


BRIEF REPORT

Team characteristics associated with weight loss in a First Nations community intervention: An observational study

Erika Bohn-Goldbaum^{1,2}  | Aaron Cashmore^{3,4} | Adrian Bauman^{1,2} |
Anna Sullivan³ | Lose (Rose) Fonua³ | Andrew Milat^{1,2,3} | Kate Reid³ |
Anne Grunseit^{1,2}

¹Faculty of Medicine and Health, Sydney School of Public Health, Prevention Research Collaboration, The University of Sydney, Camperdown, New South Wales, Australia

²The Australian Partnership for Prevention Centre, Glebe, New South Wales, Australia

³Population and Public Health Division, NSW Ministry of Health, St Leonards, New South Wales, Australia

⁴Faculty of Medicine and Health, Sydney School of Public Health, The University of Sydney, Camperdown, New South Wales, Australia

Correspondence

Erika Bohn-Goldbaum, Faculty of Medicine and Health, Sydney School of Public Health, Prevention Research Collaboration, The University of Sydney, Sydney School of Health Sciences, D18 SWHB level6, Camperdown, NSW, Australia.

Email: erika.goldbaum@sydney.edu.au

Present address

Erika Bohn-Goldbaum, Faculty of Medicine and Health, Sydney School of Health Sciences, The University of Sydney, Camperdown, New South Wales, Australia.

Lose (Rose) Fonua, Hearing Assessment Unit—Early Ears, Hearing Australia, Sydney, New South Wales, Australia.

Kate Reid, NSW Department of Customer Service, Haymarket, New South Wales, Australia.

Anne Grunseit, Faculty of Health, School of Public Health, University of Technology Sydney, Ultimo, New South Wales, Australia.

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Abstract

Issue addressed: Group-based weight-loss programs can be effective in addressing high rates of overweight and obesity among Aboriginal and Torres Strait Islander Peoples. The purpose was to determine associations between demographic and baseline weight-related variables and team weight loss in a community-based intervention as no previous studies have analysed this at a team level.

Methods: Binomial models tested associations between team-level age, proportion female and baseline weight and classification as higher weight-loss team (HWT) (>50% persons losing 2.5% of initial weight) vs lower weight-loss team (LWT). Linear regressions compared HWT and LWT on diet and physical activity (PA) outcomes adjusted for age and gender.

Results: For each 1 kg increment in mean baseline weight, a team's likelihood of higher weight loss was increased by 4% (APR: 1.04, 95%CI: 1.00, 1.08). HWTs increased vigorous PA by 0.32 sessions more than LWTs ($P = .02$). Fruit and vegetable intakes were not associated with team weight loss classification.

Conclusions: Only baseline weight and vigorous PA distinguished HWT and LWT. Promoting PA components in team-based weight-loss approaches may be beneficial as these lend themselves to group participation.

So what?: Demographic and baseline weight-related variables are largely not predictive of weight loss success in group programs. Identifying other characteristics shared by HWT may help teams achieve weight loss.

Abbreviations: APR, adjusted prevalence ratios; HWT, higher weight-loss team; KHC, The NSW Aboriginal Knockout Health Challenge; LWT, lower weight-loss team; PA, physical activity; SD, standard deviation.

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KEYWORDS

Aboriginal Australians and Torres Strait Islanders, health behaviours, obesity, program evaluation

1 | INTRODUCTION

Health promotion may be more successful when it incorporates the values of the target population.¹ Group-based weight-loss programs can be acceptable and effective among Australia's First Nations peoples,^{1,2} a population among whom ~71% are overweight/obese.³ The NSW Aboriginal Knockout Health Challenge (KHC) is one such program^{2,4} and, evaluations of the KHC have contributed to the dearth of lit evaluating such programs.⁵

Group-based lifestyle programs can have wide reach and effectiveness, though there is a gap in the knowledge for Indigenous community-based programs.⁶ In workplaces and communities, team competitions have achieved positive participant outcomes, including weight loss⁷ and increased physical activity (PA).⁸ Some studies have investigated participant-level predictors of weight loss; however, little is known about how group composition and interactions influence team outcomes. Social factors (eg, shared experiences and goals) can enhance engagement with,⁹ and the outcomes of, healthy lifestyle programs, particularly in groups with shared traits¹⁰ and there is emerging understanding that interpersonal factors facilitate PA participation among Indigenous peoples.¹¹

Shared experiences and goals can form through common demographic characteristics, whereas differences can impede group cohesion.¹⁰ Insights into relationships between team demographics and successful health behaviours could help program design and implementation for better outcomes. Previous research evaluating team effects found team size, age range and gender composition were not correlated with individual weight loss outcomes.¹² To improve understanding of team-based weight-loss programs, this study compares characteristics of teams with higher and lower weight loss.

2 | METHODS

The KHC has been described in detail elsewhere.^{2,4,13} Briefly, Aboriginal and Torres Strait Islander people form teams of 20-33 persons and compete for prize monies in 10-16 week-long weight-loss and healthy lifestyle contests. A program advisory committee, which includes representatives of Aboriginal community-controlled health organisations and oversees the KHC and KHC-related research, identified a need to understand factors influencing team success. Aboriginal people are involved in the coordination and delivery of the KHC and have been investigators on associated research, including this study.

The primary aim of this study was to identify predictors of being a higher weight-loss team (HWT), defined as $\geq 50\%$ of team members achieving $\geq 2.5\%$ weight loss. Previous research has shown

clinical benefits from weight loss of 2.5%.¹⁴ The 50% criterion was set by KHC program managers' operational expectations for the intervention.

Of 297 teams competing in the KHC from 2012 to 2018, 148 met the contest award criterion of ≥ 20 persons completing. From those 148 teams, we excluded participants not consenting to data-sharing for research purposes or aged < 18 , because adolescent weight regulation is physiologically different from adults,¹⁵ leaving 3169 observations for analysis.

De-identified data from participant enrolment/completion forms from the contests were provided through an independent data linkage agency (The Centre for Health Record Linkage—<http://www.cherel.org.au>) that used probabilistic record matching by participant name, sex and date of birth and were collapsed to derive aggregate measures by team (the unit of analysis) at baseline and at competition completion: team proportion female, losing $\geq 2.5\%$ weight, meeting guidelines for fruit and vegetable intakes,¹⁶ and sufficient PA¹⁷; means and standard deviation (SD) for age and weight at registration; mean servings of fruit and vegetables, and number of weekly sessions of walking, moderate PA and vigorous PA (defined as 'activity that makes you sweat or puff and pant? [eg, heavy lifting, digging, jogging, aerobics or fast bicycling]'). An indicator variable (HWT vs lower weight-loss team [LWT]) captured whether the team met the weight-loss criterion as defined above.

2.1 | Analysis

A complete case analysis was undertaken as missing data for predictor variables comprised $< 5\%$ for the analytic sample.

To examine demographic or baseline weight-related variables associated with HWT loss, we conducted multivariable generalized linear regressions using a binomial distribution and a log link. Covariates included proportion female and mean and SD of age and weight at registration. Results are reported as adjusted prevalence ratios (APR) with 95% confidence intervals.

To investigate whether team categorization (HWT/LWT) differed by diet and PA outcomes, a series of linear regressions were conducted with the fruit and vegetable servings and proportion meeting guidelines, and sessions of PA and proportion meeting PA guidelines at competition completion as the outcomes. The analyses were adjusted for baseline levels of the outcome variables, the proportion female and mean age. Results are reported as the adjusted difference in the outcome variable if the team had higher weight loss.

Analyses were performed using STATA (version 16.1) with alpha set at 0.05.



TABLE 1 Difference between teams with lower and higher weight loss

Outcome variable	Lower weight loss team mean (SD)	Higher weight loss team mean (SD)	Adjusted beta	95%CI
Fruit intake (servings/day)	1.88 (0.36)	1.91 (0.38)	0.05	-0.08, 0.19
Vegetable intake (servings per day)	2.82 (0.72)	2.90 (0.55)	0.13	-0.09, 0.36
Vigorous PA (sessions/week)	2.53 (0.76)	2.68 (0.77)	0.32	0.05, 0.59
Moderate PA (sessions/week)	2.44 (0.74)	2.55 (1.02)	0.17	-0.14, 0.48
Walking (sessions/week)	2.99 (0.79)	2.99 (0.94)	0.21	-0.10, 0.52
% meeting fruit guidelines	65.7	69.9	0.44	-0.01, 0.10
% meeting vegetable guidelines	13.1	15.1	0.01	-0.03, 0.06
% sufficiently active	76.1	78.5	0.01	-0.01, 0.10

Note: Difference between successful (vs. non-successful) teams across behavioural outcomes at KHC competition end are adjusted for baseline values of outcome and gender and age.

3 | RESULTS

Of 148 teams, 48 (32.4%) met the definition for a HWT. Only mean weight of the team at registration was significantly associated with high weight loss: with each 1 kg increment in mean weight, a team's likelihood of being classified as a HWT was increased by 4% (APR: 1.04 [95%CI: 1.00, 1.08], $P = .038$). Body weight variation within teams was not statistically significant ($P = .802$). Although proportion female yielded a high APR (2.94), the confidence interval was wide (0.57, 15.19). Mean age had a marginally decremental effect on probability of high weight loss (APR: 0.93 [95%CI: 0.85, 1.01], $P = .099$), but spread of age across the team was not statistically significant ($P = .110$).

Table 1 shows the differences across the behavioural outcomes at the competition end for teams by team weight-loss classification, adjusted for baseline values, age and gender composition of the team. Only the number of vigorous PA sessions showed a significant difference between the two groups, with HWTs doing 0.32 of a session more than LWTs ($P = .02$). No other PA or diet outcomes, including the proportion sufficiently physically active, reached statistical significance despite the result for vigorous PA.

4 | DISCUSSION

Only mean starting weight predicted likelihood of higher team weight loss, with a 4% increase per kilogram. This result, combined with the contest goal to lose weight, may suggest that HWTs identified more strongly with the common purpose of weight loss. There is evidence that being heavier may motivate weight loss behaviour¹⁸ and having a common purpose has been associated with weight loss success by individuals within teams¹² and with exercise adherence.¹⁹ Having a common goal may foster a shared identity and social support,¹⁰ interpersonal factors which facilitate PA participation among Indigenous peoples.¹¹ Thus, a shared goal of weight loss could explain the higher frequency of vigorous PA sessions among HWTs. Community and environmental (eg, session times and locations) factors have also been identified as PA facilitators among Indigenous people¹¹ though

whether this results in weight loss is unclear. Social factors are associated with retention in the KHC,¹³ suggesting the potential for these to also underpin HWTs' success.

5 | CONCLUSIONS

Demographic and baseline weight-related variables were largely not determinants of weight loss success in group programs; only mean weight of the team at registration predicted team success. Understanding the role of social and environmental factors could improve understanding of how teams succeed within an effective weight loss program.

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CONFLICT OF INTEREST

The NSW Ministry of Health engaged Adrian Bauman's consultancy firm to conduct the study, with EG engaged as sub-contractor. Aaron Cashmore, Anna Sullivan and Andrew Milat have a nonfinancial competing interest in that they work for the organization that operates the program. Additionally, author Lose (Rose) Fonua's and author Kate Reid's former employment in the same organization overlapped with this study.

DATA AVAILABILITY STATEMENT

The datasets generated and/or analysed during the current study are not publicly available due to the conditions of ethics approval. The





contest data that support the findings of this study are not publicly available and restrictions apply to their availability; data may be made available from NSW Ministry of Health or from the authors upon reasonable request and with permission of NSW Ministry of Health.

ETHICS STATEMENT

Ethics approval was provided by the Aboriginal Health and Medical Research Council (Project 1125/15) and The University of Sydney (2019/425).

ORCID

Erika Bohn-Goldbaum  <https://orcid.org/0000-0003-4966-4978>

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