



Age and gender differences in the relationship between obesity and disability with self-perceived employment discrimination: Results from a retrospective study of an Australian national sample

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ABSTRACT

Background: Health status is a crucial determinant of an individuals' labour market outcomes. The present study investigates the association between obesity and disability with perceived employment discrimination within Australia.

Methods: A total of 17,174 person-year observations from the 11,079 respondents were analysed using four waves of data from the Household, Income, and Labour Dynamics in Australia (HILDA) survey. The primary outcome examined was employment discrimination, using obesity and disability as the main exposure variables. The longitudinal random-effects regression technique was applied to investigate the between-person differences in employment discrimination associated with obesity and disability.

Results: The findings suggest that more than one in ten (12.68 %) Australians experienced employment discrimination. The odds of being discriminated against while applying for a job were 1.56 times (aOR: 1.56, 95 % CI: 1.15–2.11) higher for obese than their healthy weight counterparts in youngest women. Adults with a disability had 1.89 times (aOR: 1.89, 95 % CI: 1.65–2.17) higher odds of being discriminated against than peers without disability.

Conclusion: The results provide evidence that obesity and disability contribute to employment discrimination in Australia. The findings can assist government and related agencies to consider the adequacy of existing discrimination legislation and help organisations to develop appropriate policies to address discrimination against obese and disabled people in their workplaces.

1. Introduction

Obesity and disability are crucial indicators of population health. Globally, the prevalence of obesity has increased rapidly, and it is becoming a major public health concern. Over 650 million people worldwide are classified as obese (World Health Organization, 2020). An increasing rate of obesity is also a significant public health issue in Australia, as in 2019, over one in four adults aged 15 years and over were obese (26 %) (Keramat et al., 2021a). Overweight and obesity were responsible for 7 % of Australia's total burden of disease and injuries

(AIHW, 2017). Like obesity, the prevalence of disability is also rising worldwide. Over one billion people live with some form of disability globally, and this is projected to double by 2050 (World Health Organization, 2018). In 2018, an estimated one in five adults (18 %) were diagnosed with some form of disability in Australia (AIHW, 2019), and around 5.7 % of adults had a severe disability (Australian Bureau of Statistics, 2018). However, a recent study found that over one in four Australian adults (28 %) have some form of disability (Keramat et al., 2021b).

Obesity and disability are responsible for rising adverse labour

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market outcomes, such as a high rate of absenteeism (Keramat et al., 2020a), the rise of presenteeism (Keramat et al., 2020b), and low job satisfaction (Keramat et al., 2020c). People experiencing both obesity and disability are often subject to workplace discrimination. For example, a study on European workers revealed that obese workers faced higher discrimination in the hiring process (Flint et al., 2015). Besides, a Canadian study concluded that disabled people faced higher levels of harassment and discrimination in the workplace (Jones et al., 2018). Recent empirical evidence also reveals that workplace harassment and discrimination continue to grow among workers with disabilities in the USA and UK despite protective legislation (Fevre et al., 2013; Snyder et al., 2010). Further, there is evidence that obese people experience higher unemployment levels than healthy-weight peers in the USA (Tunceli et al., 2006). Studies of American adults showed that obesity is associated with several forms of discrimination, including in the workplace (Hunte & Williams, 2009; Lewis et al., 2011). A few studies conducted in European countries (e.g., UK (Morris, 2006), Finland (Böckerman et al., 2019; Sarlio-Lahteenkorva & Lahelma, 1999) and Denmark (Greve, 2008)) found that obese people tend to earn less than their non-obese counterparts and that overweight people were also more likely to report employment discrimination and discriminatory experiences than healthy weight counterparts (Roehling et al., 2007).

Physical disabilities also prevent people from securing continuous employment (Waterhouse et al., 2010). According to the Australian Institute of Health and Welfare (AIHW), people with disabilities are under-represented in the Australian workforce (53 % compared to 84 % of those without disabilities) (AIHW, 2020), and the rate of employment is declining (AIHW, 2017). The empirical evidence demonstrates that people with psychiatric disabilities have unemployment of longer durations, lower probability of securing highly-paid jobs, have lower earnings, and are denied training opportunities and promotions (Baldwin & Marcus, 2006; Stuart, 2006). There is also evidence that people with physical and sensory impairments face large-scale hiring discrimination in the USA (McMahon, 2012).

Few studies have quantified the longitudinal association between obesity and disability with employment discrimination, and those that do exist have mainly been undertaken in the USA and UK. Longitudinal studies monitor individual changes over time which can evaluate the relationship more accurately than other study designs. No research has examined to what extent people with obesity and disability receive disparate treatment at work in Australia. A longitudinal study on obesity, disability and perceived employment discrimination nexus using Australian data is non-existent.

Therefore, the objectives of the present study are twofold: firstly, to determine the current state of perceived employment discrimination and, secondly, to examine the relationships between obesity and disability with perceived employment discrimination in the Australian adult population. Findings will assist in developing a broader conceptual framework for understanding and tackling obesity and disability-related prejudice and discrimination in a workplace setting and developing more inclusive workplaces in Australia. Moreover, the evidence will assist organisations and the government to develop and implement evidence-based anti-discrimination policies covering weight and disability-related workplace discrimination. Furthermore, the study findings may help policymakers and organisations to develop and implement workplace health promotion programs to reduce obesity problems of employees and increase productivity in the workplace.

2. Methods

2.1. Data source and sample selection

The data utilised in this study were obtained from the Household Income and Labour Dynamics in Australia (HILDA) survey. HILDA is a nationally representative longitudinal study of Australian households that collects information annually from the adult members of the same

household. The survey gathers information on a wide range of topics, including wealth, retirement, fertility, health, education, skills, abilities, job-related discrimination, intentions and plans, non-co-residential family relationships, health insurance, youth, literacy and numeracy, diet, and material deprivation from household members aged 15 years or over through both self-completion questionnaires and face-to-face interviews by trained interviewers. The HILDA survey commenced in 2001 and collected information on 19,914 individuals from 7682 households. Since then, the survey gathers information annually from over 17,000 Australians. HILDA survey selects sample households through multi-stage sampling techniques that are representative of the Australian population. A detailed description of the HILDA sampling technique and survey methodology has been outlined elsewhere (Freidin et al., 2002).

This study acquired data from four waves of the HILDA survey: Wave 8 (2008), Wave 10 (2010), Wave 14 (2014), and Wave 18 (2018). These waves were selected as they included specific questions related to employment discrimination. The analytic sample was restricted to respondents aged 15 years or over, and excludes observations with missing values on the outcome variable (employment discrimination) and primary variables of interest (obesity and disability status). These selection criteria resulted in an unbalanced panel comprising 17,174 person-year observations from 11,079 participants.

2.2. Outcome variable

The primary outcome variable of the present study is perceived employment discrimination. Participants aged 15 years or over were asked, "thinking of the jobs you have applied for in the past two years, do you think you were ever unsuccessful because the employer discriminated against you?" Responses to the questions were taken in binary form; 0 indicates no, and 1 indicates yes. This reflects respondents' perception of discrimination and may not be actual discrimination. Since it is difficult to measure actual labour market discrimination, existing studies have relied on participants' perceptions (Biddle, 2013; Jones et al., 2018). As data on real labour market discrimination is not available in the HILDA survey, the present study has taken into account the study participants' perceptions concerning employment discrimination.

2.3. Key explanatory variables

The primary variables of interest of this study are the obesity and disability status of the study participants. One of the primary exposure, obesity, was measured through Body Mass Index (BMI). The HILDA survey collects self-reported weight and height by asking questions, "What is your current weight (kilograms)" and "how tall are you, without shoes (metres)?", respectively. Each participant's BMI was then calculated by applying the formula, weight in kilograms divided by height in metres squared. The present analysis categorised BMI into four groups: 'underweight' (BMI <18.50), 'healthy weight' (18.50 ≤ BMI <25), 'overweight' (25 ≤ BMI <30), and 'obese' (BMI ≥30) following the World Health Organization's BMI cut-off points to define an individual's weight status (World Health Organization, 2020).

Another primary exposure variable of this study is self-reported disability. The HILDA survey collects information on each respondent's disability status through personal interviews following the definition of the International Classification of Functioning, Disability, and Health (ICF) framework (LaMontagne, Krnjacki, Milner, Butterworth, & Kavanagh, 2016; Lopez Silva et al., 2020). Participants' disability status was ascertained by asking if they have any long-term health condition, impairment, or disability that restricted their daily activities and has lasted for six months or more. The survey presents 17 categories of disabilities (e. g., sight problems not corrected by glasses or lenses, hearing problems, speech problems, limited use of feet or legs, and chronic or recurring pain) to the respondents to define their

disability status. The responses were taken into binary form (yes and no); yes indicates that the participant has a disability, and no indicates otherwise.

2.4. Covariates assessed in the model

This study included a range of covariates to account for confounding effects in the multivariate regression models following previous studies (Biddle, 2013; Jones et al., 2018; Tunceli et al., 2006). The covariates included in the study were age (youngest [15–30]; ; , middle-age [31–50], and oldest [51 and over]), gender (male and female), education (school not completed, year 12/certificate/diploma, and bachelor degree or greater), civil status (partnered and unpartnered), household yearly disposable income quintile (quintile 1 [lowest] to quintile 5 [highest]), labour force status (employed, unemployed, and not in the labour force), indigenous status (non-indigenous, and Aboriginal or Torres Strait Islander), state of residence (New South Wales [NSW], Victoria [VIC], Queensland [QLD], South Australia [SA], Western Australia [WA], Tasmania [TAS], Northern Territory [NT], and Australian Capital Territory [ACT]), and country of birth (Australia or other country).

2.5. Estimation methods

The present analysis formed an unbalanced panel data set that includes 17,174 person-year observations from 11,079 unique respondents. The data set was constructed by linking de-identified individuals' records who participated in any of the four waves (waves 8, 10, 14, and 18) of the HILDA survey spanning the period of 2008–2018.

Descriptive statistics in terms of frequency (n) and percentages (%) with 95 % Confidence Intervals (CIs) were used to present the pooled characteristics of the study sample. The bivariate relationships between employment discrimination and the primary variables of interest and other covariates were then assessed through chi-square tests. A covariate was included in the adjusted model only if it was statistically significant at 5 % in the chi-square test. However, some exceptions have been considered to evaluate whether a variable is statistically significant at any levels in the multivariate regression models despite being insignificant in the chi-square tests. This study employed the longitudinal random-effects logistic regression approach to examine the association between perceived employment discrimination and obesity and disability. The random-effects regression modelling allows identifying the between-person differences in perceived employment discrimination concerning change in obesity and disability. For the present study, the random-effect regression approach is appropriate as this technique considers the effects of a variable that changes over time, such as the age of the individuals (Milner & LaMontagne, 2017). The study conducted both unadjusted and adjusted models. Age, gender, civil status, education, household yearly disposable income, labour force status, indigenous status, state of residence, and country of birth served as the confounders in the adjusted model. Besides, the between-person effect models were stratified by age and gender as part of the sensitivity analysis to examine the differences in employment discrimination associated with obesity and disability. This study replaced missing observations in one covariate, Indigenous status, through imputation (last observation carried forward). However, no survey weights have been used in the analyses.

The test results are displayed in the form of odds ratio with 95 % confidence intervals (CIs) along with respective p-values for each variable. A predictor was considered statistically significant if the respective p-value of a particular exposure was less than or equal to 0.05 in the multivariate regression analyses. This study performed all statistical analyses using the statistical software Stata (version 16).

Table 1

Distribution of the analytic sample: Baseline, final and pooled across all waves (persons = 11,079, observations = 17,174).

Characteristics	Baseline wave (2008)		Final wave (2018)		All waves pooled (2008–2018)	
	n	%	n	%	n	%
Outcome variable						
Perceived employment discrimination						
No	3420	88.42	4156	87.48	14,996	87.32
Yes	448	11.58	595	12.52	2178	12.68
Exposures and covariates						
BMI						
Underweight	130	3.36	164	3.45	593	3.45
Healthy weight	1849	47.80	2055	43.25	7785	45.33
Overweight	1190	30.77	1417	29.83	5249	30.56
Obesity	699	18.07	1115	23.47	3547	20.65
Disability						
No	3253	84.10	3747	78.87	14,006	81.55
Yes	615	15.90	1004	21.13	3168	18.45
Age						
Youngest (15–30 years)	2069	53.49	2469	51.97	9268	53.97
Middle-age (31–50 years)	1389	35.91	1658	34.90	5882	34.25
Oldest (51 years and over)	410	10.60	624	13.13	2024	11.79
Gender						
Male	1816	46.95	2303	48.47	8291	48.28
Female	2052	53.05	2448	51.53	8883	51.72
Civil Status						
Partnered	2062	53.31	2416	50.85	8915	51.91
Unpartnered	1806	46.69	2335	49.15	8259	48.09
Education						
School not completed	1193	30.84	933	19.64	4232	24.64
Year 12/certificate/diploma	1814	46.90	2437	51.29	8568	49.89
Bachelor degree or greater	861	22.26	1381	29.07	4374	25.47
Household yearly disposable income quintile						
Quintile 1 (lowest)	774	20.01	951	20.02	3440	20.03
Quintile 2	775	20.04	952	20.04	3430	19.97
Quintile 3	773	19.98	948	19.95	3436	20.01
Quintile 4	773	19.98	951	20.02	3434	20.00
Quintile 5 (highest)	773	19.98	949	19.97	3434	20.00
Labour force status						
Employed	3073	79.45	3685	77.56	13,224	77.00
Unemployed	347	8.97	541	11.39	1949	11.35
Not in the labour force	448	11.58	525	11.05	2001	11.65
Indigenous status						
Non-indigenous	3734	96.54	4484	94.38	16,401	95.50
Aboriginal or Torres Strait Islander	134	3.46	267	5.62	773	4.50
State of residence						
NSW	1057	27.33	1302	27.40	4740	27.60
VIC	939	24.28	1299	27.34	4463	25.99
QLD	946	24.46	1075	22.63	3921	22.83
SA	326	8.43	373	7.85	1437	8.37
WA	341	8.82	394	8.29	1498	8.72
TAS	120	3.10	152	3.20	550	3.20
NT	34	0.88	38	0.80	140	0.82
ACT	105	2.71	118	2.48	425	2.47
Country of birth						
Australia	3253	84.10	4012	84.45	14,438	84.07
Other country	615	15.90	739	15.55	2736	15.93

3. Results

Table 1 demonstrates the distribution of the study participants' characteristics in the first and last waves and pooled across all waves. A total of 17,174 person-year observations from 11,079 participants were included in the analyses. Over one in ten adults (12.68 %) experienced employment discrimination in Australia. The proportion of employment discrimination reported in the baseline and final waves was 11.58 % and 12.52 %, respectively. Among the study sample, 18.07 % were obese, and 15.90 % had a disability in the baseline. The prevalence of obesity (23.47 %) and disability (21.13 %) were highest in the final waves (Table 1). Table 1 (all waves pooled) also shows that 53.97 % were aged

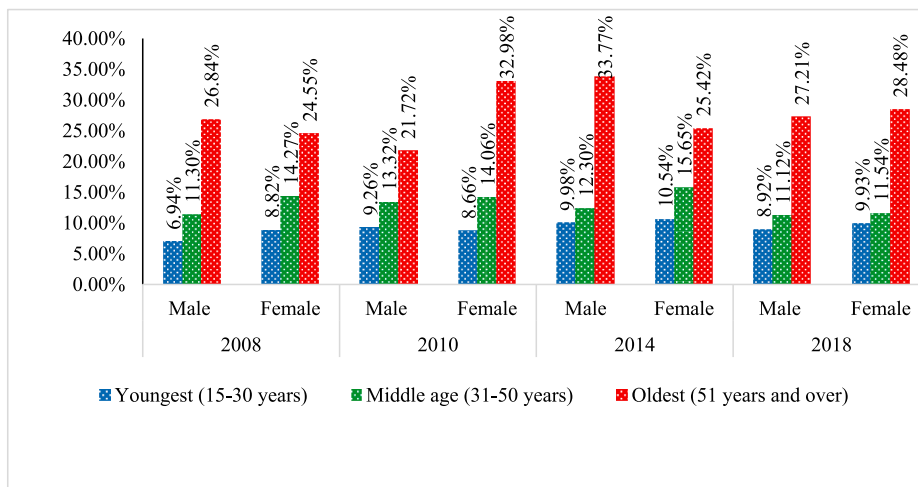


Fig. 1. Point estimates of perceived employment discrimination by age and gender, 2008–2018.

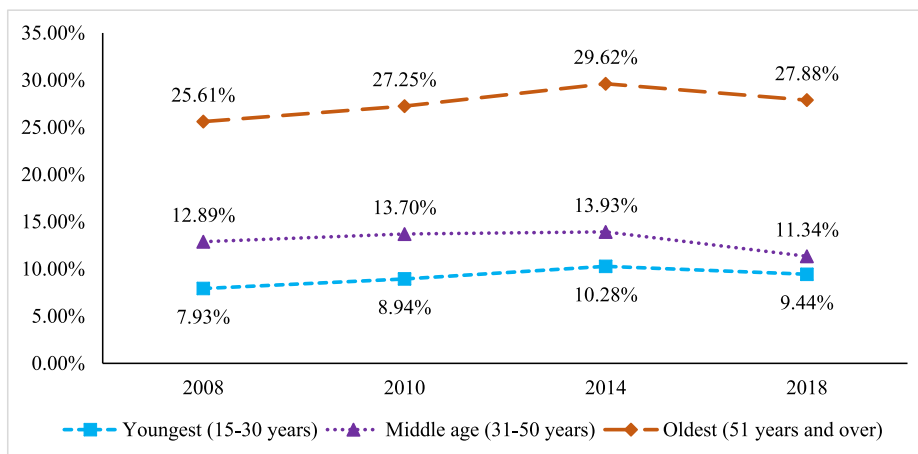


Fig. 2. Point estimates of perceived employment discrimination by age groups, 2008–2018.

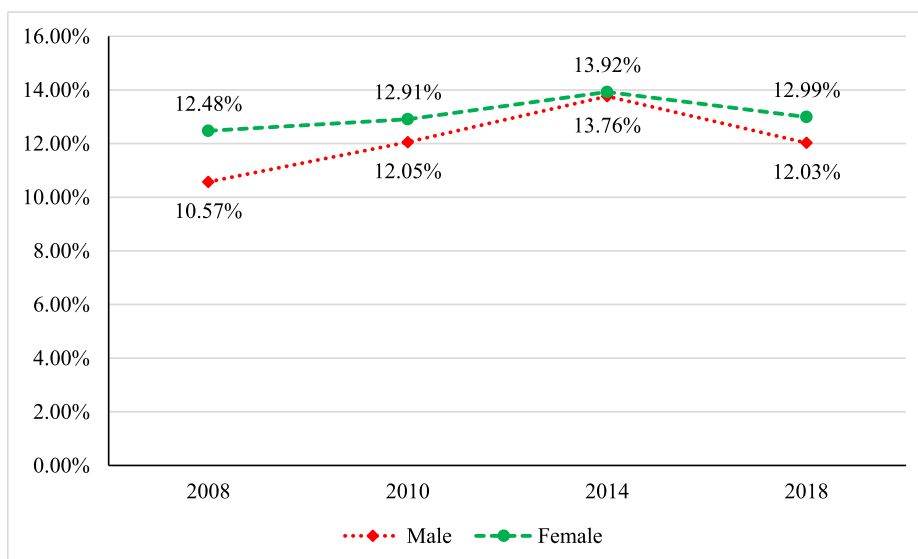


Fig. 3. Point estimates of perceived employment discrimination by gender, 2008–2018.

Table 2

Description of obesity, disability and other covariates by perceived employment discrimination at baseline and final waves.

Characteristics	Baseline wave (2008)				P- value	Final wave (2018)				P- value
	Not discriminated		Discriminated			Not discriminated		Discriminated		
	n	%	n	%		n	%	n	%	
BMI					0.08					0.01
Underweight	117	90.00	13	10.00		143	87.20	21	12.80	
Healthy weight	1656	89.56	193	10.44		1822	88.66	233	11.34	
Overweight	1045	87.82	145	12.18		1250	88.21	167	11.79	
Obesity	602	86.12	97	13.88		941	84.39	174	15.61	
Disability					<0.001					<0.001
No	2940	90.38	313	9.62		3355	89.54	392	10.46	
Yes	480	78.05	135	21.95		801	79.78	203	20.22	
Age					<0.001					<0.001
Youngest (15–30 years)	1905	92.07	164	7.93		2236	90.56	233	9.44	
Middle-age (31–50 years)	1210	87.11	179	12.89		1470	88.66	188	11.34	
Oldest (51 years and over)	305	74.39	105	25.61		450	72.12	174	27.88	
Gender					0.07					0.31
Male	1624	89.43	192	10.57		2026	87.97	277	12.03	
Female	1796	87.52	256	12.48		2130	87.01	318	12.99	
Civil Status					0.85					0.96
Partnered	1825	88.51	237	11.49		2114	87.50	302	12.50	
Unpartnered	1595	88.32	211	11.68		2042	87.45	293	12.55	
Education					0.19					0.04
School not completed	1038	87.01	155	12.99		810	86.82	123	13.18	
Year 12/certificate/diploma	1616	89.08	198	10.92		2112	86.66	325	13.34	
Bachelor degree or greater	766	88.97	95	11.03		1234	89.36	147	10.64	
Household yearly disposable income quintile					<0.001					<0.001
Quintile 1 (lowest)	652	84.24	122	15.76		764	80.34	187	19.66	
Quintile 2	668	86.19	107	13.81		833	87.50	119	12.50	
Quintile 3	688	89.0	85	11.00		841	88.71	107	11.29	
Quintile 4	698	90.30	75	9.70		858	90.22	93	9.78	
Quintile 5 (highest)	714	92.37	59	7.63		860	90.62	89	9.38	
Labour force status					<0.001					<0.001
Employed	2774	90.27	299	9.73		3298	89.50	387	10.50	
Unemployed	267	76.95	80	23.05		422	78.00	119	22.00	
Not in the labour force	379	84.60	69	15.40		436	83.05	89	16.95	
Indigenous status					0.34					0.64
Non-indigenous	3305	88.51	429	11.49		3920	87.42	564	12.58	
Aboriginal or Torres Strait Islander	115	85.82	19	14.18		236	88.39	31	11.61	
State of residence					0.11					0.01
NSW	923	87.32	134	12.68		1166	89.55	136	10.45	
VIC	848	90.31	91	9.69		1140	87.76	159	12.24	
QLD	827	87.42	119	12.58		934	86.88	141	13.12	
SA	279	85.58	47	14.42		326	87.40	47	12.60	
WA	310	90.91	31	9.09		320	81.22	74	18.78	
TAS	108	90.00	12	10.00		134	88.16	18	11.84	
NT	29	85.29	5	14.71		33	86.84	5	13.16	
ACT	96	91.43	91.43	8.57		103	87.29	15	12.71	
Country of birth					<0.001					0.04
Australia	2903	89.24	350	10.76		3527	87.91	485	12.09	
Other country	517	84.07	98	15.93		629	85.12	110	14.88	

*P values were derived from chi-square tests to examine the bivariate association between obesity and disability with self-perceived employment discrimination.

15–30 years, 51.72 % were female, 24.64 % did not complete school, and 51.91 % were partnered. The majority of the participants were employed (77 %), non-indigenous (95.50 %), residing in NSW (27.60 %), and born in Australia (84.07 %).

Fig. 1 shows the distribution of perceived employment discrimination by age and gender. As can be seen, the oldest age group reported the highest rate of employment discrimination for all the survey years. The rate of perceived employment discrimination was highest among the oldest male (33.77 %) in 2014, followed by the oldest female (32.98 %) in 2010.

Fig. 2 presents the trend in the prevalence of perceived employment discrimination by different age groups. The rate of perceived discrimination is highest among the oldest and ranges from 25.61 % (2008) to 29.62 % (2014). The figure also shows that the prevalence of job discrimination among the youngest and middle-age adults is less than 15 % over the study period.

Fig. 3 demonstrates the point in time rates of self-perceived employment discrimination by gender. The figure shows that the job

discrimination rate is higher in women than men over the study period. The prevalence of job discrimination in women ranged from 12.48 % (2008) to 13.92 % (2014).

Table 2 reports the distribution of perceived employment discrimination patterns varied by BMI, disability, and other characteristics of the study participants in the baseline and final waves. The table also shows the bivariate association between the primary exposures and other covariates with perceived employment discrimination using chi-square tests. The prevalence of employment discrimination among the obese was 13.88 % in 2008 and 15.61 % in 2018. However, the rates were comparatively higher among adults with some form of disability. Over one in five adults with disabilities faced employment discrimination (Table 2). In addition, the percentage of perceived employment discrimination among the disabled participants were two times higher (21.95 vs 9.62 in 2008 and 20.22 vs 10.46 in 2018) than those with no disability.

Table 3 presents the unadjusted and adjusted multivariate regression results. Results of the random-effects logistic model represent the

Table 3

Unadjusted and adjusted random-effect regression results for the between-person difference in self-perceived employment discrimination due to obesity and disability.

Exposure Variables	Unadjusted model (1)	Unadjusted model (2)	Fully adjusted model (3)
	Discrimination (yes versus no)	Discrimination (yes versus no)	Discrimination (yes versus no)
	OR (95 % CI), P-value	OR (95 % CI), P-value	aOR (95 % CI), P-value
BMI			
Underweight	1.01 (0.71–1.42), 0.97		0.99 (0.72–1.38), 0.97
Healthy weight (ref)			
Overweight	1.18 (1.02–1.36), 0.02		0.99 (0.86–1.13), 0.85
Obesity	1.61 (1.37–1.89), <0.001		1.16 (0.99–1.35), 0.06
Disability			
No (ref)			
Yes		2.73 (2.38–3.12), <0.001	1.89 (1.65–2.17), <0.001
Age			
Youngest (15–30 years) (ref)			
Middle-age (31–50 years)			1.55 (1.34–1.78), <0.001
Oldest (51 years and over)			4.26 (3.57–5.08), <0.001
Gender			
Male (ref)			
Female			1.10 (0.98–1.24), 0.12
Civil status			
Partnered (ref)			
Unpartnered			1.05 (0.93–1.19), 0.41
Education			
School not completed (ref)			
Year 12/certificate/diploma			1.09 (0.94–1.26), 0.24
Bachelor degree or greater			0.99 (0.82–1.19), 0.92
Household yearly disposable income quintile			
Quintile 1 (lowest)			2.06 (1.70–2.50), <0.001
Quintile 2			1.56 (1.29–1.89), <0.001
Quintile 3			1.33 (1.10–1.62), 0.01
Quintile 4			1.09 (0.90–1.33), 0.36
Quintile 5 (highest) (ref)			
Labour force status			
Employed (ref)			
Unemployed			2.54 (2.15–2.99), <0.001
Not in the labour force			1.48 (1.25–1.76), <0.001
Indigenous status			
Non-indigenous (ref)			
Aboriginal or Torres Strait Islander			0.80 (0.60–1.07), 0.13
State of residence			
NSW (ref)			
VIC			0.96 (0.82–1.13), 0.64
QLD			1.01 (0.86–1.20), 0.89

Table 3 (continued)

Exposure Variables	Unadjusted model (1)	Unadjusted model (2)	Fully adjusted model (3)
	Discrimination (yes versus no)	Discrimination (yes versus no)	Discrimination (yes versus no)
	OR (95 % CI), P-value	OR (95 % CI), P-value	aOR (95 % CI), P-value
SA			1.14 (0.90–1.43), 0.27
WA			1.17 (0.93–1.46), 0.17
TAS			0.74 (0.52–1.07), 0.11
NT			1.04 (0.54–2.00), 0.91
ACT			0.81 (0.53–1.25), 0.34
Country of birth			
Australia (ref)			
Other country			1.29 (1.10–1.51), 0.01

Abbreviations: aOR, Adjusted Odds Ratio; ref, reference. Values in bold are statistically significant.

between-person differences in perceived employment discrimination through the unadjusted main effects of obesity (Model 1), the unadjusted main effects of disability (Model 2), and the adjusted effects of obesity and disability (Model 3). Models 1 and 2 indicate a strong positive relationship between obesity (OR: 1.61, 95 % CI: 1.37–1.89) and disability (OR: 2.73, 95 % CI: 2.38–3.12) with employment discrimination in the unadjusted models. However, Model 3 shows that only disability has substantial direct effects on perceived employment discrimination. The results demonstrate that persons with some forms of disability were 1.89 (aOR: 1.89, 95 % CI: 1.65–2.17) times more likely to be discriminated against in the job market (Model 3).

Results for the other covariates in the model display that middle-aged (aOR: 1.55, 95 % CI: 1.34–1.78) and oldest (aOR: 4.26, 95 % CI: 3.57–5.08) age groups have higher odds of being discriminated against. Individuals belonging to lower household yearly disposable income quintiles were more likely to be discriminated against. Besides, unemployed (aOR: 2.54, 95 % CI: 2.15–2.99) and adults not in the labour force (aOR: 1.48, 95 % CI: 1.25–1.76) had a greater discrimination rate against compared with employed peers. Further, individuals born outside of Australia (aOR: 1.29, 95 % CI: 1.10–1.51) reported increased odds of being discriminated against relative to those born in Australia.

The results from the random-effects logistic regression models to explain the age and gender differences in the relationship between obesity and disability with employment discrimination are presented in Table 4. There is strong evidence that the odds of being discriminated against was 1.56 times (aOR: 1.56, 95 % CI: 1.15–2.11) higher in the obese population than peers of healthy weight among the female and youngest age group (Model 2). The results also showed that disability was significantly associated with greater perceived employment discrimination in both male and female youngest and middle-age groups (Models 1–4). However, no significant associations have been observed between disability and perceived job discrimination in both the male and female oldest age groups (Models 5–6).

4. Discussions

This study explored the association between obesity and disability with perceived employment discrimination using longitudinal data. The study results revealed that obesity in the youngest women is responsible for higher employment discrimination. The findings also indicate that disability is significantly associated with higher employment discrimination.

These findings concur with the existing literature concerning the

Table 4

Multivariate regression results for the between-person difference in self-perceived employment discrimination due to obesity and disability stratified by age and gender, 2008 to 2018.

Characteristics	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Male and youngest (15–30)	Female and youngest (15–30)	Male and Middle-age (31–50)	Female and Middle-age (31–50)	Male and oldest (51 and over)	Female and oldest (51 and over)
	aOR (95 % CI), P-value	aOR (95 % CI), P-value	aOR (95 % CI), P-value	aOR (95 % CI), P-value	aOR (95 % CI), P-value	aOR (95 % CI), P-value
BMI						
Underweight	1.13 (0.62–2.03), 0.69	1.16 (0.73–1.85), 0.52	0.18 (0.02–1.81), 0.15	1.17 (0.46–2.99), 0.74	0.15 (0.01–2.23), 0.17	0.66 (0.16–2.67), 0.58
Healthy weight (ref)						
Overweight	1.12 (0.83–1.51), 0.47	0.80 (0.60–1.08), 0.15	1.07 (0.77–1.48), 0.69	0.90 (0.66–1.24), 0.53	0.98 (0.60–1.62), 0.95	1.06 (0.66–1.71), 0.80
Obesity	1.37 (0.97–1.94), 0.07	1.56 (1.15–2.11), 0.01	1.09 (0.75–1.57), 0.66	0.95 (0.68–1.33), 0.77	1.13 (0.66–1.93), 0.67	0.95 (0.57–1.58), 0.85
Disability						
No (ref)						
Yes	2.77 (2.03–3.80), <0.001	2.06 (1.57–2.71), <0.001	2.26 (1.63–3.13), <0.001	1.63 (1.20–2.22), 0.01	1.42 (0.92–2.21), 0.12	1.12 (0.74–1.71), 0.59

*All models (1–6) were adjusted for civil status, education, household yearly disposable income, labour force status, indigenous status, state of residence, and country of birth.

Abbreviations: aOR, Adjusted Odds Ratio; ref, reference.

Values in bold are statistically significant.

influence of obesity. Prior research has shown, for example, that individuals with obesity experience employment discrimination (Carr & Friedman, 2005; Tunceli et al., 2006; Vallejo-Torres et al., 2018). Several studies provided evidence that obesity was positively associated with employment discrimination in the form of lower starting salaries, individuals were considered less qualified, less competent, and made to work longer hours (Levine & Schweitzer, 2015; Schulte et al., 2007). There is also evidence that obese people experience discrimination in the initial hiring process for employment (Bartels & Nordstrom, 2013; Flint & Snook, 2014). Our study results confirm that obesity among the Australian youngest women led to higher employment-related discrimination. One of the reasons for this finding could be that managers had negative obesity stereotypes. As a result, obese applicants may be less likely to be invited for an interview and employed (Agerström & Rooth, 2011). Another potential explanation could be that obese people were perceived as less “successful” and judged as possessing lower leadership qualities than non-obese peers when reviewing applicants’ suitability for employment (Flint et al., 2015; Flint & Snook, 2014; Roehling et al., 2007).

The present findings are consistent with previous studies suggesting that disability is associated with increased workplace harassment and discrimination (Jones et al., 2018; Snyder et al., 2010). Earlier studies provide evidence that disability is associated with increased workplace harassment and discrimination rates due to lower levels of skill and occupational power (Landsbergis et al., 2014; Lopez et al., 2009; Maroto & Pettinicchio, 2014).

Any type of employment or workplace discrimination against a large section of the population is undesirable. The Australian Human Rights Commission Act (1986) and Fair Work Act (2009) specifically protect people from workplace discrimination because of race, colour, sex, age, and physical and mental disability. Despite this protective legislation, this study uncovered workplace discrimination due to obesity and disability in Australia. This issue requires immediate attention, and it is incumbent upon the government to review the adequacy of legislation and for organisations to review the limitations of existing discrimination and employment policies. These reviews should facilitate the involvement of employers in education, advocacy, and workforce development efforts to ensure the rights of obese and disabled workers are protected. Additionally, an educational campaign may be helpful to raise awareness of weight and disability-related discrimination (Kungu et al., 2019). Creating an inclusive, supportive environment for workers with disabilities and other marginalised groups is likely to reduce harassment

and discrimination in the workplace.

The current study has several strengths. Previous studies focused on a particular aspect of health while checking its association with employment discrimination and were based on cross-sectional data. However, this study was the first reported empirical study to consider the separate impacts of obesity and disability on employment discrimination. This study also incorporated a large Australian sample to evaluate the relationship between obesity and disability with employment discrimination and considered a wide range of employment discrimination-related factors as covariates. Collectively, these considerations set this study apart from other similar studies.

The present study has several limitations that should be considered when interpreting the findings. First, the study findings might be vulnerable to self-reported bias, as data on BMI, disability, and employment discrimination may be underestimated or overestimated. Secondly, this study did not consider some essential variables, such as the occupational skill set of the respondents, due to data unavailability. Another limitation is that the study focuses on employment discrimination in a particular country setting. Taking into account the limitations of the present study, future studies should investigate more closely how obese and disabled people are discriminated against in the workplace. Besides, future research may test if these relationships also exist in different country settings or across countries.

5. Conclusion

This paper is the first to investigate the longitudinal association between obesity and disability with employment discrimination in Australia. It used a nationally representative data set by linking the four waves of the HILDA survey over the period 2008 to 2018. The longitudinal random-effects regression technique was fitted to investigate the differences in employment discrimination due to obesity and disability. The study findings offer clear evidence that obesity and disability were associated with employment discrimination in Australia. The estimated outcomes are significant for Australia and instructive, in general, for other countries with similar labour market characteristics. The authors expect that the findings will support the development of more effective legislation and policies to prevent health-related employment discrimination in the workplace.

Declaration of competing interest

The authors declare that they have no conflicts of interest.

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Abbreviations

BMI	Body Mass Index
HILDA	Household, Income and Labour Dynamics in Australia Survey
OR	Odds Ratios
WHO	World Health Organization

Ethics approval

This study did not require ethical approval as the analysis used only de-identified existing unit record data from the HILDA survey. However, the authors completed and signed the Confidentiality Deed Poll and sent it to NCLD (nclresearch@dss.gov.au) and ADA (ada@anu.edu.au) before the data applications' approval. Therefore, datasets analysed and/or generated during the current study are subject to the signed confidentiality deed.

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Author statement

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Availability of data and materials

The data used for the study were collected from the Melbourne Institute of Applied Economic and Social Research. There are some restrictions on this data, and it is not available to the public. Those interested in accessing this data should contact the Melbourne Institute of Applied Economic and Social Research, The University of Melbourne, VIC 3010, Australia.

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