high workforce distress levels across both genders. These should be a focus for prevention efforts. The regression models suggest that, even when controlling for age, socioeconomic status, employment type and hours of work, males employed in the *Information media and telecommunications*, *Administrative and support services or Education and training* industries were twice as likely to be experiencing very high distress compared to males employed in the Health industry, while females employed in the *Accommodation and food* and *Retail* industries were approximately 1.5 times more likely to be experiencing very high distress compared to females in the Health industry. This is in contrast to findings from previous Australian research with full-time workers which found higher distress in the *Communications* industry,[7] although this is likely due to methodological differences, particularly our inclusion of those working part-time.

Reasons for higher rates of distress are likely to be industry-specific. Self-selection in and out of particular industries by individuals managing existing mental health conditions will have an impact on distress prevalence in the workforce; however, factors related to the workplace will also contribute. For example, in the *Accommodation and food industry*, precarious employment, shift work, and customer-facing roles are common, and each have been linked to poor mental health outcomes.[18–20] In the *Information media and telecommunications* industry, job insecurity, long linked to poor mental health outcomes,[18] may be a factor in the high rates of distress found given the industry has experienced the largest reduction in

TABLE 3 Distress-related work loss days by industry and relevant covariates for working Australians aged 18–64 years.

	Males				Females			
	Work loss prevalence[a]	95% CI	Mean annual loss days	95% CI	Work loss prevalence	95% CI	Mean annual loss days	95% CI
Total sample	5.3	4.5–6.3	3.5	2.3–4.4	7.7	6.8–8.7	3.8	3.1–4.6
Industry								
Agriculture, forestry, and fishing	6.0	2.2–15.6	5.8	−2.6 to 14.3	4.4	1.0–17.2	0.8	−0.5 to 2.0
Mining	3.2	1.0–9.6	0.5	0.0–1.0	14.4	3.9–41.0	8.3	−2.3 to 18.8
Manufacturing	3.1	1.7–5.7	1.3	0.1–2.4	7.6	2.9–18.8	6.0	−0.5to 12.8
Electricity, gas, water, and waste services	9.7	4.1–21.2	9.0	−0.8 to 18.8	4.3	0.8–20.4	1.3	−1.2 to 3.7
Construction	4.1	2.7–6.2	2.3	0.7–3.96	4.2	1.4–12.2	1.0	−0.1 to 2.2
Wholesale trade	4.3	1.7–10.4	1.9	0.4–3.5	5.4	1.9–14.3	0.7	0.0–1.4
Retail trade	4.7	2.3–9.2	3.5	0.2–6.7	10.8	7.4–15.4	5.0	2.6–7.3
Accommodation and food services	9.6	5.2–17.1	10.2	−2.4 to 22.8	11.4	7.8–16.4	5.1	2.9–7.4
Transport, postal, and warehousing	6.4	3.7–11.0	5.1	0.8–9.4	9.2	2.9–25.5	3.7	0.2–7.1
Information media and telecommunications	12.8	5.8–26.1	13.7	−6.7 to 34.2	6.7	2.6–16.3	2.8	−0.6 to 6.2
Financial and insurance services	3.2	1.2–8.3	1.3	0.2–2.4	3.6	1.7–7.6	3.2	−0.4 to 6.7
Rental, hiring, and real estate services	2.4	0.5–10.6	0.5	−0.4 to 1.3	4.6	1.7–12.0	2.0	0.0–4.0
Professional, scientific, and technical services	4.9	3.1–7.9	1.9	0.7–3.1	8.9	4.9–15.8	4.6	1.6–7.6
Administrative and support services	8.1	2.6–22.7	3.4	−0.7 to 7.4	8.6	4.3–16.2	3.4	0.8–6.0
Public administration and safety	2.7	1.5–5.1	0.9	0.2–1.6	6.5	4.3–9.6	3.3	1.6–5.0
Education and training	10.8	6.2–18.0	4.0	1.0–7.2	8.9	5.8–13.4	5.0	1.9–8.2
Health care and social assistance	3.6	1.5–8.4	1.4	0.0–2.9	5.6	4.2–7.4	3.1	1.9–4.2
Arts and recreation services	9.2	4.0–19.8	10.5	−0.8 to 22.0	7.7	3.4–16.7	3.0	0.5–5.6
Other services	5.9	2.9–11.4	3.8	−1.3 to 8.9	6.9	3.5–13.2	3.0	0.6–5.5
K10 distress category								
Low distress	1.1	0.7–1.7	0.3	0.1–0.5	1.7	1.2–2.3	0.5	0.4–0.7
Moderate distress	6.7	5.0–9.0	2.6	1.3–3.8	9.7	7.5–12.4	3.2	2.2–4.2
High distress	22.4	16.5–29.8	12.4	6.4–18.5	29.9	24.0–36.4	14.5	9.8–19.1
Very high distress	64.5	50.7–76.3	75.9	40.4–111.5	50.3	39.9–60.7	49.2	33.0–65.4
Binary distress category								
Low/moderate distress	2.6	2.0–3.4	1.0	0.6–1.3	4.0	3.3–4.8	1.3	1.0–1.7
High/Very high distress	30.5	24.7–37.0	25.9	15.7–35.9	31.6	26.2–37.4	19.8	14.8–25.0

(Continues)

TABLE 3 (Continued)

	Males				Females			
	Work loss prevalence[a]	95% CI	Mean annual loss days	95% CI	Work loss prevalence	95% CI	Mean annual loss days	95% CI
Age group								
18–29 years	6.6	4.7–9.3	3.9	1.1–6.8	10.7	7.8–14.4	5.6	3.4–7.8
30–49 years	5.6	4.5–6.8	3.1	1.9–4.3	7.2	6.0–8.6	3.3	2.3–4.4
50–64 years	3.6	2.6–4.8	3.5	1.7–5.3	5.7	4.6–7.1	3.1	1.9–4.2
SEIFA quintile								
1 (most disadvantaged)	7.4	4.5–11.8	6.5	1.8–11.3	9.7	7.5–12.4	5.4	3.0–7.8
2	5.3	3.8–7.5	2.9	1.4–4.3	7.9	6.0–10.3	4.0	2.0–6.0
3	5.0	3.5–7.2	2.9	1.6–4.3	6.7	4.8–9.2	2.8	1.7–4.0
4	5.6	4.0–8.0	2.2	1.1–3.2	9.0	6.9–11.7	4.5	2.8–6.1
5 (least disadvantaged)	4.0	2.2–6.9	3.5	0.0–7.0	5.9	4.2–8.1	3.1	1.8–4.4
Employment type								
Employee	5.4	4.5–6.5	3.0	1.9–4.2	7.8	6.8–8.9	3.9	3.2–4.6
Owner manager with employees	1.5	0.6–3.7	1.7	−0.8 to 4.2	6.0	2.8–12.3	3.9	−0.4 to 8.0
Owner manager without employees	7.4	5.2–10.3	7.4	2.6–12.0	7.6	4.7–12.0	3.3	1.7–4.9
Usual hours of work								
1–15 h	12.2	7.8–18.5	5.1	2.8–7.4	9.5	7.0–12.9	5.8	3.2–8.4
16–24 h	6.5	3.4–11.9	8.0	0.6–15.4	8.6	6.5–11.1	3.4	2.2–4.7
25–34 h	6.9	4.3–10.9	4.6	2.16–7.1	6.8	5.0–9.2	3.3	1.8–4.8
35–39 h	5.0	3.4–7.4	2.6	1.2–4.1	8.2	5.7–11.6	5.0	2.5–7.4
40 h	3.6	2.4–5.4	2.0	0.7–3.2	6.9	4.8–9.9	2.8	1.6–4.1
41–49 h	3.9	2.1–7.0	1.4	0.5–2.3	6.4	3.3–12.1	2.6	0.6–4.6
50 h and over	5.5	3.9–7.8	4.8	1.1–8.5	6.0	3.9–9.1	2.4	1.3–3.5

Note: For example, cell one indicates 6% of males in Agriculture experienced ≥1 distress-related work loss days in the last 4 weeks.

[a]Proportion of workers who experienced one or more distress-related work loss days in the last 4 weeks.

workforce size in the 5 years to 2022 (−11% compared to mean +11% growth for all industries).[21] Within this industry in Australia, both the publishing sector,[22] and the media sector[23] have acknowledged high rates of distress in their workforces, and are taking steps to address this. The media industry's introduction of a Mentally Health Industry Standard and Mentally-healthy Change group has shown promising results[24] and provides a good model for an industry-wide approach to mental health.

Distinct differences were found to exist between males and females, reinforcing the value of a gender-stratified analysis. In addition to females experiencing higher distress scores overall (which is in line with previous Australian[9] and international[10] research), the industries with the highest mean workforce distress score were different for each gender. The gender difference was starkest in the *Retail* industry, where it had the second highest prevalence of workforce distress for women employees, but the 12th highest for male employees. Why some industries are linked to higher distress for a particular gender cannot be determined within this study; however, gender discrimination,[25] work-life balance opportunities,[10] and leadership inequities[26] may play a role.

Similar gender differences are apparent in the relationship between usual hours of work and distress. While those working 40 h per week had the lowest prevalence of distress (high or very high) for both genders, for males, working between 41 and 49 h was associated with the second lowest prevalence of workforce distress, but the highest prevalence of distress for females. This is consistent with past research indicating the relationship between mental health and work hours varies by gender, with a decline in mental health seen at a lower threshold for females than males, and that this threshold decreases with increasing care and domestic work hours.[27–29] Marchand suggests the different mental health outcomes seen in working

TABLE 4 Distress-related cutback days by industry and relevant covariates for working Australians aged 18–64 years.

	Males				Females			
	Work cutback prevalence[a]	95% CI	Mean annual cutback days	95% CI	Work cutback prevalence	95% CI	Mean annual cutback days	95% CI
Total sample	7.2	6.2–8.4	4.3	3.5–5.2	10.5	9.3–11.8	7.0	5.9–8.0
Industry								
Agriculture, forestry, and fishing	6.1	2.4–14.9	2.1	−0.1 to 4.2	4.4	1.0–17.2	0.8	−0.5 to 2.0
Mining	2.5	0.7–8.1	0.9	0.0–1.8	17.1	5.4–42.6	7.0	−0.1 to 14.0
Manufacturing	6.1	3.7–9.8	3.3	1.0–5.6	12.2	6.3–22.2	7.2	1.8–12.6
Electricity, gas, water, and waste services	7.2	3.0–16.6	4.0	0.2–7.9	8.1	2.1–26.6	18.3	−10.2 to 46.9
Construction	4.6	2.9–7.0	2.6	1.2–4.1	7.7	3.4–16.6	5.0	−0.4 to 10.3
Wholesale trade	11.6	6.2–20.6	5.1	1.9–8.4	4.3	1.4–12.3	1.2	0.0–2.4
Retail trade	5.6	2.9–10.8	4.7	−0.1-9.7	13.5	9.7–18.6	8.5	4.3–12.7
Accommodation and food services	8.0	4.4–14.1	5.2	1.6–8.9	13.7	9.6–19.3	10.1	5.4–14.8
Transport, postal, and warehousing	6.2	3.4–10.9	3.8	0.8–6.7	8.0	2.1–25.5	3.3	−0.5 to 7.1
Information media and telecommunications	12.7	5.9–25.3	4.6	1.2–8.2	11.0	5.1–22.1	4.7	0.7–8.8
Financial and insurance services	6.3	3.0–12.9	2.8	0.7–5.0	14.7	8.4–24.6	13.6	1.8–25.4
Rental, hiring, and real estate services	8.2	2.9–21.0	2.8	−0.8-6.5	6.2	2.3–15.5	5.7	−1.9 to 13.3
Professional, scientific, and technical services	8.6	5.4–13.3	5.6	2.9–8.4	12.4	8.0–18.7	7.0	3.1–10.9
Administrative and support services	10.7	4.2–24.4	10.6	−3.5 to 24.7	11.1	4.8–23.4	5.7	2.3–9.2
Public administration and safety	6.3	4.1–9.5	4.4	1.4–7.2	9.3	5.7–14.9	6.6	2.4–10.8
Education and training	10.7	5.9–18.6	9.7	3.4–16.0	10.8	7.8–14.9	6.4	3.6–9.2
Health care and social assistance	7.8	4.0–14.7	3.1	0.7–5.4	7.8	5.9–10.3	5.3	3.0–7.6
Arts and recreation services	16.2	8.1–29.6	7.7	2.5–13.0	9.2	4.5–18.0	15.7	−0.4 to 31.8
Other services	8.1	4.2–14.8	3.8	1.0–6.6	11.5	6.6–19.2	5.7	2.2–9.1
K10 distress category								
Low distress	1.7	1.1–2.6	0.6	0.4–0.8	2.4	1.8–3.4	1.1	0.6–1.56
Moderate distress	12.6	10.2–15.6	5.0	3.6–6.4	15.8	12.9–19.1	9.5	7.0–12.1
High distress	28.7	22.5–35.9	18.1	12.4–23.8	37.8	32.6–43.2	22.3	17.2–27.5
Very high distress	49.7	35.5–63.9	65.1	42.8–87.5	52.1	42.3–61.6	64.4	42.7–86.2
Binary distress category								
Low/moderate distress	4.6	3.8–5.6	1.8	1.3–2.2	6.3	5.2–7.5	3.5	2.6–4.3
High/Very high distress	31.5	25.6–38.0	28.1	21.5–34.7	37.5	33.6–41.6	29.4	23.3–35.5

(Continues)

TABLE 4 (Continued)

	Males				Females			
	Work cutback prevalence[a]	95% CI	Mean annual cutback days	95% CI	Work cutback prevalence	95% CI	Mean annual cutback days	95% CI
Age group								
18–29 years	8.7	6.5–11.5	3.9	2.6–5.2	17.1	14.2–20.5	11.6	8.4–14.9
30–49 years	7.6	6.3–9.3	4.8	3.5–6.2	8.9	7.5–10.5	5.6	4.4–6.7
50–64 years	5.0	3.7–6.7	3.8	2.3–5.3	7.0	5.3–9.1	4.9	3.0–6.8
SEIFA quintile								
1 (most disadvantaged)	10.1	7.3–13.8	5.8	3.6–7.9	11.7	9.1–15.0	8.8	6.1–11.5
2	5.7	4.0–8.1	4.6	2.2–7.1	11.7	9.2–14.8	7.4	4.7–10.1
3	5.8	4.4–7.8	2.9	1.8–4.1	9.5	7.1–12.6	6.1	3.7–8.4
4	8.3	6.2–11.1	4.7	2.9–6.4	11.1	8.9–13.9	6.4	4.7–8.2
5 (least disadvantaged)	7.0	4.9–10.0	4.1	2.2–5.9	9.1	6.7–12.1	6.8	3.6–10.1
Employment type								
Employee	7.2	6.1–8.5	4.0	3.1–4.9	10.6	9.4–12.0	7.1	5.8–8.4
Owner manager with employees	5.0	2.9–8.7	2.4	0.7–4.1	8.3	4.5–14.8	4.3	1.32–7.3
Owner manager without employees	8.7	6.3–11.9	7.4	4.8–10.1	10.4	6.9–15.4	7.2	3.6–10.9
Usual hours of work								
1–15 h	15.5	10.0–23.1	11.2	6.0–16.4	13.5	9.9–18.3	8.5	5.3–11.7
16–24 h	6.9	3.4–13.5	4.6	1.4–7.8	10.3	8.1–13.1	7.0	4.6–9.4
25–34 h	9.5	6.1–14.4	6.9	3.5–10.4	9.1	6.7–12.1	6.5	4.3–8.8
35–39 h	5.4	3.8–7.6	3.5	1.8–5.2	10.4	8.0–13.3	7.1	3.8–10.4
40 h	6.2	4.3–8.8	3.1	1.7–4.4	8.5	6.1–11.8	4.8	2.6–7.0
41–49 h	7.8	5.2–11.6	4.5	1.4–7.7	11.2	6.8–17.8	7.8	1.6–14.0
50 h and over	6.7	5.0–8.7	3.4	2.3–4.6	11.6	8.9–14.9	7.5	4.6–10.4

Note: For example, cell one indicates 6% of males in Agriculture experienced ≥1 distress-related cutback days in the last 4 weeks.

[a]Proportion of workers who experienced one or more distress-related work cutback days in the last 4 weeks.

TABLE 5 Association between K10 distress category and productivity (work loss days and work cutback days) from zero-inflated negative binomial regression models.[a]

	Work loss days				Work cutback days			
	OR	**95% CI**	**95% CI**	***P***	**OR**	**95% CI**	**95% CI**	***P***
Model 1: Univariate—K10 Category								
Zero loss/cutback days (vs. not zero) [Binomial part of model]								
K10 Category								
Low distress	1.00				1.00			
Moderate distress	0.16	0.11	0.24	<.001	0.13	0.09	0.19	<.001
High distress	0.04	0.03	0.06	<.001	0.04	0.03	0.06	<.001
Very high distress	0.10	0.00	0.02	<.001	0.02	0.01	0.04	<.001
Number of loss/cutback days [Count part of model]								
K10 Category								
Low distress	1.00				1.00			
Moderate distress	1.25	0.82	1.92	.29	1.43	0.98	2.08	.06
High distress	2.16	1.44	3.24	<.001	1.76	1.20	2.60	.01
Very high distress	5.52	3.63	8.41	<.001	4.12	2.78	6.10	<.001
Model 2: Adjusted for age and sex								
Zero loss/cutback days (vs. not zero) [Binomial part of model]								
K10 Category								
Low distress	1.00				1.00			
Moderate distress	0.17	0.11	0.25	<.001	0.14	0.10	0.20	<.001
High distress	0.04	0.03	0.07	<.001	0.05	0.03	0.07	<.001
Very high distress	0.01	0.00	0.02	<.001	0.02	0.01	0.04	<.001
Number of loss/cutback days [Count part of model]								
K10 Category								
Low distress	1.00				1.00			
Moderate distress	1.27	0.80	2.02	.31	1.42	0.99	2.05	.06
High distress	2.06	1.38	3.06	<.001	1.76	1.23	2.52	<.001
Very high distress	5.27	3.45	8.05	<.001	4.17	2.91	5.99	<.001
Model 3: Fully adjusted[b]								
Zero loss/cutback days (vs. not zero) [Binomial part of model]								
K10 Category								
Low distress	1.00				1.00			
Moderate distress	0.16	0.10	0.24	<.001	0.14	0.10	0.20	<.001
High distress	0.04	0.02	0.06	<.001	0.05	0.03	0.07	<.001
Very high distress	0.01	0.01	0.02	<.001	0.02	0.01	0.04	<.001
Number of loss/cutback days [Count part of model]								
K10 Category								
Low distress	1.00				1.00			
Moderate distress	1.10	0.66	1.85	0.71	1.45	0.99	2.12	.06
High distress	1.76	1.11	2.79	0.02	1.78	1.25	2.53	<.001
Very high distress	5.54	3.23	9.51	<0.001	4.25	2.84	6.35	<.001

[a]*P* for trend for all models was <.001.

[b]Adjusted for all potential confounders: age, sex, work hours, employment type, and socioeconomic variables.

women and men may actually be a caregivers versus non-caregivers phenomenon, such is the mental health impact of combining paid and care/domestic work.[28] Work-based prevention efforts should be cognizant of these gender differences, and flexible work policies have an important role here.

Psychological distress tends to decrease over the lifespan starting from late adolescence,[30] which is consistent with our findings of higher distress among younger workers. Not surprisingly, industries where young workers are highly represented showed higher rates of workforce distress (*Retail* and *Food and accommodation*); however, controlling for age only slightly attenuated the effect of industry on distress. Given this, young workers across all industries should be prioritized for mental health support.

The high-risk industries identified in this research contrasted with those found when utilizing workers' compensation claims data in Australia. Safe Work Australia research found the highest incidence of mental health claims were in the *Public administration and safety* industry, followed by the *Health care and social assistance industry*.[4] This result is not surprising given workers' compensation data does not include non-work-related mental illness, and includes only accepted claims, with claim acceptance requiring proving work-relatedness. First-responders (such as police, fire protection, corrections officers, and health workers) are mostly employed in the *Public administration and safety* or *Health* industries, where work-related trauma, and the resulting distress, is easily identified. In contrast, while customer-facing roles (common in the *Accommodation and food*, and *Retail* industries) have been shown to be linked to higher psychological distress,[19] proving the link between such roles and a worker's distress is much more difficult.[1]

In contrast to workers' compensation data, this research analyses the all-cause distress profile of the Australian workforce. Given that workplace well-being interventions have been shown to benefit employee mental health regardless of the cause,[31] these data suggest priority for mental health interventions should be given to the *Accommodation and food*, *Information and telecommunications*, and *Retail* industries, along with the female and the younger workforces.

4.2 | Productivity impacts

Psychological distress was associated with sizeable productivity losses. Highly distressed male workers lose a mean of 75.9 days annually due to their distress, compared to the sample mean of 3.5 days. Highly distressed female workers lose 49.2 days due to distress versus the sample mean of 3.8 days. This is in contrast to findings by Wooden (2016)[32] which identified only a small association between poor mental health and annual sickness absence days. This is likely due to the outcome variable in our research being paid or unpaid distress-related absence, as opposed to total paid sickness absence (all-cause). The inclusion of unpaid distress-related absence is important given that self-employed and casual employees are ineligible for paid sick leave in Australia. Casual employees account for a quarter of the Australian workforce, and the concentration of casual workers varies by industry, with casual workers making up 65% of the *Accommodation and food services* workforce.[33] Limiting productivity loss estimates to distress-related while including unpaid sick leave in this analysis strengthens a key conclusion of this analysis—that increasing psychological distress is associated with significant additional productivity losses.

4.3 | Strengths and limitations of the study

There are several strengths of this study. First, the data were drawn from a nationally representative survey which includes all adults who reported being employed on any basis, making it more inclusive than previous studies.

Second, a major limitation of existing evidence to date estimating mental health-related productivity losses have used total absence days as a proxy for distress-related absenteeism.[32,34] This research restricts productivity estimates to those that are distress-related allowing for a more precise estimate of the additional impact of psychological distress on productivity loss across industries.

One of the major challenges in research on presenteeism (for which cutback days are a crude estimate) is the zero-inflated and highly skewed distribution of presenteeism,[35] which is equally apparent in absenteeism data. The zero-inflated modeling used in this research allows for the excessive zeroes beyond a common count distribution can accommodate, such as Poisson or negative binomial.[36]

There are several limitations to the present study. First, because of the cross-sectional nature of this study, no conclusions regarding causality can be inferred. It is possible, as has been suggested in past research, that some roles may attract individuals vulnerable to mental ill-health,[37,38] while individuals with a higher likelihood of work absences may self-select into particular work environments.[39] The flexible nature of casual roles may be particularly appealing for individuals experiencing mental ill-health, and this could contribute to the high prevalence rates seen in industries with large casual workforces. However, identifying whether the workplace is the key contributor to worker distress is of

less value in determining priority workplaces in most need of intervention, which was the primary aim of this research.

Second, we acknowledge the limitations of the measures of absenteeism and work cutback used in this research (self-reported distress-related loss and cutback days), including the drawbacks of self-report data and the possibility of recall bias; however, their ease of use, limited recall period of 4 weeks, and specificity to distress-related impacts means they are widely used in national survey research to estimate productivity loss and work impairment.[1,5,14]

Lastly, because of the face-to-face nature of the NHS data collection, the impact of social desirability may influence responses to questions about psychological distress.[9] Lower participation rates among individuals with poor mental health has also been observed in other survey research.[40] As a result, these estimates are likely an underrepresentation of psychological distress and their impact in the workforce.

5 | CONCLUSION

This cross-sectional study examined the prevalence of elevated psychological distress and related productivity losses by industry in the Australian workforce, in order to determine priority industries for intervention support. Our results demonstrated significant disparity across industries in terms of workforce distress, with the *Information media and telecommunications, Accommodation and food services*, and *Retail* industry workforces experiencing the highest rates of distress, along with distinct gender differences. By analyzing distress-related work loss and cutback days we were able to quantify the impact of this distress on productivity, with very high distress being associated with substantial additional loss days and cutback days, compared to those with low distress.

AUTHOR CONTRIBUTIONS

Kristy Burns, Janaki Amin, and Elizabeth-Ann Schroeder conceived the ideas; Kristy Burns, Janaki Amin, and Thomas Fung analyzed the data; Kristy Burns, Janaki Amin, Elizabeth-Ann Schroeder, and Louise A. Ellis contributed to the writing.

ACKNOWLEDGMENTS

The authors are grateful to the Australian Bureau of Statistics for access to the National Health Survey dataset. Open access publishing facilitated by Macquarie University, as part of the Wiley - Macquarie University agreement via the Council of Australian University Librarians.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the Australian Bureau of Statistics (ABS). Restrictions apply to the availability of these data, which were used under an agreement between Universities Australia and the ABS. Data are available at https://www.abs.gov.au/statistics/microdata-tablebuilder/available-microdata-tablebuilder/national-health-survey with the permission of the ABS.

DISCLOSURES

Informed consent: N/A. Registry and the Registration No. of the study/Trial: N/A. Animal Studies: N/A. The authors declare that there is no conflict of interest.

ORCID

Kristy Burns https://orcid.org/0000-0002-3060-4812
Elizabeth-Ann Schroeder https://orcid.org/0000-0003-0236-2833
Thomas Fung https://orcid.org/0000-0003-2601-0728
Louise A. Ellis https://orcid.org/0000-0001-6902-4578
Janaki Amin https://orcid.org/0000-0003-2161-9366

REFERENCES

1. Productivity Commission. Mental Health. Report no. 95. Canberra, Australia: Productivity Commission. 2020. Accessed June 7, 2023. https://www.pc.gov.au/inquiries/completed/mental-health/report
2. Harvey SB, Modini M, Joyce S, et al. Can work make you mentally ill? A systematic meta-review of work-related risk factors for common mental health problems. *Occup Environ Med*. 2017;74(4):301-310. doi:10.1136/oemed-2016-104015
3. Bluff E, O'Keeffe V. The evidence base for WHS priority setting in a changing work landscape: an appraisal of sources and opportunities for enhancement. *Labour Ind*. 2020;30(2):133-155. doi:10.1080/10301763.2020.1769898
4. Safe Work Australia. *Work-Related Mental Disorders Profile 2015*. Safe Work Australia; 2015.
5. Lim D, Sanderson K, Andrews G. Lost productivity among full-time workers with mental disorders. *J Ment Health Policy Econ*. 2000;3(3):139-146. doi:10.1002/mhp.93
6. Hilton MF, Whiteford HA, Sheridan JS, et al. The prevalence of psychological distress in employees and associated occupational risk factors. *J Occup Environ Med*. 2008;50(7):746-757. doi:10.1097/JOM.0b013e31817e9171
7. LaMontagne AD, D'Souza RM, Shann CB. Socio-demographic and work setting correlates of poor mental health in a population sample of working Victorians: application in evidence-based intervention priority setting. *Int J Ment Health Promot*. 2012;14(2):109-122. doi:10.1080/14623730.2012.703048
8. Marchand A. Mental health in Canada: are there any risky occupations and industries? *Int J Law Psychiatry*. 2007;30(4–5):272-283. doi:10.1016/j.ijlp.2007.06.002 [published Online First: 2007/08/03].
9. Butterworth P, Watson N, Wooden M. Trends in the prevalence of psychological distress over time: comparing results from

longitudinal and repeated cross-sectional surveys. *Front Psych*. 2020;11:1345. doi:10.3389/fpsyt.2020.595696
10. Viertiö S, Kiviruusu O, Piirtola M, et al. Factors contributing to psychological distress in the working population, with a special reference to gender difference. *BMC Public Health*. 2021;21(1):1-17. doi:10.1186/s12889-021-10560-y
11. Australian Bureau of Statistics. National Health Survey: Users' Guide, 2017–18. Australian Bureau of Statistics; 2019. Accessed February 15, 2022. https://www.abs.gov.au/ausstats/abs@nsf/mf/4363.0
12. Australian Bureau of Statistics. *Information Paper: Use of Kessler Psychological Distress Scale in ABS Health Surveys*. Australian Bureau of Statistics; 2012.
13. Trollor JN, Anderson TM, Sachdev PS, Brodaty H, Andrews G. Age shall not weary them: mental health in the middle-aged and the elderly. *Aust N Z J Psychiatry*. 2007;41(7):581-589. doi:10.1080/00048670701392817
14. Kessler RC, Greenberg PE, Mickelson KD, Meneades LM, Wang PS. The effects of chronic medical conditions on work loss and work cutback. *J Occup Environ Med*. 2001;43(3):218-225. doi:10.1097/00043764-200103000-00009
15. Bryan ML, Bryce AM, Roberts J. Presenteeism in the UK: effects of physical and mental health on worker productivity. *The Sheffield Economic Research Paper Series (SERPS)* 2020; 2020005.
16. Australian Bureau of Statistics. Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006. (cat. no. 1292.0) Australian Bureau of Statistics; 2006. Accessed June 2021. https://www.abs.gov.au/ausstats/abs@.nsf/mf/4363.0
17. Birrell CL, Steel DG, Batterham MJ, Arya A. How to use replicate weights in health survey analysis using the National Nutrition and physical activity survey as an example. *Public Health Nutr*. 2019;22(18):3315-3326. doi:10.1017/S1368980019001927
18. Demiral Y, Ihle T, Rose U, Conway PM, Burr H. Precarious work as risk factor for 5-year increase in depressive symptoms. *Int J Environ Res Public Health*. 2022;19(6):3175. doi:10.3390/ijerph19063175
19. Patel PC, Pearce JA II, Bachrach DG. Psychological distress is increasing among customer-facing retail employees: evidence from 1997 to 2015. *J Bus Res*. 2018;89:21-26.
20. D'Oliveira TC, Anagnostopoulos A. The association between shift work and affective disorders: a systematic review. *Chronobiol Int*. 2020;38:1-19.
21. Australian Government. Jobs and skills Australia: Labour market insights 2022. 2023. Accessed February 7, 2023. labourmarketinsights.gov.au
22. Bowen S, Driscoll B. *Australian Publishing Industry Workforce Survey on Diversity and Inclusion*. Australian Publishers Association; 2022.
23. Tynan R, Thienal R. *Mentally Healthy 2018: A Study into the Creative Media and Marketing Industry*. Everymind; 2018.
24. Never Not Creative. Mentally Healthy 2022 Research Report. 2022.
25. Vigod SN, Rochon PA. The impact of gender discrimination on a woman's mental health. *EClinicalMedicine*. 2020;20:100311. doi:10.1016/j.eclinm.2020.100311
26. Stamarski CS, Son Hing LS. Gender inequalities in the workplace: the effects of organizational structures, processes, practices, and decision makers' sexism. *Front Psychol*. 2015;6:1400. doi:10.3389/fpsyg.2015.01400
27. Dinh H, Strazdins L, Welsh J. Hour-glass ceilings: work-hour thresholds, gendered health inequities. *Soc Sci Med*. 2017;176:42-51. doi:10.1016/j.socscimed.2017.01.024
28. Marchand A, Bilodeau J, Demers A, Beauregard N, Durand P, Haines VY III. Gendered depression: vulnerability or exposure to work and family stressors? *Soc Sci Med*. 2016;166:160-168. doi:10.1016/j.socscimed.2016.08.021
29. Milner A, Smith P, LaMontagne AD. Working hours and mental health in Australia: evidence from an Australian population-based cohort, 2001–2012. *Occup Environ Med*. 2015;72(8):573-579. doi:10.1136/oemed-2014-102791
30. Drapeau A, Marchand A, Beaulieu-Prevost D. Epidemiology of psychological distress. In: Labate L, ed. *Mental Illnesses: Understanding, Prediction and Control*. IntechOpen; 2012.
31. Waddell A, Kunstler B, Lennox A, et al. How effective are interventions in optimizing workplace mental health and well-being? A scoping review of reviews and evidence map. *Scand J Work Environ Health*. 2023;49(4):235-248.
32. Wooden M, Bubonya M, Cobb-Clark D. Sickness absence and mental health: evidence from a nationally representative longitudinal survey. *Scand J Work Environ Health*. 2016; 42(3):201-208. doi:10.5271/sjweh.3553
33. Gilfillan G. *Characteristics and Use of Casual Employees in Australia: Statistical Snapshot*. Parliamentary Library; 2018.
34. Waterworth P, Pescud M, Chappell S, et al. Culture, management and finances as key aspects for healthy workplace initiatives. *Health Promot Int*. 2018;33(1):162-172. doi:10.1093/heapro/daw068
35. Ruhle S, Breitsohl H, Aboagye E, et al. "To work, or not to work, that is the question" recent trends and avenues for research on presenteeism. *Eur J Work Organ Psychol*. 2020;29(3):344-363. doi:10.1080/1359432X.2019.1704734
36. Feng CX. A comparison of zero-inflated and hurdle models for modeling zero-inflated count data. *J Stat Distrib Appl*. 2021;8(1):1-19. doi:10.1186/s40488-021-00121-4
37. Wieclaw J, Agerbo E, Mortensen PB, Bonde JP. Occupational risk of affective and stress-related disorders in the Danish workforce. *Scand J Work Environ Health*. 2005;31(5):343-351. doi:10.5271/sjweh.917 [published Online First: 2005/11/09].
38. Stansfeld S, Pike C, McManus S, et al. Occupations, work characteristics and common mental disorder. *Psychol Med*. 2013;43(5):961-973. doi:10.1017/S0033291712001821
39. Hartikainen E, Solovieva S, Viikari-Juntura E, Leinonen T. Associations of employment sector and occupational exposures with full and part-time sickness absence: random and fixed effects analyses on panel data. *Scand J Work Environ Health*. 2022;48(2):148-157. doi:10.5271/sjweh.4003
40. Perez FP, Baffour B. Respondent mental health, mental disorders and survey interview outcomes. *Survey Res Method*. 2018;12(2):161-176. doi:10.18148/srm/2018.v12i2.7225

How to cite this article: Burns K, Schroeder E-A, Fung T, Ellis LA, Amin J. Industry differences in psychological distress and distress-related productivity loss: A cross-sectional study of Australian workers. *J Occup Health*. 2023;65:e12428. doi:10.1002/1348-9585.12428