

Bond University
Research Repository



Changes in smoking, drinking, overweight and physical inactivity in young Australian women 1996-2013

Powers, Jennifer R.; Loxton, Deborah; Anderson, Amy E.; Dobson, Annette J.; Mishra, Gita D.; Hockey, Richard; Brown, Wendy J.

Published in:
Health Promotion Journal of Australia

DOI:
[10.1071/HE16085](https://doi.org/10.1071/HE16085)

Licence:
Other

[Link to output in Bond University research repository.](#)

Recommended citation(APA):
Powers, J. R., Loxton, D., Anderson, A. E., Dobson, A. J., Mishra, G. D., Hockey, R., & Brown, W. J. (2017). Changes in smoking, drinking, overweight and physical inactivity in young Australian women 1996-2013. *Health Promotion Journal of Australia*, 28(3), 255-259. <https://doi.org/10.1071/HE16085>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

For more information, or if you believe that this document breaches copyright, please contact the Bond University research repository coordinator.

Changes in smoking, drinking, overweight and physical inactivity in young Australian women from 1996 to 2013

Abstract

Issue addressed Smoking, risky drinking, overweight and obesity, and physical inactivity are health-risk factors (HRFs) that contribute significantly to morbidity worldwide. Several initiatives have been introduced over the past two decades to reduce these HRFs. This paper examines changes in the prevalence of HRFs in young women (aged 18-23 years) between 1996 and 2013, overall, and within demographic groups.

Methods Data from two cohorts of the Australian Longitudinal Study on Women's Health, born in 1973-78 (n=14,247) and 1989-95 (n=17,012) were weighted to provide national estimates. Prevalence ratios were used to compare HRFs in 2013 relative to 1996.

Results In 1996, 32% were current smokers, 38% were risky drinkers, 22% were overweight or obese and 7% were physically inactive. In 2013, corresponding estimates were 19%, 35%, 33% and 6% respectively. Between 1996 and 2013, overall smoking prevalence decreased, but remained over 43% among least educated women. Overweight and obesity increased in all demographic groups.

Conclusions The findings suggest that only smoking, which has been the subject of changes in taxation, legislation and regulation, declined significantly, in all except the least educated women. In contrast, the prevalence of overweight and obesity, which has largely been addressed through awareness campaigns and voluntary actions by the food industry, increased markedly in all demographic sub-groups.

So what?

The findings show that comprehensive health promotion interventions, such as those for tobacco control, are successful (but may still be ineffective among less educated women). In contrast the measures to control population weight gain among young women have been futile so far.

Keywords: health policy, women's health, smoking, obesity, alcohol consumption, ALSWH

Changes in smoking, drinking, overweight and physical inactivity in young Australian women from 1996 to 2013

Introduction

Tobacco smoking, alcohol use, overweight and obesity, and physical inactivity are among the top ten health-risk factors (HRFs) contributing to the global burden of disease.¹ Many countries have adopted initiatives to combat HRFs.²⁻⁴ During the last two decades in Australia, strategies to reduce these HRFs have included public health guidelines, educational campaigns, and structural and fiscal changes to encourage healthier behaviours.⁵⁻⁷

The primary aim of this paper was to assess changes in levels of smoking, risky drinking, overweight and obesity, and physical inactivity between 1996 and 2013 among young women in Australia. The secondary aim was to examine changes in HRFs in population subgroups, to provide insights relevant to health promotion strategies.

Methods

Participants

The Australian Longitudinal Study on Women's Health (ALSWH) is a national study of women's health and well-being.⁸ In 1996 three cohorts of women were recruited, with the youngest aged 18-23 years (the 1973-78 cohort). Women were randomly selected from the national health insurance database, Medicare, with over-sampling of those living in rural and remote areas. Data were collected by mailed questionnaires. Further details have been reported elsewhere.⁸

In 2013, ALSWH recruited a new cohort of 18-23 year old women (the 1989-95 cohort), using the internet and social networking sites, traditional media and referral.⁹ Participants

completed surveys online. Further details have been reported elsewhere.^{9, 10} Surveys for both cohorts are available on the ALSWH website: <http://www.alswh.org.au/for-researchers/surveys>.

Ethics approvals were obtained from the Human Research Ethics Committees of the University of Newcastle (H-076-0795 and H-2012-0256) and the University of Queensland (2004000224 and 2012000950).

This paper compares nationally representative estimates of HRF prevalence in 18-23 year old women, based on data from 14,247 ALSWH respondents in the 1973-78 cohort in 1996 and 17,012 in the 1989-95 cohort in 2013.

Measures

Demographic factors were age (single year), area of residence (major city, inner regional, outer regional, remote and very remote), education, student status, employment status, relationship status and ability to manage on available income. HRFs included smoking, alcohol use, overweight and obesity, and physical inactivity. Risk categories for alcohol consumption were based on national guidelines as no risk, low episodic risk (binge less than once a month), high episodic risk (binge at least once a month) or long-term risk (more than two drinks per day on average). Overweight and obesity was based on body mass index (BMI) calculated from self-reported height and weight. In the 1996 survey, participants who reported 'never' engaging in vigorous or less vigorous exercise lasting 20 minutes or more were categorised as physically inactive. Participants in 2013 who responded 'zero' to the number of times they walked briskly, and did moderate or vigorous leisure activities were categorised as physically inactive. For comparisons of HRF changes between population subgroups, HRFs were dichotomised as follows: current smoker or not; risky drinker (high episodic risk or long-term risk) or not; overweight or obese, or not; and physically inactive or not.

Statistical Analyses

All analyses used SAS version 9.4 (SAS Institute Inc., Cary, NC, USA). To estimate population prevalence of the HRFs, the ALSWH data were weighted to match the national populations at each time. The weighting was based on age and area of residence distributions of 18-23 year old women at the 1996 Census for the 1973-78 cohort, and at the 2011 Census for the 1989-95 cohort. The national representativeness of the cohorts and details of the weighting have been described previously.^{10, 11}

Few data were missing for any variable (between 0% and 2%) except for BMI in the 1973-78 cohort (8.8% missing). Multiple imputation (MI) was used to reduce bias due to missing data.¹² The Genmod procedure was used to estimate prevalence ratios in 2013 relative to 1996 and 99% confidence intervals for each HRF and each demographic sub-group separately.

Results

National population estimates of demographics and HRFs of women aged 18-23 in 1996 and 2013 are compared in Table 1. In 2013, greater proportions of women had post-school education (Certificate, Diploma or University), were working part-time and studying part-time, and were in a de-facto relationship, than in 1996. In 2013 young women were less likely to be current smokers, but more likely to be overweight or obese. The prevalence of long-term risky drinking was lower and low episodic risk drinking was higher in 2013 than in 1996. Few young women were physically inactive at either time.

The prevalence and prevalence ratios of each HRF are shown by demographic sub-groups in Table 2. In 2013, the prevalence of smoking (relative to 1996) was significantly lower in all demographic groups, except for the least educated women (those with less than 12 years school), where smoking prevalence was 46.7% in 1996 and 43.6% in 2013. More than a third of young women were risky drinkers in 2013, representing a small decrease since 1996. The biggest difference in risky drinking occurred among full-time students, who had 28% lower prevalence, and married participants, who had 40% lower prevalence in 2013 than in 1996. The prevalence of overweight and obesity increased by 10.9% overall; this increase was statistically significant in all demographic groups. Change in the prevalence of physical inactivity was small.

Discussion

Over this 17 year period, the prevalence of smoking declined markedly, while the prevalence of overweight and obesity increased. The prevalence of risky drinking decreased slightly and physical inactivity was little changed.

After decades of anti-smoking campaigns, legislation, regulation and increased taxes, smoking prevalence has declined in a number of countries.¹³ In 2013 the overall prevalence of smoking in this study was 18.8%, which is similar to previous Australian estimates.¹⁴ However, large proportions of the least educated women still smoked in 2013, with little change since 1996. Consistently, results from the Netherlands and Slovakia show that less educated people are more likely to be current smokers than those with a university education.¹⁵ Less educated women also start smoking earlier, which suggests there is a need to better understand what leads to the uptake and maintenance of smoking among girls. Such

understanding could inform the development of targeted anti-smoking interventions in this vulnerable demographic group.

Recently, most alcohol campaigns aimed to decrease binge drinking, and reduce the adverse outcomes associated with excess use.¹⁶ Despite the small decline in long-term risk drinking, a third of the women in 2013 still reported risky drinking behaviour. While messages targeted specifically at young women might help, it has been suggested that a volumetric tax on alcohol may have a greater effect on overall alcohol consumption.¹⁷ Following the 25% increase in tobacco tax in 2010, there was an immediate decrease in smoking.¹⁸ However, the response to the ‘alcopops’ tax was mixed.¹⁷ While consumption of alcopops declined, consumption of other alcoholic beverages increased, making it difficult to determine whether the introduction of a broader tax on alcohol would actually decrease levels of binge drinking in young people.

In light of the current global ‘obesity epidemic’, the finding that one third of young women were overweight or obese in 2013 was not unexpected. However, the increase in prevalence of 11% between 1996 and 2013 is particularly concerning, because the prevalence of overweight and obesity in the 1973-78 ALSWH cohort has increased markedly since 1996; by 2012 (when they were 34-39 years), 49% were overweight or obese.¹⁹ If BMI increases at a similar rate among young women born in 1989-95, then when they reach 34-39 years, an estimated 60% will be overweight or obese. This is similar to the 1998 estimate of 64% for women in the United States. Women born in the 1990s are likely to face significant weight-related health problems and increases in healthcare needs as they move into their childbearing years and beyond. The increase in overweight and obesity was evident across all demographic sub-groups.

The prevalence of physical inactivity was low at both time periods. As previous research has shown that activity levels fall markedly during the childbearing years,²⁰ there is a need for strategies to encourage young women to eat less and move more, in order to prevent further increases in overweight and obesity as they age. Awareness campaigns alone are unlikely to be effective. Legislation and regulation strategies have been effective in tobacco⁷ and alcohol control in particular locations.¹⁶ Similarly, regulating the sale of unhealthy, energy dense food, and improving social and physical environmental support for physical activity, should be included in multifactorial prevention strategies.

Study Strengths and Limitations

The main strength is that the findings are based on data from more than 30,000 young women who were largely representative of Australian women who were 18-23 years old in 1996 and 2013. Limitations include self-reported data, though wherever possible validated questions were used, and demographic differences between the cohorts associated with societal changes. In both ALSWH cohorts, less educated women were under-represented, potentially leading to underestimation of prevalence for each HRF. This should not however affect the estimated prevalence ratios.

Conclusions

The four HRFs considered here jointly increase future risk of cardiovascular, metabolic, musculoskeletal and reproductive conditions, and many forms of cancer. While prevention strategies have had some success over nearly two decades in reducing some of these HRFs,

smoking prevalence remains high in less educated women and obesity rates are escalating in all demographic sub-groups. There is a need to tailor prevention strategies for young women, particularly the less educated, who may not be reached by large scale population approaches.

References

1. World Health Organization. Global health risks: mortality and burden of disease attributable to selected major risks. Geneva: WHO 2009.
2. Moodie R, Daube M, Carnell K, Connors C, Larkin S, Roberts L, et al. Technical Report 1 Obesity in Australia: a need for urgent action Including addendum for October 2008 to June 2009. Canberra: Commonwealth of Australia 2009.
3. Office of Disease Prevention and Health Promotion. Healthy People 2020. Washington, D.C.: 2015.
4. Public Health Policy and Strategy Unit. Public Health Outcomes Framework 2013 to 2016. London: United Kingdom Department of Health, 2012.
5. Australian Government Department of Health. Australia's physical activity and sedentary behaviour guidelines Canberra: Commonwealth of Australia; [23 Jun 2015]. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines>.
6. Howard SJ, Gordon R, Jones SC. Australian alcohol policy 2001-2013 and implications for public health. *BMC Public Health*. 2014;**14**:848.
7. Scollo MM, Winstanley MH. Tobacco in Australia: Facts and issues. Melbourne: Cancer Council Victoria; [23 Jun 2015]. Available from: <http://www.tobaccoinaustralia.org.au/>.
8. Lee C, Dobson AJ, Brown WJ, Bryson L, Byles J, Warner-Smith P, et al. Cohort Profile: the Australian Longitudinal Study on Women's Health. *Int J Epidemiol*. 2005;**34**(5):987-91.
9. Loxton D, Powers J, Anderson AE, Townsend N, Harris ML, Tuckerman R, et al. Online and offline recruitment of young women for a longitudinal health survey:

- findings from the Australian Longitudinal Study on Women's Health 1989-1995 cohort
J Med Internet Res. 2015;**17**(5):e109.
10. Mishra GD, Hockey R, Powers J, Loxton D, Tooth L, Rowlands I, et al. Recruitment via the Internet and Social Networking Sites: The 1989-1995 Cohort of the Australian Longitudinal Study on Women's Health. *J Med Internet Res.* 2014;**16**(12):e279.
 11. Brown WJ, Bryson L, Byles JE, Dobson AJ, Lee C, Mishra G, et al. Women's Health Australia: Recruitment for a national longitudinal cohort study. *Women & Health.* 1998;**28**(1):23-40.
 12. Sterne JA, White IR, Carlin JB, Spratt M, Royston P, Kenward MG, et al. Multiple imputation for missing data in epidemiological and clinical research: potential and pitfalls. *BMJ.* 2009;**338**:b2393.
 13. Organisation for Economic Cooperation and Development (OECD). OECD Factbook 2014: Economic, Environmental and Social Statistics. OECD Publishing, 2014.
 14. Australian Institute of Health and Welfare [AIHW]. Risk factor trends: age patterns in key health risks over time. Canberra: AIHW, 2012 Contract No.: Cat. no. PHE 1 66.
 15. Behanova M, Nagyova I, Katreniakova Z, van Ameijden EJC, van Dijk JP, Reijneveld SA. Health-risk behaviours in deprived urban neighbourhoods: a comparison between Slovak and Dutch cities. *Int J Public Health.* 2014;**59**(2):405-14.
 16. Kypri K, Jones C, McElduff P, Barker D. Effects of restricting pub closing times on night-time assaults in an Australian city. *Addiction.* 2011;**106**(2):303-10.
 17. Doran CM, Digiusto E. Using taxes to curb drinking: A report card on the Australian government's alcopops tax. *Drug Alcohol Rev.* 2011;**30**(6):677-80.
 18. Dunlop SM. Impact of the 2010 tobacco tax increase in Australia on short-term smoking cessation: a continuous tracking survey. *Med J Aust.* 2011;**195**(8):469-72.

19. Gomersall S, Dobson A, Brown W. Weight gain, overweight, and obesity: determinants and health outcomes from the Australian Longitudinal Study on Women's Health. *Current obesity reports*. 2014;**3**(1):46-53.
20. Brown WJ, Hockey R, Dobson AJ. Effects of Having a Baby on Weight Gain. *Am J Prev Med*. 2010;**38**(2):163-70.

Table 1 Comparison of demographic characteristics and health-risk factors of women aged 18-23 in Australia in 1996 and 2013: national prevalence estimates based on data from two cohorts of the Australian Longitudinal Study on Women's Health

Demographic characteristics and health-risk factors of 18 to 23 year old women	in 1996 ^a N=14247		in 2013 ^b N=17012		Prevalence ratio (PR) for 2013 compared with 1996 (99% CI)	
	N	%	N	%	PR	(99% CI)
Educational qualifications						
Less than 12 years school	2447	15.3	1291	7.7	0.50	(0.46;0.55)
12 years school	7633	52.8	7377	43.1	0.82	(0.79;0.84)
Certificate or diploma	2587	17.6	4479	26.4	1.50	(1.40;1.60)
University	1580	14.3	3865	22.8	1.60	(1.48;1.73)
Student status^c						
Studying full-time	4900	35.9	1734	10.2	0.28	(0.26;0.30)
Studying part-time	1637	11.6	9505	55.6	4.78	(4.45;5.15)
Not studying	7710	52.5	5773	34.2	0.65	(0.63;0.68)
Employment status^c						
Working full-time	5021	36.0	3952	23.6	0.66	(0.63;0.69)
Working part-time	2493	17.1	9306	54.3	3.17	(2.99;3.37)
Not working	6733	46.9	3754	22.1	0.47	(0.45;0.49)
Managing on available income is						
Easy	1802	13.0	1803	10.7	0.82	(0.75;0.90)
Not too bad	5085	36.5	4824	28.4	0.78	(0.74;0.81)
Difficult some of the time	4726	32.7	6073	35.6	1.09	(1.04;1.14)
Difficult all the time	2130	14.4	3569	20.9	1.45	(1.35;1.56)
Impossible	504	3.4	743	4.4	1.29	(1.10;1.52)
Relationship status						
Married*	1408	10.5	573	3.4	0.33	(0.29;0.37)
De facto	1954	12.6	4010	23.8	1.89	(1.75;2.04)
Not partnered	10885	76.9	12429	72.8	0.95	(0.93;0.96)
Smoking						
Never-smoker	7505	53.6	10656	62.6	1.17	(1.13;1.20)
Ex-smoker less than daily	1090	7.4	2488	14.6	1.99	(1.79;2.20)
Ex-smoker daily	1097	7.3	675	4.0	0.55	(0.48;0.62)
Current smoker	4555	31.7	3193	18.8	0.59	(0.56;0.63)
Alcohol consumption						
No risk	3968	29.6	3659	21.5	0.73	(0.69;0.77)
Low episodic risk	4623	32.1	7330	43.0	1.34	(1.28;1.40)
High episodic risk	4855	33.1	5393	31.7	0.96	(0.91;1.01)
Long-term risk	801	5.2	630	3.8	0.72	(0.62;0.84)
Body mass index (kg/m²)						
Underweight (<18.5)	1449	10.7	1360	8.0	0.74	(0.67;0.83)
Healthy weight (18.5-24.9)	9413	67.0	10016	58.8	0.88	(0.86;0.90)
Overweight (25-29.9)	2416	16.1	3337	19.6	1.22	(1.14;1.31)
Obese (≥30)	968	6.2	2300	13.6	2.19	(1.96;2.45)
Physical Activity						
None	967	6.9	1019	6.0	0.88	(0.77;0.99)

Any	13280	93.1	15993	94.0	1.01	(1.00;1.02)
-----	-------	------	-------	------	-------------	--------------------

Percentages weighted to age and area distributions of 18-23 year old women at the 1996 Census^a and the 2011 Census^b

^c Part-time was less than 35 hours/week and full-time was at least 35 hours/week

Prevalence ratios shown in bold are statistically significant at the 0.01 level

Married includes a small number of women who were separated, divorced or widowed

Table 2 Prevalence and prevalence ratios (with 99% CIs) of health-risk factors, by demographic characteristics, among 18-23 year old Australian women in 1996 and 2013

Characteristics of 18 to 23 year old women in	Smoker			Risky drinker			Overweight or obese			Physical inactivity		
	1996 %	2013 %	2013 v 1996 PR (99% CI)	1996 %	2013 %	2013 v 1996 PR (99% CI)	1996 %	2013 %	2013 v 1996 PR (99% CI)	1996 %	2013 %	2013 v 1996 PR (99% CI)
All participants	31.7	18.8	0.59 (0.56;0.63)	38.3	35.5	0.93 (0.89;0.97)	22.3	33.2	1.49 (1.41;1.58)	6.9	6.0	0.88 (0.77;0.99)
Qualifications												
<12 years school	46.7	43.6	0.93 (0.84;1.04)	35.1	33.7	0.96 (0.84;1.10)	29.7	46.1	1.55 (1.36;1.77)	11.8	12.7	1.08 (0.83;1.41)
12 years school	29.6	16.1	0.54 (0.50;0.59)	40.1	36.5	0.91 (0.86;0.96)	20.4	29.6	1.45 (1.34;1.58)	6.0	4.9	0.83 (0.68;1.01)
Certificate/ Diploma	32.6	24.0	0.74 (0.66;0.82)	36.8	33.2	0.90 (0.82;0.99)	25.4	40.8	1.61 (1.43;1.81)	7.4	8.2	1.11 (0.86;1.41)
University	22.4	9.6	0.43 (0.35;0.52)	37.0	36.8	0.99 (0.88;1.12)	17.4	27.1	1.55 (1.29;1.86)	4.6	3.4	0.75 (0.50;1.12)
Student status												
Full-time	23.5	8.2	0.35 (0.28;0.44)	38.8	28.1	0.72 (0.65;0.81)	18.3	26.5	1.45 (1.26;1.66)	4.9	3.0	0.62 (0.42;0.93)
Part-time	30.6	15.6	0.51 (0.45;0.58)	35.0	36.2	1.03 (0.93;1.15)	21.7	30.3	1.39 (1.20;1.61)	6.1	4.7	0.77 (0.56;1.05)
Not studying	37.6	27.1	0.72 (0.67;0.78)	38.8	36.5	0.94 (0.88;1.01)	25.1	40.1	1.59 (1.48;1.72)	8.5	9.2	1.08 (0.92;1.27)
Employment status												
Full-time	33.2	21.5	0.65 (0.58;0.72)	42.1	39.9	0.95 (0.88;1.02)	21.9	37.1	1.70 (1.53;1.88)	7.9	7.0	0.89 (0.72;1.10)
Part-time	34.7	15.9	0.46 (0.41;0.51)	40.2	36.9	0.92 (0.84;0.99)	21.5	29.1	1.35 (1.20;1.53)	5.4	5.0	0.92 (0.70;1.21)
Not working	29.5	23.1	0.78 (0.71;0.86)	34.8	27.4	0.79 (0.72;0.86)	22.9	39.2	1.71 (1.57;1.87)	6.7	7.6	1.13 (0.92;1.39)
Difficulty managing on income												
No or some	28.6	15.6	0.54 (0.51;0.58)	37.4	35.3	0.95 (0.90;0.99)	21.4	30.8	1.44 (1.35;1.54)	6.8	5.4	0.79 (0.68;0.91)
All the time	45.9	28.4	0.62 (0.57;0.68)	42.8	36.0	0.84 (0.77;0.92)	26.4	40.6	1.53 (1.37;1.72)	7.4	8.1	1.09 (0.85;1.40)
Relationship status												
Married*	28.3	14.2	0.50 (0.37;0.68)	20.0	11.9	0.60 (0.42;0.84)	28.3	45.8	1.62 (1.34;1.95)	9.5	10.3	1.08 (0.71;1.66)
De facto	42.5	22.5	0.53 (0.47;0.59)	33.7	29.2	0.87 (0.77;0.98)	25.9	38.7	1.49 (1.31;1.70)	8.6	8.0	0.93 (0.71;1.22)
Not partnered	30.4	17.8	0.59 (0.55;0.63)	41.6	38.6	0.93 (0.89;0.97)	20.9	30.9	1.48 (1.38;1.58)	6.3	5.2	0.83 (0.72;0.96)

* includes a small number of women who are separated, divorced or widowed

Percentages weighted to age and area distributions of 18-23 year old women at the 1996 Census and 2011 Census.

Prevalence ratios (PRs) shown in bold are statistically significant at the 0.01 level