



The role of sociocultural factors in obesity aetiology in Pacific adolescents and their parents: a mixed-methods study in Auckland, New Zealand

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Abstract

Aim To explore sociocultural factors that may promote or prevent obesity in Pacific communities in New Zealand. Specific objectives were to describe the behaviours, beliefs and values of Pacific adolescents and their parents, related to food consumption and physical activity and to examine the patterns among obese and non-obese Pacific adolescents and their parents.

Methods A self-completion questionnaire was administered to 2495 Pacific students who participated in the New Zealand arm of the Obesity Prevention In Communities (OPIC) project, with quantitative comparisons between 782 obese and 814 healthy weight students. Sixty-eight people (33 adolescents and 35 parents) from 30 Pacific households were interviewed in the qualitative phase of the study.

Results Healthy eating and higher levels of physical activity were related to parental presence at home, parental occupational type (non-shift) and better health education and experience. Obese adolescents held the same attitudes, beliefs and values about food and physical activity as their healthy-weight counterparts, but these factors were not protective for obesity-risk.

Conclusion This study indicates that social status and environmental factors related to poverty affect the health-promoting behaviours of Pacific communities in New Zealand. To address obesity in Pacific youth, specific macro-environmental changes are recommended including food pricing control policies to mitigate healthy food costs, revising sustained employment hour policies, making changes to school food and physical activity environments.

The South Pacific region has the highest rates of obesity in the world.^{1,2} However, of particular concern is the higher prevalence observed in Pacific population groups in New Zealand. Pacific adults (63.7%) and children (23.3%) have an almost three-fold higher risk of being obese compared to the general population (26.5% for adults; 8.3% for children).^{3,4} These disparate prevalences and the lack of empirical data to support the development of preventive and management actions to address obesity among Pacific populations in New Zealand, is the key motivation behind the current study.

Current evidence from obesity aetiology suggests environmental factors are more influential in the rapid increase of population obesity levels than determinants such as evolutionary genetic changes.^{5,6} In particular, social changes in modern environments seem to track the observed increases in obesity rates.⁷

Social factors are considered the most important influence on the prevalence of obesity although few investigations have examined the associations between sociocultural variables and obesity-risk behaviours related to eating and physical activity. Potential sociocultural (or socioenvironmental) determinants of obesity include social circumstances, such as economic and material wealth, social norms regarding physical activity and eating, levels of social support for obesity-protective behaviours, social and cultural customs, beliefs, values or expectations for what is important in relation to the role of food or the acceptability of vigorous exercise.⁸

Obesity research reviews have also reinforced the role that primary caregivers have over children and adolescent health behaviours.^{9,10} Parents often control the resources for adolescent lifestyles and values about food, diet and physical activity may also be influenced by parents and other caregivers. This study assumed that, for Pacific adolescents socialised in traditional Pacific cultural milieu, the influence of parents was a critical area for investigation, and the study therefore included Pacific parents as key participants.

This study was an affiliated sub-study to the larger Obesity Prevention in Communities (OPIC) project and this sub-study formed the basis of a University of Auckland PhD doctoral thesis for the first author. Further description of the OPIC study sample and methodology is available in other sources.^{11,12}

Method

Study design—The overall aim of the research was to explore sociocultural factors, such as community behaviours, beliefs and values that may promote or prevent obesity in Pacific communities. To further support the development of future obesity intervention or management programmes for Pacific communities in New Zealand the study used a solution-focused paradigm, or appreciative inquiry lens, to explore the factors that influence non-obese states.¹³

The specific objectives were to:

- Investigate culturally specific beliefs, values and practices around food, eating and physical activity; and
- Compare the responses of obese Pacific adolescents and their parents to their non-obese or healthy weight counterparts.

A mixed-methods research design including both qualitative and quantitative research methods was used. Given the lack of research on sociocultural factors and obesity risk for Pacific populations in New Zealand, qualitative methods were used to allow the topic to be explored in depth.

Quantitative survey questionnaire—Information was collected from 2495 Pacific students who participated in the New Zealand arm of the OPIC project. Analysis presented in this paper include results for obese and healthy weight students only ($n=1596$). Students were surveyed at secondary schools. The questionnaire items included demographic variables, anthropometry, food and nutrition behaviours, physical activity and leisure time activities, and questions relating to family, home, school and neighbourhood environments. Anthropometric measurements such as weight were taken using an electronic scale (BC418 Body Composition Analyzer, Tanita, UK), and height was measured to the nearest 0.1 cm with a standard portable stadiometer. Students' weight status was assessed using BMI measurements and international cut-off points recommended by the International Obesity Taskforce.¹⁴ In this survey, ethnicity was measured using a forced one-choice question.

This study compared prevalence of outcomes between comparison groups, which is appropriate for cross-sectional studies. Chi-squared tests were used to determine the relationship in comparisons involving two variables and statistical significance was set at $p<0.05$. Statistical software SAS (v 9.1, SAS Institute Inc., Cary, NC, USA) was used to generate results. Relative risks were calculated to adjust for possible confounders using the Mantel-Haenszel method and p-values are reported along with the crude proportions.

Qualitative interviews—Sixty-eight individuals (33 students and 35 parents) from 30 Pacific households participated in the qualitative phase of the study. Students were recruited for individual interviews if they had completed the OPIC baseline questionnaire. Students were randomly selected for the interviews, depending on weight status (healthy weight and obese students only). In the qualitative interviews, students chose multiple ethnicities.

The scope of the interview included questions on participants' eating and physical activity patterns, the influences on behaviour, and knowledge, beliefs or values about the health consequences of physical activity and food and eating habits.

Household location was deemed important for comparing equivalent environmental influences so families were recruited from the catchment area of the Mangere ward. Interview sessions included at least one adult parent or primary caregiver and a separate interview was conducted with their child/student. Five parent interview sessions included both parents present. Interview sessions progressed until information saturation was reached.

Integral to the research process and in alignment with indigenous Pacific research principles, particular cultural processes and strategies were followed for interviews.¹⁵ Participant consent was achieved for all participants and the study met the University of Auckland's Human Participants Ethics Committee standards for undertaking research.

In the qualitative component, interview transcripts were transcribed and analysed using the grounded theory inductive approach described by Strauss and Corbin.¹⁶ This technique enables the systematic identification, categorising and sorting of key themes and sub-themes running through text segments in the transcripts. NVivo7 (a software program) was used to analyse, sort and code interview data.

Results

Demographic composition of study samples

Table 1 details the key demographic variables amongst the Pacific students recruited in the quantitative survey sample only showing heterogeneity (or otherwise) across variables. Results showed a difference in weight status by ethnicity, with a lower proportion of Cook Island students, and higher proportion of Samoan and Tongan students among the obese students compared to their proportions among healthy weight students.

Table 1. Weight status by key demographic variables amongst Pacific students in quantitative survey (*n*=1596)

Demographic variable	Weight status				
	Obese (<i>n</i> =782)		Healthy weight (<i>n</i> =814)		P value
	<i>n</i>	%	<i>n</i>	%	
Gender					
Boys	386	49.4%	403	49.5%	0.95
Girls	396	50.6%	411	50.5%	
Age					
12–13	276	35.3%	299	36.7%	0.09
14	165	21.1%	192	23.6%	
15	130	16.6%	133	16.3%	
16	125	16.0%	119	14.6%	
17	86	11.0%	71	8.8%	
Ethnicity					
Samoan	387	49.5%	329	40.4%	0.02
Cook Island	133	17.0%	220	27.0%	
Tongan	195	24.9%	173	21.3%	
Other Pacific	67	8.6%	92	11.3%	

Of the 33 students interviewed in the qualitative survey, 11 identified with multiple ethnicities (30% multi-ethnic cases). Most of the households had one or more adults who were employed (25 out of 30 or 83%), and they had a combined parental income in the low-mid range of \$30–\$60K per annum (not adjusted for total household size). Most families (21 out of 30 or 70%) lived in extended families, most parents were Island-born (26 out of 30 or 86%), were bilingual (26 out of 30 or 86%) and 9 out of 30 (30%) were mixed parental-ethnicity households.

The key differences between households of healthy weight and obese students was in parental presence at home, with healthy weight student households more likely to have a full-time or part-time parent at home (13 out of 15 or 86% compared to 8 out of 15 or 53% for obese student households), while obese student households had parents that were more likely to be working in shift type working arrangements (6 out of 11 employed households or 54% compared to 1 out of 12 or 8% of households with a healthy weight student). Healthy weight student-parent pairs also came from larger household sizes (average 8.3 compared to 5.3 for obese households) with greater numbers of dependent children (average 4.3 compared to 2.5 for obese households).

Food consumption patterns

In the quantitative survey, students were asked “In the last 5 school days, on how many days did you have something to eat for breakfast before school started?” The question was repeated for eating lunch across the five school days. Table 2 shows that by weight status, obese Pacific adolescents were less likely to regularly consume (i.e. 4–5 days) breakfast (45.4%) or lunch meals (55.6%) compared to their healthy weight Pacific counterparts (breakfast 56.8%, lunch consumption 70.7%).

Table 2. Proportion (%) of Pacific students’ and their breakfast and school lunch consumption by weight status (n=1596)

Times in the last 5 school days	Obese (n=782)	Healthy weight (n=814)	P value*
Breakfast			
0–1 days	11.7%	8.9%	0.0077
2–3	42.9%	34.3%	0.0013
4–5	45.4%	56.8%	Reference
Lunch			
0–1 days	8.6%	6.3%	0.0047
2–3	35.8%	23.0%	<0.0001
4–5	55.6%	70.7%	Reference

* P value adjusted for age, gender and Pacific ethnicity.

These questions were repeated in the qualitative interviews and analysis confirmed the patterns shown by the quantitative data. That is, from the interview sample more healthy weight Pacific students (12 out of 17 or 70%) regularly ate breakfast on most school days compared to only 5 out of 16 (or 31%, p=0.056) of obese Pacific students. More parents of healthy weight students (11 out of 15, or 73%) reported regular consumption of breakfast but only 5 out of 15 (or 33%, p=0.067) of parents with an obese student reported regular breakfast intake. For both adolescents and their

parents, lack of available time was the main reason for not eating breakfast in the morning.

In the qualitative interviews, adolescents and parents were asked to identify foods they typically consumed for their main meal of the day (i.e., evening meals). Typically consumed foods differed between obese and healthy weight adolescent-parent pairs. Vegetables were identified by healthy weight adolescents and their parents as being a typically consumed food item for dinner evening meals, whilst parents with an obese child did not mention vegetables. They stated sausages as being a typically consumed food item. All other food items were similar.

Food knowledge

Students and parents were asked during the interviews to state foods they deemed healthy and unhealthy. All students and parents (i.e. 33 students and 35 parents or 100%) regardless of adolescent weight status, were knowledgeable about healthy versus unhealthy foods, for example, vegetables, fruits and water were rated healthy, and fizzy drinks, takeaways and chocolates or sweets were rated unhealthy. However, parents explained that cost, affordability and time restraints were more influential on food choices and habits than food knowledge alone.

...People eat bad foods because it's cheap I think. Like you can go and get \$10 worth of fish and chips if we have that our whole family would be eating that, you couldn't finish it...I do know what's right and what's wrong, for me its expensive. Usually we will eat white bread, [its] cheap, it's 89 cents a loaf, I can get two or three loaves of that and then the kids will get full up on that, but I know its not good for you...I mean I'm not going to go out and buy Vogel [bread brand] everyday cos they are like \$5 a loaf, you know, I only buy those ones that cost a \$1 something...I know what to do, but it's just hard on the pocket.

(NZ Māori/European/Samoan household with 2 dependant children, part-time cleaner & beneficiary, household size 6)

In the qualitative interviews, adolescents rated parents and other household members as the main sources of food knowledge and encouragement to eat healthy foods. There was a small difference by weight status, with healthy weight adolescents rating school educational classes and staff just as important as the family environment, whereas obese adolescents did not. However, one student was able to explain that despite all of the numerous sources of food knowledge resulting in good personal understanding of healthful foods it was still difficult to practice healthy eating surrounded by an obesogenic environment of easily accessible unhealthy foods.

...I get information about foods from my mother, cos my mother's a nurse, and the health council at school, and a nutritionist came to talk to our whole class. Also sometimes from TV, like those obesity programmes like Downsize Me and the Biggest Loser. ...Takeaways, coffee, fizzy drinks, lots, really I would say there is more bad food out there than there is good, so, its kinda hard to stop having all the bad foods that's out there, like takeaways.

(Cook Island/NZ Maori, female, Age 17, classified obese)

Parents rated health professionals like doctors, diabetes nurses, dietitians, family members and media sources equally high as key sources of food knowledge. Nutritional knowledge was also related to prior experience and those that worked in health related fields or health employment places had working experiences that seemed vital in affirming knowledge about food.

Food supply and preparation—In the qualitative interviews adolescents and parents were asked to identify who typically made the household food decisions (i.e.

purchased and sourced household food), and if this was the parent being interviewed, to further explain what determined food supply and preparation decisions. This study found that mothers were typically responsible for food supply and preparation of household foods. Food pricing and affordability was the key purchasing factor for all Pacific households irrespective of adolescent weight status. Food supply was reliant on available monetary resources and for low-income large-member households, food insecurity occasions were regular and was a constant cause of stress for parents, as highlighted by comments below:

...Yeah, it's true sometimes you know if I make the dinner and its not enough, sometimes I never eat, you know, mums are always like that, I have to feed them [the kids] first, it doesn't matter about me... you can't eat and leave your kids hungry. Sometimes you know my husband he always tries to eat first and then I say [to him] 'you better be second, so the kids can eat first and then we see what they left, that's for us'

(Tongan mother of 7 dependent children, at-home parent, household size 13)

Employment time particularly for those on shift work arrangements encroached on food preparation and takeaway ready-made meals was the default choice for family evening meals. The most popular food items supplied, prepared and consumed were those that were cheap and took little time to prepare.

...Sometimes during the week, if I don't cook cos normally I have to go early [to work] like today, then I say to them [kids], 'what are you going to have for dinner?', 'oh, I don't know', 'get some fish and chips or buy some takeaways', and then they will have that

(Samoan mother of 2 dependent children, cleaner, household size 6)

Physical activity

Physical activity levels—Physical activity status of adolescents was assessed in the quantitative survey with three questions which inquired about the frequency of activity across three school-time recess periods in the previous school week. Adolescents responded to the question 'Over the last 5 school days, what did you do most of the time at morning recess/ interval (apart from eating)?' The question was repeated for "lunch time" and students had three responses to choose from: (1) Mostly just sat down; (2) Mostly stood or walked around; (3) Mostly played active games. The responses were dichotomised into two categories, with choices (1) and (2) combined as the 'Inactive' category and choice (3) as 'Active'.

After-school activity was assessed with the question, "In the last 5 school days, on how many days after school, did you do sports, dance, cultural performances or play games in which you were active? There were 6 possible responses from 0 to 5 days. The responses were dichotomised into two categories of activity of 5 days and less than 5 days. Table 3 shows Pacific students' activity by weight status. Healthy weight adolescents were more frequently active than obese adolescents and the difference was significant particularly during school lunchtimes.

The qualitative interview data confirmed that the most active students were of healthy weight status. Adolescents provided information on weekly frequency of activity, and the pattern of activities including, duration, intensity, seasonal variation, and historical participation. Activity status was assessed against current definitions of activity and inactivity using Ministry of Health guidelines.³ Thirteen out of 17 (76%) healthy weight adolescents interviewed were currently active compared to 3 out of 16 obese students (19%, $p=0.003$).

Table 3. Proportion (%) of Pacific students' and their activity across three school-time recess periods by weight status (n=1596)

Activity by time period	Obese (n=782)	Healthy weight (n=814)	P value*
Interval recess			
"Mostly sat or walked"	69.3%	65.2%	0.09
"Mostly active"	30.7%	34.8%	Reference
Lunchtime			
"Mostly sat or walked"	62.5%	56.3%	0.0062
"Mostly active"	37.5%	43.7%	Reference
After school			
"0–4 days"	75.2%	70.3%	0.06
"5 days"	24.8%	29.7%	Reference

* P-value adjusted for age, gender and Pacific ethnicity

Reasons for adolescents' being active (i.e. "to have fun", "achievement motivations"; "finding challenges"; "for better health" and "historical habit") and inactive (i.e., "not having skills to be selected for school teams"; "not having money for joining activities/sports/gym fees"; "No transport between home and sports activities, important for safety reasons"; "not enough time, competing activities like school work and church activities" and "needing friends or family members to train or join teams with"), were common across groups and consistent with reasons reported in current literature.^{17–19}

All (except one) of the obese students who were currently inactive used to be active in sporting activities when they were younger usually at primary or intermediate schools. Drop-out from sports activities usually took place when they entered high school or senior school levels. Students explained that inactivity was related to finding the school sporting environment too competitive and that organised school activities did not meet their primary motive for physical activity participation, which was to have fun and enjoyment of the activity.

...Yeah, I used to play netball, that was for intermediate and primary [school]

[Interviewer] What made you stop playing?

Cos for previous seasons it was just for fun and now they're too serious, whereas at intermediate [school] it was more like muck around and having fun. But now that we're at high school the trainings are really serious you have to be there, you have to be there on time, otherwise you get laps or something. But I think they're worth it cos they [school team] won their grade"

(Samoan/Niuean, female, Age 16, classified obese).

In the interviews, students were asked if they would like to increase or decrease their current level of activity. Obese students desired more future activity than healthy weight students. The barriers for future activity were the same for reasons for inactivity, that is, "needing friends or family members to train with or to join teams with"; "not having enough money for sports/gym fees"; "no transport between home and sports venues for safety reasons"; and "not having the skills to be selected for school teams" were the main reasons given as barriers to future activity.

Physical activity beliefs and values—To assess students and parents beliefs about physical activity and its relationship to healthy weight, in the interviews, participants responded to the question, ‘Do you think there is any link between physical activity and being of a healthy weight?’

This study found adolescents and their parents held the same beliefs and values for physical activity’ regardless of adolescent weight status. There was a small difference between obese versus healthy weight students with more obese students (12 out of 16, or 75%) stating there was a positive link between being physically active and body weight, and comparatively less healthy weight students (9 out of 17 or 53%, $p=0.34$) believed there was a positive link. Most students (21 from 33, or 64%) attributed body weight, described as bigness and thinness, to both inactivity and over-consumption of food.

Most students (30 from 33, or 90%) valued physical activity and regardless of weight status, all students thought it was important to participate in daily physical activity. When students were asked why doing physical activity was important, most stated the health benefits of physical activity, for example, “to increase energy”, “to live a long life”, “to be physically fit and healthy”. Most affirmed this knowledge was derived from taking health class at their school. Most students were able to correctly identify the recommended dosage of physical activity required per week to gain health benefits.

Most parents (27 from 30 or 90%) were knowledgeable about the health benefits of physical activity, and made a positive link between physical activity and healthy weight. This included knowledge about the recommended dosage of physical activity required for health benefits.

Parents, like the students, valued physical activity mainly for the “good health” of their children, because it “kept them off the street”, for increasing children’s self-esteem, self-confidence and giving them a “competitive edge”, because it was prescribed by doctors to manage chronic conditions, (e.g., child’s disability) and lastly, because being active “is being part of a kid”. Parents valued physical activity for their children and were happy to sacrifice their own physical activity to support their children’s interests.

Discussion

The results of this study found that socioeconomic circumstances determined food and physical activity behaviours more than cultural beliefs and values about food and activity. This analysis has important implications for obesity interventions, as framing the determinants of healthy eating and physical activity between individual cultural and social structural factors will determine the appropriate interventions. A key implication for interventions is that if food and physical activity habits are influenced more by structural factors rather than cultural, then interventions that address structural barriers should prove more effective.

This study supports the evidence from other studies which found that cost and affordability of food was found to be the main barrier to healthful eating and this should therefore be addressed as the intervention priority.^{20–22}

Food price is a particularly important consumption determinant among low-income groups and therefore has the greatest potential to reducing health inequities in low income groups. Food price controls can involve either increasing the prices of foods which contribute to an unbalanced diet and or reducing the price of foods which would contribute to a more balanced nutritional intake. Supplementary grants for food purchases could mitigate food insecurity for such families. Food policies that directly impact on the cost of healthy food, for example, removing Goods and Services Tax (GST) on healthy foods will address perceptions of expense and affordability particularly important for low-income population groups.

Time constraint was also a key barrier to healthful eating which is consistent with other studies.^{23,24} Analysis of household demographic variables across student weight status showed obese students' parents were absent due to employment such as working shifts. There is a case for making policy changes to continuous work time arrangements particularly in occupations requiring personnel to work longer than ten hours. For Pacific families overrepresented in low-skilled, low-income shift work occupations, these employment law changes are more pertinent. Government policies that support the well-being of families, by ensuring better work-life balance, should be prioritised.

Habitual levels of physical activity were different between healthy weight and obese Pacific students. The current high school sporting environments does well to support students with exceptional sporting skills. However, those with average ability but an enjoyment of sports and active leisure are often left out of school sporting opportunities. Changes need to occur within school environments to maintain the interest of Pacific young people in sporting activities. This is likely to require further government funding support for both facilities, equipment and given the decline of community volunteerism, sports and physical education personnel.

Students' reasons for drop-out in activity matched their perceived barriers for future activity. To mitigate the structural barriers, interventionists can address monetary cost and transport for safety, by subsidising sports fees and providing transport for after-school activities. As found in other studies, safe transportation between home, school and sports venues is important for low-income communities resident in high-crime neighbourhoods.^{25,26}

Parents and particularly mothers, were identified as the most influential person for adolescent food habits. These results suggest the home environment and the family unit (or extended family unit) is the most influential for promoting health behaviours among Pacific adolescents. This provides further support for family-based intervention strategies to address childhood and adolescent obesity.^{9,27}

Conclusion

It is very likely that the recommendations suggested here have been presented before while political and policy response has been slow. Some authors explain this is due to dominant cultural values such as 'free will' and 'individual right' which run counter to public health goals like 'health equity for all'.^{28,29} This has led subsequent governments to promote contradictory messages like "lose weight but enjoy the market-based offerings that encourage weight gain."^{30 (p8)}

Policymakers are therefore encouraged to assess outcome impacts carefully as proposed policy change will no doubt impact on commercial interests of other groups. However these repercussions should also be carefully assessed against future government health-related costs should no action be taken to remedy obesity risk for Pacific groups.

Health prevention is a desirable economic-impact policy approach to take over increasing health care costs and the long-lasting effect of children's health status tracking into adulthood should compel those in power towards immediate policy action. Governments also need to be more explicit and act upon its own health goals and values particularly where it values positive health standards as a right for all New Zealanders.

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