

Two years on: Gambling amongst Pacific mothers living in New Zealand

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Abstract

Research investigating the prevalence and correlates of Pacific peoples gambling within a New Zealand context is limited. This paper provides data about gambling activity from the two-year data collection point for a cohort of mothers within the longitudinal Pacific Islands Families study. The results indicate a number of consistencies and discrepancies between data collected at this time point and two years previously (six-week baseline data collection point). For example, at baseline, Samoans were the least likely to gamble and spent less money on gambling activities. Two years later, Samoans remained the least likely to gamble, but those who did gamble, were more likely to spend more money than other ethnicities. This article highlights the importance of this type of prospective study in examining the development of the risk and protective factors in relation to the development of problem gambling.

Introduction

Pacific peoples make up 6.9% of the total New Zealand population. Samoan people constitute half of this ethnic group (131,103), followed by Cook Islanders (58,008), Tongans (50,481), Niueans (22,476), Fijians (9,864) and Tokelauans (6,819). Pacific peoples have also been identified as a youthful population with the highest proportion of children (aged 0 to 14 years) of all of the major ethnic groups, at 38%.¹ They are one of the fastest growing ethnicities in this country and it is estimated that by 2051 Pacific peoples will represent 12% of the New Zealand population.¹ Following mass-migration to New Zealand during the 1960s and 70s the social and economic situation of Pacific peoples has progressed. However, compared with the total New Zealand population, this ethnic group remains over-represented in low levels of formal education, high rates of unemployment, low skilled manual jobs, low annual income* and poor health status. In addition, Pacific peoples are also highly susceptible to conditions conducive to

the development of addictive behaviours such as smoking and alcohol consumption.¹

The Pacific population has been identified as being the most at-risk ethnic group for developing problem and pathological gambling behaviour.^{2,3} The 2002/03 New Zealand Health Survey identified significantly high prevalence for problem gambling amongst Pacific peoples with 13.3% of the adult (18 years or older) Pacific population identified as problem gamblers and with Pacific peoples being 4.5 times more likely to be problem gamblers than Europeans/Others[†]. These findings are consistent with the 1999 national prevalence survey results where 13.6% of the adult Pacific population were identified as problem gamblers with a risk ratio of 6.17 times more likely to develop problem gambling than European/Other ethnicities.[‡] When put into context with the Pacific population as a proportion of the total population, it can be seen that Pacific peoples are disproportionately affected

* Median annual income NZ\$20,500 compared with NZ\$24,400 for the national population (Statistics New Zealand, 2006)

† The measure of problem gambling was based on participation rates over the previous 12 months. However, it should be noted that a non-standard problem gambling screen was used, developed specifically for this survey.

‡ The measure of problem gambling was based on participation rates over the previous six months using the revised South Oaks Gambling Screen (SOGS-R).

by problem gambling.

Another consistency across gambling research in New Zealand is that the high prevalence of problem gambling amongst Pacific peoples is disproportionate to the small percentage of Pacific peoples who take part in gambling activities. For example, the 1999 national prevalence survey identified that the majority of the Pacific population did not gamble regularly; however, those who did gamble reported relatively high gambling expenditure in comparison with other population groups.² Abbott and Volberg describe this as a bimodal gambling distribution and suggest that this is one reason why Pacific peoples are more likely than others to develop gambling problems. Similarly, the New Zealand Health Survey found that only 54% of Pacific peoples had gambled in the previous 12 months compared with 72% of the European/Other group; expenditure on gambling was not reported.³ Further New Zealand research has indicated similar low levels of gambling activity amongst mothers within a child development cohort study in South Auckland, New Zealand whereby only 30% had gambled in the previous 12 months.⁴ Bellringer et al⁴ report this from the data collection phase of the Pacific Islands Families study when the cohort children were six weeks old. This paper presents findings relating to the same mothers at the two year measurement point.

Since 1999, increasing numbers of Pacific peoples have presented to gambling treatment services. During 2007, Pacific peoples represented 7.2% of the 1,816 new face-to-face counselling clients (compared to 5% in 1999) and 13.6% of new gambler callers to the national telephone helpline (compared to 4.6% in 1999).⁵ Despite these increases, Pacific peoples' access to treatment services remains low in light of the high prevalence for this population.

In 2007, Pacific males and females presenting to face-to-face problem gambling treatment services reported electronic gaming machines (EGMs) outside casinos as their main mode of gambling (65.1% and 83.0% respectively). This rose to 75.9% and 93.6% respectively when casino machines were included. These findings are consistent with the majority of new face-to-face counselling clients that also report gaming machines as their primary mode of problem gambling (76.5%).⁵ Abbott and Volberg² suggest that continuous forms of gambling such as EGMs are significantly associated with problem gambling.

This paper presents gambling-related demographic data and associated factors for mothers in the Pacific Islands Families (PIF) study when the cohort children were two years of age. This longitudinal investigation of a birth cohort of Pacific infants in New Zealand is

designed to provide information on Pacific people's health as well as the cultural, economic, environmental and psychosocial factors that are associated with child health and developmental outcomes, and family functioning. At two years, two gambling-related questions were added to those already asked at the first measurement point (six weeks postpartum);⁴ The analyses presented in this paper, relating to gambling, were selected by the authors as those considered most relevant to the cultural, social and economic situation of many Pacific peoples in New Zealand. To that end, analyses were performed on variables including cultural orientation and religious affiliation. In addition, a variable identifying the number of years lived in New Zealand was included to identify any distinctions between mothers born in New Zealand and those migrant to this country. On this premise, the discussion focuses on variables that the authors considered were important to understanding Pacific-specific cultural factors relevant to contemporary Pacific gambling.

The purpose of gambling-related questions at the six week base-line and subsequent data collection phases of the PIF longitudinal study are to track and record any trends or changes over time in regard to gambling activity. These findings will develop the currently limited knowledge base on Pacific peoples gambling and provide information to identify problem gambling risk and protective factors for Pacific mothers and children.

Methods

Data were collected as part of the PIF study which follows a cohort of Pacific Island infants born at Middlemore Hospital in South Auckland between 15 March and 17 December 2000. All potential participants were selected from births where at least one parent self-identified as being of Pacific ethnicity and who was also a New Zealand permanent resident. At the Birthing and Pacific Islands Cultural Resource Units participants were identified, information about the study was provided and consent was gained for an interviewer to conduct a home visit.

Postpartum maternal interviews were carried out at six-weeks, one and two years. Pacific interviewers fluent in English and a Pacific language visited mothers in their homes. Subsequent to obtaining informed consent, mothers participated in one-hour long interviews concerning family functioning and the health and development of the child. Detailed information about the PIF cohort and procedures is described elsewhere.⁶ Over the three measurement points, these interviews included three short questions related to gambling. At the one and two year data

Pacific peoples are disproportionately affected by problem gambling.

collection points, two additional gambling questions were included.

The interviewers read out the following examples of gambling: Lotto, poker/slot machines in casinos or pubs, raffles, card games, Housie (bingo), Instant Kiwi (a scratchcard game), horse betting and lottery tickets, then asked whether the mothers had gambled within the previous 12 months. This was intended to be a generic question only, solely ascertaining whether any form of gambling had taken place during the previous year. At the one and two year data collection points, upon affirmation of gambling participation in the previous 12 months, the mothers were then asked their preferred form of gambling and how often they partook in this activity. Consistent with the questions at the six week time point, they were then asked how much they usually spent per week on gambling activities.

This paper presents results from the two year measurement point in relation to the gambling questions on participation and expenditure, and to any associations between the questions as well as a total of seven selected other variables assessed at two years. In addition, results from the additional questions asked at one and two years regarding preferred gambling forms and frequency of participation are presented. Data are also presented and discussed in relation to the findings at the six-week measurement point, which have been provided in more detail elsewhere.⁴

Statistical analysis

The statistical software package used for analyses was SPSS for MS Windows (11.0) with a significance level of 0.05. Univariate and multivariate logistic regression procedures were performed to examine associations between the gambling questions and certain maternal, demographic and cultural variables assessed at the two-year measurement point.

Logistic regression is used when the independent variables include both numeric and nominal measures and the outcome is dichotomous. A major advantage of the procedure is that it requires no assumptions about the distributions of the independent variables. Additionally, the results provide odds ratios that lend interpretability to the data by indicating how much more likely (or unlikely) it is for the outcome to be present given certain conditions.

Binary outcomes for the gambling questions were: (1) whether respondents had gambled at all during the previous 12 months, and (2) whether those that

had gambled fell within the upper quartile for usual weekly expenditure (\geq NZ\$20).

Predictor variables ($n=7$) examined in the univariate logistic regression analyses were age, ethnicity, social marital status, years lived in New Zealand, cultural orientation, religious affiliation, and gambling status at the six-week baseline. Numerical predictor variables such as age were categorised prior to the analyses.

With regard to the multiple logistic regression analyses, four demographic variables (age, ethnicity, marital status and gambling status at six-weeks) were initially forced into each of the two gambling outcome models as control variables and then all remaining predictor variables were submitted to a forward stepwise entry procedure (p to enter = 0.15 and p to remove = 0.20).

Results

Tests for differential attrition associated with the gambling variables assessed at the six-week baseline (i.e. whether gambled in the past 12 months, and usual weekly expenditure) were conducted at the one- and two-year data collection points[§]. No important differential attrition was observed for any of the socio-demographic variables investigated at either time point. Eighty-two percent ($N=1,132$) of the mothers who agreed at six-weeks to participate in the study ($N=1,376$) completed the gambling questions at the two-year time point.

All 1,132 mothers responded to the first question. Most (71%) reported that they had not gambled in the last 12 months compared with 29% who replied in the affirmative. Of those who gambled ($n=315$) the usual weekly expenditure on gambling activities ranged from NZ\$1 to NZ\$100, with a median of NZ\$10 and a mean of NZ\$14.

Preferred Form of Gambling and Expenditure

Table 1 shows that at the one- and two-year data collection points, Lotto was identified by the majority of mothers (78% and 76% respectively) as their most preferred form of gambling. Over half of mothers at both time points (55% and 56%) gambled weekly on Lotto with a weekly median expenditure of NZ\$10. Other preferred forms of regular (weekly) gambling included Housie (bingo) and EGMs. At the one-year data collection, almost three quarters (71%) of mothers gambled weekly on Housie with a median weekly expenditure of NZ\$40; by the two-year data collection, popularity of Housie appeared to have

[§] Differential attrition was deemed to have occurred if both one- and two-year distributions of participation and non-participation were significantly different from the baseline six-week distributions using a significance level of $\alpha=0.05$ to determine statistical significance.

diminished with half of the mothers (50%) gambling weekly on this form with a median expenditure of NZ\$23. At the same time, 12% of mothers gambled weekly on EGMs at the one-year time point (expenditure NZ\$20); this increased to a third of mothers (33%) a year later with greater median weekly expenditure (NZ\$30).

Gambling Participation

Table 1: Preferred form of gambling at 12 and 24 month time points

	12 months (%)	24 months (%)
Lotto	78.3	76.4
EGMs (pokies)	4.6	6.3
Raffles	3.8	0.0
Housie	3.8	13.9
Instant Kiwi	1.6	1.2
Horse Betting	0.5	0.6
Other	7.3	1.5

Tables 2, 3, 4 and 5 in this paper show variables examined for potential associations with gambling phenomena at the 24 month measurement point**. Within each variable, the numbers and percentages of mothers who reported: (1) whether or not they gambled, and (2) how much money they spent on gambling, are shown along with the associated odds ratios.

Statistically significant associations in the univariate analyses were found between whether mothers gambled and all variables examined (see previously) except for education, household income, whether born in New Zealand, English fluency, post natal depression, traditional gift giving, and whether gambled at 6 weeks. All significant associations are presented in Table 2, although it should be noted that with 20 variables assessed, it is highly likely that at least one of these significant results is spurious (a Type I error). All significant associations at the six week time point are presented in Table 2a.

At 24 months, the variables reaching statistical significance with gambling participation were age, ethnicity, marital status (being partnered), years lived in New Zealand (more than ten years), cultural orientation, religious affiliation, cigarettes smoked yesterday (higher cigarette dosage at 6 weeks, more likely to gamble 2 years later) and alcohol.

Including the five demographic variables initially forced in as control variables, the final step of the multivariate logistic regression model included nine variables. Model statistics were: -2 log likelihood = 1377.62; model chi-square = 76.07, d.f. = 5, $p < 0.001$; Nagelkerke $R^2 = 0.248$. Variables retaining their significant associations with gambling activity were age, ethnicity, religious orientation, number of cigarettes smoked yesterday, and for drinking six or more drinks on one occasion before pregnancy. Statistical significance was also attained for cultural orientation. Table 3 presents adjusted odds ratios of variables attaining significance in the multiple logistic regression model. Table 3a presents information from the six week time point.

Gambling Expenditure

At the univariate level, variables having statistically significant associations with greater weekly gambling expenditure ($\geq \$20$) were ethnicity, English fluency, cigarettes smoked yesterday, and gambling status at six-weeks. As noted for the gambling participation outcome, given that 20 variables were assessed, it is likely that at least one of the significant associations constitutes a Type I error. Data are presented in Table 4. Table 4a presents comparable data from the six week time point.

Relative to Samoan mothers, Tongan and Non Pacific mothers were less likely to spend high weekly amounts (i.e. spending $\geq \$20$) on gambling. Also, those fluent in English were more likely to spend $\geq \$20$ than those not fluent. In addition, mothers who smoked at six-weeks and those with a usual spend of $\geq \$20$ at this time-point were also more likely to spend $\geq \$20$ per week at 24 months.

The final model of the multivariate logistic regression included ten variables, five of which were the demographic variables initially forced in as control variables. Model statistics were: -2 log likelihood = 427.97; model chi-square = 39.85, d.f. = 9, $p < 0.001$; Nagelkerke $R^2 = 0.227$. Variables retaining their significant associations with a higher amount of money spent weekly on gambling activities ($\geq \$20$) were ethnicity, number of cigarettes smoked yesterday, and whether participants drank alcohol during pregnancy. Table 5 presents adjusted odds ratios of variables attaining significance in the multiple logistic regression model. Data from the six week time point is presented in Table 5a.

** For comparative purposes, Tables 2a, 3a, 4a and 5a show variables examined for potential associations with gambling phenomena at the 6 week measurement point (Bellringer, Perese, Abbott, & Williams, 2006).

Table 2: 24 month time point - Numbers (row percentages) and univariate odds ratios of mothers gambling during the past 12 months at two years' postpartum by variables assessed six weeks postpartum attaining statistical significance (N=1131¹)

Variable	Category	Spent money on gambling				Univariate odds ratio	
		Yes	(%)	No	(%)	(95% CI)	
Age (years) ²	<20	22	(27.5)	58	(72.5)	1.00	
	20-29	145	(24.9)	438	(75.1)	0.87	(0.52, 1.48)
	30-39	152	(35.3)	278	(64.7)	1.44	(0.85, 2.45)
	40+	13	(35.1)	24	(64.9)	1.43	(0.62, 3.29)
Ethnicity	Samoan	77	(14.2)	464	(85.3)	1.00	
	Cook Island	75	(40.3)	111	(59.7)	4.07	(2.79, 5.95)***
	Tongan	108	(45.0)	132	(55.0)	5.38	(3.47, 7.00)***
	Other Pacific ³	35	(42.2)	48	(57.8)	2.93	(2.67, 7.23)***
	Non Pacific	37	(45.7)	44	(54.3)	3.72	(3.08, 8.35)***
Social marital status	Partnered, legally married	190	(28.4)	480	(71.6)	1.18	(0.83, 1.68)
	Partnered, de facto	89	(35.6)	161	(64.4)	1.65	(1.10, 2.47)*
	Non-partnered	53	(25.1)	158	(74.9)	1.00	
Years lived in NZ	0-2	13	(17.6)	61	(82.4)	1.00	
	3-5	39	(27.9)	101	(72.1)	1.81	(0.90, 3.66)
	6-10	26	(20.6)	100	(79.4)	1.89	(0.58, 2.55)
	>10	252	(31.9)	537	(68.1)	1.33	(1.19, 4.08)*
Cultural Orientation	High Pacific, low NZ	81	(22.2)	284	(77.8)	1.00	
	High Pacific, High NZ	55	(28.5)	138	(71.5)	1.40	(0.94, 2.08)
	Low Pacific, High NZ	115	(31.1)	255	(68.9)	1.58	(1.14, 2.20)**
	Low Pacific, Low NZ	78	(40.6)	114	(59.4)	2.40	(1.64, 3.51)***
Religious Orientation	No Religion	36	(44.4)	45	(55.6)	1.00	
	Catholic	58	(28.3)	147	(71.7)	0.50	(0.30, 0.84)
	Mormon	28	(18.9)	120	(81.1)	0.30	(0.16, 0.53)
	Congregational church	24	(20.2)	95	(79.8)	0.32	(0.17, 0.60)
	Methodist	46	(36.2)	81	(63.8)	0.71	(0.40, 1.25)
	Presbyterian	53	(46.9)	60	(53.1)	1.10	(0.62, 2.00)
	Assembly of God	12	(14.3)	72	(85.7)	0.21	(0.10, 0.44)
	7 th Day Adventist	9	(20.5)	35	(79.5)	0.32	(0.14, 0.80)
Cigarettes smoked yesterday	None	220	(25.6)	640	(74.4)	1.00	
	1-9	83	(39.2)	129	(60.8)	1.87	(1.37, 2.57)***
	10 or more	28	(50.0)	28	(50.0)	2.91	1.69, 5.02)***
Frequency of alcohol usage Before pregnancy	Never	256	(26.6)	707	(73.4)	1.00	
	Monthly or less	32	(42.7)	43	(57.3)	2.06	(1.27, 3.32)**
	Two or more times/month	41	(46.6)	47	(53.4)	2.89	(10.55, 3.75)***
Six or more alcoholic drinks on one occasion Before pregnancy	No	271	(27.1)	730	(72.9)	1.00	
	Yes	58	(46.8)	66	(53.2)	2.37	(1.62, 3.46)***
Ever unable to stop drinking in past year	No	310	(28.5)	779	(71.5)	1.00	
	Yes	17	(51.5)	16	(48.5)	2.67	(1.33, 5.35)**
Gambled during past year	No	163	(21.2)	607	(78.8)	1.00	
	Yes	169	(46.8)	192	(53.2)	3.28	(2.50, 4.29)

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$ ¹ Numbers will vary due to missing data for some variables² Although none of the contrasts shown reach significance, compared to 20-29 year old mothers the odds of those aged 30-39 years gambling were 1.65 (95% CI: 1.26, 2.17) times greater ($p < 0.001$).³ Includes mothers identifying equally with two or more Pacific groups, equally with Pacific and non-Pacific groups or with Pacific groups other than Tongan, Samoan or Cook Island

Table 2a: Six week time point - Numbers (row percentages) and univariate odds ratios of mothers gambling during the past 12 months by selected variables (N=1376¹)

Variable	Category	Spent money on gambling				Univariate odds ratio	
		Yes	(%)	No	(%)	(95% CI)	
Age (years)	<20	20	(18.0)	91	(82.0)	1.00	
	20-29	207	(28.8)	513	(71.3)	1.84	(1.10, 3.06)*
	30-39	171	(34.2)	329	(65.8)	2.37	(1.41, 3.97)**
	40+	16	(36.4)	28	(63.6)	2.60	(1.19, 5.68)*
Ethnicity	Samoan	115	(17.7)	535	(82.3)	1.00	
	Cook Island	59	(25.4)	173	(74.6)	1.59	(1.11, 2.27)*
	Tongan	155	(53.6)	134	(46.4)	5.38	(3.96, 7.31)***
	Other Pacific ²	41	(38.7)	65	(61.3)	2.93	(1.89, 4.56)***
	Non Pacific	44	(44.4)	55	(55.6)	3.72	(2.39, 5.81)***
Social marital status	Partnered, legally married	249	(32.0)	530	(68.0)	1.75	(1.26, 2.43)**
	Partnered, de facto	108	(32.9)	220	(67.1)	1.83	(1.26, 2.65)**
	Non-partnered	57	(21.2)	212	(78.8)	1.00	
Education	Post-school qualification	144	(38.2)	233	(61.8)	2.18	(1.30, 2.82)***
	Secondary school qual.	152	(32.8)	312	(67.2)	1.72	(1.63, 2.92)***
	No formal qualifications	118	(22.1)	417	(77.9)	1.00	
Household income	<\$20,000	117	(25.6)	340	(74.4)	1.00	
	\$20,001-\$40,000	224	(31.5)	486	(68.5)	1.34	(1.03, 1.74)*
	>\$40,000	58	(36.0)	103	(64.0)	1.64	(1.11, 2.40)*
	Unknown	15	(31.3)	33	(68.8)	1.32	(0.69, 2.52)
Born in New Zealand	Yes	113	(24.9)	341	(75.1)	1.00	
	No	301	(32.6)	621	(67.4)	1.46	(1.14, 1.89)**
Years lived in NZ	0-2	24	(23.5)	78	(76.5)	1.00	
	6-10	54	(36.7)	93	(63.3)	1.89	(1.07, 3.33)*
	>10	276	(29.0)	677	(71.0)	1.33	(0.82, 2.14)
Post-natal depression	No	318	(28.0)	818	(72.0)	1.00	
	Yes	88	(39.3)	136	(60.7)	1.66	(1.24, 2.24)**
Traditional gifting	No	131	(25.4)	385	(74.6)	1.00	
	Yes	283	(32.9)	577	(67.1)	1.44	(1.13, 1.84)**
Frequency of alcohol usage Before pregnancy	Never	306	(26.4)	854	(73.6)	1.00	
	Monthly or less	50	(49.5)	51	(50.5)	2.74	(1.81, 4.13)***
	Two or more times/month	56	(50.9)	54	(49.1)	2.89	(1.95, 4.30)***
Since birth	Never	375	(29.3)	907	(70.7)	1.00	
	Monthly or less	25	(39.7)	38	(60.3)	1.59	(0.95, 2.67)
	Two or more times/month	13	(48.1)	14	(51.9)	2.25	(1.05, 4.82)*
Six or more alcoholic drinks on one occasion Before pregnancy	No	319	(26.4)	891	(73.6)	1.00	
	Yes	92	(57.9)	67	(42.1)	3.84	(2.73, 5.39)***
Ever unable to stop drinking in past year	No	384	(29.0)	938	(71.0)	1.00	
	Yes	25	(59.5)	17	(40.5)	3.59	(1.92, 6.73)***

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$ ¹ Numbers will vary due to missing data for some variables² Includes mothers identifying equally with two or more Pacific groups, equally with Pacific and non-Pacific groups or with Pacific groups other than Tongan, Samoan or Cook Island

Table 3: 24 month time point - Adjusted odds of mothers who had gambled during the past 12 months at two years postpartum for variables attaining significance in a multiple logistic regression (N = 1343)

Variable	Category	Adjusted odds ratio (95% CI)	
Age (years)	40+	1.00	
	<20	0.47	(0.18, 1.21)
	20-29	0.41	(0.19, 0.90)*
	30-39	0.78	(0.36, 1.71)
Ethnicity	Samoan	1.00	
	Cook Island	3.18	(1.94, 5.24)***
	Tongan	5.76	(3.81, 8.71)***
	Other Pacific ¹	3.65	(1.98, 6.70)***
	Non Pacific	5.99	(3.11, 11.51)***
Cultural Orientation	Low Pacific, Low NZ	1.00	
	High Pacific, low NZ	0.66	(0.41, 1.06)
	High Pacific, High NZ	1.04	(0.62, 1.75)
	Low Pacific, High NZ	0.52	(0.33, 0.81)**
Cigarettes smoked yesterday	None	1.00	
	1-9	1.88	1.28, 2.76)**
	10 or more	2.56	(1.36, 4.80)**
Six or more drinks on one occasion before pregnancy	No	1.00	
	Yes	1.68	(1.01, 2.78)*
Religious orientation	No religion	1.00	
	Catholic	0.81	(0.43, 1.54)
	Mormon	0.37	(0.19, 0.75)**
	Congregational church	0.78	(0.36, 1.70)
	Methodist	0.83	(0.41, 1.70)
	Presbyterian	1.52	(0.77, 2.98)
	Assembly of God	0.41	(0.17, 0.99)*
	7th Day Adventist	0.46	(0.17, 1.20)
	Other	0.61	(0.33, 1.14)

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

¹ Includes mothers identifying equally with two or more Pacific groups, equally with Pacific and non-Pacific groups or with Pacific groups other than Tongan, Samoan or Cook Island

Table 3a: Six week time point - Adjusted odds of mothers who had gambled in the past 12 months for variables attaining significance in a multiple logistic regression (N = 1343)

Variable	Category	Adjusted odds ratio (95% CI)	
Maternal variables			
Age (years)	<20	1.00	
	20-29	1.53	(0.84, 2.76)
	30-39	2.07	(1.11, 3.86)*
	40+	3.17	(1.31, 7.69)*
Education	Post-school qualification	2.03	(1.44, 2.85)***
	Secondary school qual.	1.88	(1.37, 2.59)***
	No formal qualifications	1.00	
Ethnicity	Samoan	1.00	
	Cook Island	1.49	(1.00, 2.24)
	Tongan	5.09	(3.65, 7.10)***
	Other Pacific ¹	2.03	(1.21, 3.42)**
	Non Pacific	3.79	(2.16, 6.65)***
Social marital status	Partnered, legally married	1.58	(1.00, 2.49)*
	Partnered, de facto	2.23	(1.38, 3.61)**
	Non-partnered	1.00	
Born in New Zealand	Yes	1.00	
	No	2.01	(1.40, 2.89)***
Cigarettes smoked yesterday	None	1.00	
	1-9	0.88	(0.60, 1.28)
	10 or more	1.84	(1.06, 3.19)*
Six or more alcoholic drinks on one occasion	Before pregnancy	No	1.00
	Yes	5.95	(3.70, 9.55)***
During pregnancy	No	1.00	
	Yes	0.24	(0.11, 0.54)***

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

¹ Includes mothers identifying equally with two or more Pacific groups, equally with Pacific and non-Pacific groups or with Pacific groups other than Tongan, Samoan or Cook Island

Table 4: 24 month time point - Numbers (row percentages) and univariate odds ratios of mothers who gambled during the past 12 months at two years postpartum falling in the upper quartile of usual expenditure per week ($\geq \$20$) by variables assessed six weeks postpartum attaining statistical significance (N=313¹)

Variable	Category	Expenditure $\geq \$20$ per week				Univariate odds ratio (95% CI)	
		Yes	(%)	No	(%)		
Ethnicity	Samoan	35	(46.1)	41	(53.9)	1.00	
	Cook Island	22	(33.8)	43	(66.2)	0.60	0.30, 1.19)
	Tongan	14	(13.1)	93	(86.9)	0.18	(0.09, 0.36)***
	Other Pacific ²	8	(25.8)	23	(74.2)	0.41	(0.16, 1.03)
	Non Pacific	4	(11.8)	30	(88.2)	0.16	(0.05, 0.49)**
Fluent in English	No	21	(18.6)	92	(81.4)	1.00	
	Yes	62	(31.0)	138	(69.0)	1.97	(1.12, 3.45)*
Cigarettes smoked yesterday	None	42	(20.1)	167	(79.9)	1.00	
	1-9	31	(40.3)	46	(59.7)	2.68	(1.52, 4.73)**
	10 or more	10	(38.5)	16	(61.5)	2.49	(1.05, 5.87)*
Gambled status	Gambled, usual spend < \$20	20	(19.2)	84	(80.8)	1.00	
	Gambled, usual spend $\geq \$20$	24	(40.0)	36	(40.0)	2.80	(1.38, 5.70)**
	Did not gamble	39	(26.2)	110	(73.8)	1.490	(0.81, 2.74)

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$, ¹ Numbers will vary due to missing data for some variables, ² Includes mothers identifying equally with two or more Pacific groups, equally with Pacific and non-Pacific groups or with Pacific groups other than Tongan, Samoan or Cook Island

Table 4a: Six week time point - Numbers (row percentages) and univariate odds ratios of mothers who gambled in the past year falling in the upper quartile for usual expenditure per week ($\geq \$20$) by selected variables (N=414¹)

Variable	Category	Expenditure $\geq \$20$ per week				Univariate odds ratio (95% CI)	
		Yes	(%)	No	(%)		
Ethnicity	Samoan	27	(23.5)	88	(76.5)	1.00	
	Cook Island	20	(33.9)	39	(66.1)	1.67	(0.84, 3.33)
	Tongan	66	(42.6)	89	(57.4)	2.42	(1.41, 4.13)**
	Other Pacific ²	8	(19.5)	33	(80.5)	0.79	(0.33, 1.91)
	Non Pacific	8	(18.2)	36	(81.8)	0.72	(0.30, 1.75)
Education	Post school qualification	30	(20.8)	114	(79.2)	0.46	(0.27, 0.80)**
	Secondary school qualification	56	(36.8)	96	(63.2)	1.02	(0.62, 1.68)
	No formal qualifications	43	(36.4)	75	(36.4)	1.00	
Traditional gifting	No	28	(21.4)	103	(78.6)	1.00	
	Yes	101	(35.7)	182	(64.3)	2.04	(1.26, 3.31)**
Cigarettes smoked yesterday	None	84	(27.4)	223	(72.6)	1.00	
	1-9	31	(42.5)	42	(57.5)	1.96	(1.16, 3.32)*
	10 or more	14	(42.4)	19	(57.6)	1.96	(0.94, 4.08)
Alcohol usage Before pregnancy	Never	100	(32.7)	206	(67.3)	1.00	
	Monthly or less	9	(18.0)	41	(82.0)	0.45	(0.21, 0.97)*
	Two or more times/month	20	(35.7)	36	(64.3)	1.14	(0.63, 2.08)

* $P < 0.05$, ** $P < 0.01$, ¹ Numbers will vary due to missing data for some variables, ² Includes mothers identifying equally with two or more Pacific groups, equally with Pacific and non-Pacific groups or with Pacific groups other than Tongan, Samoan or Cook Island

Table 5: 24 month time point - Adjusted odds of mothers who had gambled during the past 12 months at two years' postpartum falling in the upper quartile of usual expenditure per week ($\geq \$20$) for variables attaining significance in a multiple logistic regression.

Variable	Category	Adjusted odds ratio (95% CI)	
Ethnicity	Samoan	1.00	
	Cook Island	0.71	(0.33, 1.54)
	Tongan	0.30	(0.12, 0.60)
	Other Pacific ¹	0.31	(0.10, 0.94)
	Non Pacific	0.11	(0.03, 0.43)
Cigarettes smoked yesterday	None	1.00	
	1-9	3.00	(1.44, 5.60)
	10 or more	3.50	(1.20, 10.20)
Six or more drinks on one occasion before pregnancy	No	0.11	(0.02, 0.65)
	Yes	2.74	(0.77, 9.80)

Table 5a: Six week time point - Adjusted odds of usual expenditure falling in the upper quartile per week ($\geq \$20$) for variables attaining significance in a multiple logistic regression (N=400)

Variable	Category	Adjusted odds ratio (95% CI)	
Maternal variables			
Education	Post-school qualification	0.50	(0.26, 0.94)*
	Secondary school qual.	1.07	(0.60, 1.90)
	No formal qualifications	1.00	
Ethnicity	Samoan	1.00	
	Cook Island	1.58	(0.69, 3.66)
	Tongan	2.44	(1.30, 4.59)**
	Other Pacific ¹	0.68	(0.24, 1.88)
	Non Pacific	0.28	(0.09, 0.86)*
Born in New Zealand	Yes	1.00	
	No	0.24	(0.11, 0.53)***
Traditional gifting	No	1.00	
	Yes	2.04	(1.09, 3.81)*
Cigarettes smoked yesterday	None	1.00	
	1-9	3.02	(1.54, 5.92)**
	10 or more	3.60	(1.47, 8.85)**

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

¹ Includes mothers identifying equally with two or more Pacific groups, equally with Pacific and non-Pacific groups or with Pacific groups other than Tongan, Samoan or Cook Island

Discussion

The knowledge base on contemporary Pacific gambling remains limited despite the high risk of problem gambling within this ethnic group. The PIF study is the only study nationally and internationally to provide an insight into Pacific female gambling activity over time.

Participation & Expenditure (6 weeks & 24 months)

There was no significant change in the numbers of mothers gambling between six weeks and 24 months (30.1% and 29.4% respectively). About 70% of mothers were non gamblers at both measurement points. This finding is consistent with low participation rates found among Pacific peoples in both the 1999 general prevalence survey and the 2002/03 New Zealand Health Survey. In light of the disproportionately high prevalence of problem gambling amongst Pacific peoples, this finding indicates an increased propensity for risk within this gambling population.

There were also no significant differences in the median expenditure for mothers who gambled during the 12 months prior to the six-week (\$10) and 24 month (\$10) measurement points. However, mothers with a usual weekly expenditure of \$20 or more at the six week time point (14.8%) were 3.5 times more likely to do the same at the 24 month time point when compared with those that spent less than \$20. Given that the annual median income for the Pacific population is low in comparison to the national median income, this finding suggests that gambling expenditure for a proportion of mothers is high. Also, despite increasing efforts to reduce gambling related harms within Pacific communities, this finding implies that there is a need for further research on effective interventions.

Consistent with the six week measurement point, mothers from all ethnic groups have a significantly increased likelihood of gambling activity in comparison to the Samoan mothers. This remained significant in the multivariate analyses even when gambling status at six weeks was controlled for and suggests that ethnicity has prognostic significance with gambling activity. Although Tongans were identified as being more likely to gamble compared with Samoans at six weeks, and to spend \$20 or more per week on gambling (42.6% and 23.5%), at 24 months, despite Samoans remaining the least likely to gamble, those that did were more likely than Tongans to spend \$20 or more per week on gambling (46.1% vs 13.1%). This ethnic specific difference provides further evidence of the need for future gambling research to acknowledge the heterogeneity within Pacific

populations. Further research is also required to explore whether Samoan ethnicity can be a protective factor for gambling participation and/or a risk factor for gambling expenditure.

Another consistency across measurement points was that older mothers (over 20 years of age) were more likely to gamble than younger mothers. Age remained a significant variable when gambling status was controlled for at the six week measurement point and thus has prognostic significance with participation in gambling activities.

Mothers who were in de-facto or partnered relationships also had a significantly increased likelihood to gamble than single mothers at both measurement points. A small qualitative study on Samoan people in Auckland highlights that the pressure associated with fulfilling household and childrearing responsibilities in addition to the demands of employment can influence gambling participation. Gambling provides opportunities for socialisation, time-out, independence, relaxation, and moments of reprieve from cultural and gender-role responsibilities.⁷

This finding suggests that a reduced sense of cultural identity for Pacific peoples increases the likelihood of gambling participation.

Migrant mothers who had lived in New Zealand for increased lengths of time were more likely to gamble than more recent migrants at both the six week and 24 month measurement points. At six weeks, mothers who had lived in this country for between six to ten years, and at 24 months, those who had been here for more than

ten years had a significantly increased likelihood of participation. Although there was no overall statistical significance reached between the number of years lived in New Zealand and the amount spent on gambling, it is noted that those who have lived in New Zealand for more than 10 years were likely to spend \$20 or more compared with those who have lived in this country 5 years or less.

Mothers in the categories of *Low Pacific, High New Zealand* (low following of Pacific culture but high following of New Zealand culture, i.e. more Westernised) and *Low Pacific, Low New Zealand* (poorly adapted with loss of Pacific culture and little adaptation to New Zealand culture) orientations had significantly greater odds of gambling at 24 months than those in the *High Pacific, Low New Zealand* (retains high Pacific culture with low signs of New Zealand culture incorporated, i.e. may not fit well into New Zealand society) category. This finding suggests that a reduced sense of cultural identity for Pacific peoples increases the likelihood of gambling participation. This could also suggest that a strong sense of personal and cultural identity can

reduce the likelihood of gambling participation and act as a protective factor. As no studies have been conducted that specifically investigate the migration and adaptation processes of Pacific peoples in New Zealand in relation to gambling activity, further research in this area is required.

At 24 months, mothers who were affiliated with a religious denomination were less likely to participate in gambling activities than those not affiliated. This remained significant in the multivariate analyses which also identified that mothers belonging to the Mormon and Assembly of God faiths remained significantly less likely to have bet money on gambling activities.

Preferred gambling form and frequency of participation (12 & 24 months)

Within the 12 month measurement point, although less people identified Housie as their overall preferred form of gambling (3.8%), a high proportion of mothers (71.4%) participated in it weekly and more money was spent on this activity than any other gambling form. In other words, despite few mothers identifying housie as their preferred form of gambling, the majority of those that did also reported high weekly participation and expenditure on this activity. This study contends that, in light of the church being an important aspect of Pacific culture, and Housie a common form of fundraising within particular churches, that the increased frequency of participation in this activity could be a function of church membership. Also, since children in the PIF study are relatively young at this measurement point, Housie within the church could provide an accessible and acceptable environment to gamble. There have been no studies conducted that specifically investigate the role of housie within Pacific churches, further research in this area is required.

At the 24 month measurement point, a high proportion of mothers identified Housie as their preferred form of gambling. However fewer mothers participated weekly when compared with 12 months. At this measurement point more mothers reported a weekly preference for EGMs and a higher expenditure on this activity. It is plausible that mothers are more mobile to engage in other forms of gambling, as well as fulfil their roles and responsibilities within the church. Given that EGMs are significantly associated with problem gambling, it will be important to monitor the participation of mothers in this study over time and the impacts that this may have on Pacific individuals, children, families and communities.

This paper is a Pacific specific investigation into the consistencies and inconsistencies that have occurred with gambling activity over time. It highlights areas associated with contemporary Pacific gambling that require further exploration within Pacific cultures, understandings and knowledge.

The authors recognise that there are several limitations to this study. In particular, the gambling questions are brief and thus provide limited information.

Also, the associations examined in relation to gambling have been selected by the authors from a large range of variables investigated as part of the longitudinal PIF study and other potentially more important variables may have been overlooked. It is hoped that these issues can be at least partially addressed at future measurement points within the longitudinal study.

Additionally, the associations that have been discussed were those selected and considered by the authors to be of most relevance to developing the limited knowledge base and understandings of Pacific specific cultural factors and contemporary Pacific gambling.

Conclusion

This paper provides data about gambling activity from the two-year data collection point for a cohort of mothers within the longitudinal PIF study. The results indicate a number of consistencies and discrepancies between data collected at this time point and the six-week baseline data collection point.

The proportions of mothers gambling as well as median expenditure 12 months prior to a data measurement point remain consistent between six-weeks and two years. Another significant consistency is that mothers from all ethnic groups are more likely than Samoan mothers to participate in gambling activity. However, it is important to recognise that whilst Samoan mothers remain the least likely to gamble at two years, those that did were more likely to spend more money on gambling activities. Other consistencies between the six-week and 24 month measurement points are that older mothers (over 20 years of age), mothers in de-facto or partnered relationships and migrant mothers who had lived in New Zealand for increased lengths of time were more likely to gamble.

An additional finding at the two year measurement point suggests that low cultural orientation or sense of cultural identity increases the likelihood of gambling. Conversely a strong sense of cultural identity may serve act as a protection factor. Further research is required in this area as well as on the role of housie within Pacific churches. This paper identifies the need to continue to monitor Pacific mothers gambling preferences over time and highlights aspects of contemporary Pacific gambling that require further exploration within Pacific understandings and contexts.

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