Will New Zealand be smokefree by 2025?
Smoking prevalence amongst a cohort of Pacific adults

El-Shadan Tautolo, Leon Iusitini, Steve Taylor, Janis Paterson

Abstract

Aim To examine the prevalence of smoking amongst a cohort of Pacific fathers and mothers from birth up to 11 years after the birth of their child.

Methods Within the context of broader interviews, 1073 Pacific fathers and 1434 Pacific mothers participating in the longitudinal Pacific Islands Families (PIF) Study were surveyed about their smoking at multiple time-points of the study from 2000 until 2012. Prevalence rates of any and heavy smoking were calculated and analysed.

Results Maternal prevalence rates showed a sharp decline during pregnancy and immediately postpartum, yet rates then increased gradually to pre-birth levels within one to four years. Prevalence rates for mothers showed little change between 4 and 11 years postpartum, maintaining a steady 32% for mothers. While prevalence rates for fathers show a decline from initial levels (40.3%), they still remain extremely high (37.5%) at 11 years postpartum.

Conclusion The minimal decline in smoking prevalence amongst this cohort is of alarming concern for Pacific families and their communities. Given the New Zealand Government’s Aotearoa Smokefree 2025 goal, innovative approaches must be implemented to discover effective solutions to help Pacific communities reduce their smoking.

In recent years cigarette smoking has been identified as one of the most preventable causes of premature death and poor health worldwide. Cigarette smoking continues to contribute to the adverse mortality and morbidity rates for Pacific people in New Zealand. Current statistics indicate that almost one in four Pacific adults smoke (24.7%), and this is markedly higher than the general New Zealand European (15.4%) and Asian (10.2%) populations.

Pacific people in New Zealand numbered 295,944 and comprised 7.4% of the population at the 2013 Census. 60.0% of Pacific people were born in New Zealand and 65.8% lived in the Auckland urban area. Samoans constitute the largest ethnic group (49.2%), followed by Cook Islands Maori (21.0%) and Tongans (20.0%). This ethnic diversity is manifest in differing cultures, languages, generations of immigrants, and strength of acculturation. However, Pacific people suffer from an excess of social, health and economic deprivation. There is a growing recognition that issues which have a significant impact on Pacific people’s lives need to be understood, of which parental smoking stands out.

While good information is available about Pacific smoking rates in New Zealand, there is little epidemiological information and understanding about Pacific fathers’ or mothers’ smoking status and the relationship between the smoking status of parents.
within a family setting—despite the health impact this potentially has on their children.

If the public health approach to smoking cessation is based on the rigorous requirement of the scientific method that moves from understanding and measuring the problem to finding, implementing and evaluating a solution, then such robust epidemiological information is essential.

Using a large cohort study of Pacific families, this paper aims to determine the prevalence of smoking amongst Pacific fathers over four time-points and for Pacific mothers over six time-points, up to 12 years after the arrival of their child.

Methods

Study design—The Pacific Islands Families (PIF) Study follows a cohort of Pacific infants born at Middlemore Hospital, South Auckland, between 15 March and 17 December 2000.

Participants—This study utilises maternal data from the 6-week, 1, 2, 4, 6, 9, and 11-year measurement waves, and paternal data from the 1, 2, 6, and 11-year measurement waves of the PIF Study. All potential participants were selected from births where at least one parent was identified as being of a Pacific Island ethnicity and a New Zealand permanent resident. The current analysis of smoking excludes the non-Pacific parents.

Recruitment occurred through the Birthing Unit, in conjunction with the Pacific Islands Cultural Resource Unit. Approximately 6-weeks after infants’ births, female interviewers of Pacific Islands ethnicity who were fluent in English and a Pacific Islands language visited mothers in their homes. Once eligibility was confirmed and informed written consent obtained, mothers participated in interviews of approximately 90 minutes concerning family functioning and the health and development of the child.

At the 6-week interview, there were 1477 mothers who were able to act as respondents, of whom 1376 (93%) consented and completed the interview. At specific time-points postpartum, maternal participants were re-contacted and revisited by a female Pacific interviewer. Again, written consent was obtained before the interview was conducted. At the time of the, 1, 2, 6 and 11-year interviews, mothers were asked to give permission for a male Pacific interviewer to contact and interview the father of their child. If permission and paternal contact details were obtained then the male Pacific interviewer contacted the father to discuss participation in the study.

Once informed consent was obtained, fathers participated in one-hour interviews concerning family functioning and the health and development of their child. This interview was conducted in the preferred language of the father. Detailed information about the PIF Study and procedures has been described elsewhere.

Maternal and paternal smoking status—At the 6-week interview, maternal smoking status before pregnancy, during each trimester and “yesterday” was assessed with the question “On average, how many cigarettes did you smoke per day.” At the 1, 2, 4 and 6-year measurement waves, maternal smoking status was assessed using the following question: “On average, how many cigarettes did you smoke yesterday?” Similarly, at the 1, 2 and 6-year measurement waves, paternal smoking status was assessed using the same question.

At the 9 and 11-year measurement waves, smoking status was assessed using the following question from the survey: “Over the past week, how many cigarettes on average did you smoke a day?” Participants who answered with zero cigarettes are referred to in this study as ‘non-smokers’, and participants who answered more than zero cigarettes are referred to as ‘smokers’.

Prevalence of smoking is categorized two ways; (i) “any smoking” which is smoking of 1 or more cigarettes daily, and (ii) “heavy smoking” which is smoking 10+ cigarettes daily.

Sociodemographic variables—Additional sociodemographic variables were incorporated into the analysis as descriptors of the sample cohort. These variables included ethnicity, highest educational qualification, being New Zealand born and household income. Even though household income is time-varying, baseline values were used throughout.
Ethnicity classifications included ‘Other Pacific’ for participants who identified equally with two or more Pacific Island groups or with a Pacific Island ethnic group that was not Samoan, Tongan, Cook Islands Maori or Niuean.

Statistical analysis—Prevalence of smoking was estimated using binary logistic models. Repeated measures of smoking status on the same individual are likely to be correlated. Furthermore, some participants were not seen at every measurement wave and some new participants entered after baseline due to changes of caregivers of the cohort child.

The models were derived using generalised estimating equations (GEE) with a compound symmetry correlation structure to allow for both these matters. Missingness of the original participants at the final follow-up interview was assessed for differential attrition against baseline smoking status using a Chi-squared test. All analyses were conducted using R 3.0.1.

Ethical clearance—Careful consideration is always applied to the ethical aspects of this longitudinal study with Pacific people. Ethical approval for the PIF study was obtained from the Auckland Branch of the National Ethics Committee, the Royal New Zealand Plunket Society, and the South Auckland Health Clinical Board.

Results

Valid smoking data were collected from 1273, 1135, 1054, 964, 920, 912 and 950 Pacific mothers at the 6-week, 1-year, 2-year, 4-year, 6-year, 9-year, and 11-year measurement waves, respectively. Likewise, valid smoking data were collected from 759, 559, 551 and 720 Pacific fathers at the 1-year, 2-year, 6-year, and 11-year measurement waves, respectively.

Respondents’ sociodemographic characteristics from the baseline and 11-year measurement waves are presented in Table 1. No evidence was found of differential attrition against baseline smoking status (p=0.99).

Table 1. Sample characteristics for Pacific mothers and fathers at baseline and the 11-year measurement wave

<table>
<thead>
<tr>
<th></th>
<th>Mothers Baseline† (N=1273)</th>
<th>Year 11† (N=950)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td><strong>New Zealand-born</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>914</td>
<td>(72)</td>
</tr>
<tr>
<td>Yes</td>
<td>359</td>
<td>(28)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samoan</td>
<td>648</td>
<td>(51)</td>
</tr>
<tr>
<td>Tongan</td>
<td>288</td>
<td>(23)</td>
</tr>
<tr>
<td>Cook Island</td>
<td>231</td>
<td>(18)</td>
</tr>
<tr>
<td>Niuean</td>
<td>59</td>
<td>(5 )</td>
</tr>
<tr>
<td>Other Pacific</td>
<td>47</td>
<td>(4 )</td>
</tr>
<tr>
<td><strong>Baseline household income ($NZ)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$0 to $20,000</td>
<td>425</td>
<td>(33)</td>
</tr>
<tr>
<td>$20,001 to $40,000</td>
<td>660</td>
<td>(52)</td>
</tr>
<tr>
<td>Over $40,000</td>
<td>145</td>
<td>(11)</td>
</tr>
<tr>
<td>Unknown</td>
<td>43</td>
<td>(3 )</td>
</tr>
<tr>
<td><strong>Highest education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to secondary</td>
<td>943</td>
<td>(74)</td>
</tr>
<tr>
<td>Beyond secondary</td>
<td>330</td>
<td>(26)</td>
</tr>
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</table>
**Fathers**

<table>
<thead>
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<th>Ethnicity</th>
<th>Baseline (N=759)</th>
<th>Year 11 (N=720)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Samoan</td>
<td>434</td>
<td>(57)</td>
</tr>
<tr>
<td>Tongan</td>
<td>199</td>
<td>(26)</td>
</tr>
<tr>
<td>Cook Island</td>
<td>72</td>
<td>(9 )</td>
</tr>
<tr>
<td>Niuean</td>
<td>26</td>
<td>(3 )</td>
</tr>
<tr>
<td>Other Pacific</td>
<td>28</td>
<td>(4 )</td>
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</table>

*Highest education*

<table>
<thead>
<tr>
<th></th>
<th>Baseline (N=759)</th>
<th>Year 11 (N=720)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Up to secondary</td>
<td>657</td>
<td>(87)</td>
</tr>
<tr>
<td>Beyond secondary</td>
<td>100</td>
<td>(13)</td>
</tr>
</tbody>
</table>

* Some evidence was seen of a shift in distribution (p<0.05), as might be expected.
† Data from intermediate measurement waves have followed similar patterns of transition and are not shown.

**Prevalence of smoking**—The prevalence of any and heavy smoking by mothers and fathers over all measurement waves are summarised in Figure 1 below.

**Figure 1. Maternal and paternal prevalence of any and heavy smoking within the PIF Study longitudinal cohort**

*Note: The margin of error is 3.6% for fathers and 2.8% for mothers.

Maternal smoking prevalence rates exhibit a sharp decline at the onset of pregnancy, yet increase gradually to pre-pregnancy levels within one to four years of their child’s
birth. Prevalence rates for any smoking amongst mothers exhibit little change between 4 and 11 years postpartum, maintaining a steady 32%. Paternal smoking rates while initially much higher (40.3%) show a stable decline from 2 years after their child’s birth, however approximately 37.5% of fathers still continue to smoke 11 years after their child’s birth.

Discussion

Prevalence estimates for smoking by mothers and fathers over all measurement waves were higher than the Pacific male (28%) and Pacific female (25%) rates reported in the 2011/12 New Zealand Health Survey.\(^\text{10}\)

Comparison with national data and trends indicates the prevalence of cigarette smoking among Pacific people has fluctuated between 30% and 38% over the five years from 2000 to 2005.\(^\text{11}\) However, results from the recent 2013 Census indicate a significant drop in the Pacific adult smoking rate from 30.3% to 23.2% since the 2006 Census.\(^\text{3}\) While this lauds the efforts of cessation service providers, policy initiatives, and tobacco control advocates, there is still more to be done for the almost 1 in 4 Pacific adults currently smoking. Also of concern are the maternal smoking prevalence rates, which exhibit a sharp decline at the onset of pregnancy, yet increase gradually to exceed pre-pregnancy levels within 2 to 4 years of their child’s birth.

Although little research has examined smoking behaviour amongst Pacific mothers during pregnancy and postpartum, current research being undertaken within Maori communities may be beneficial in understanding the behaviours and practices for smoking amongst pregnant mothers.\(^\text{12}\) Clearly, if Pacific communities are to successfully achieve the NZ Government’s goal of a smoking prevalence rate less than 5% by 2025, a more comprehensive and considered approach to the issue would be more effective.

Implementation of increases in excise tobacco tax in countries including NZ has shown some success in reducing smoking rates.\(^\text{13}\) \(^\text{14}\) Moreover, research examining the impact of the 2010–2012 tobacco excise tax increases amongst the Pacific male smokers in the PIF cohort found that 80% claimed they had reduced their smoking as a result of the tax.\(^\text{15}\) Although there has been some debate about the differential impact of tobacco tax increases on the ability of lower socioeconomic groups to quit/reduce smoking\(^\text{16}\), our evidence indicates the advocacy of larger and more frequent tobacco tax increases would be effective in reducing Pacific smoking rates.

The utility of plain packaging has been previously examined, with research findings suggesting the removal of tobacco branding from cigarette packs could assist many smokers, including Pacific, who wish to relinquish their addiction and become smoke-free.\(^\text{17}\) In addition, current social marketing campaigns may need to be reoriented to be effective for Pacific populations.

Research exploring the reactions amongst Pacific smokers regarding the imagery in health advertisements found that advertisements with hard-hitting graphic images particularly highlighting potential impacts for children, were more likely to influence them to quit smoking.\(^\text{18}\) Strategies such as this, alongside other social media campaigns which assist in denormalising tobacco use and smoking, could be more successful in reducing current smoking rates amongst Pacific people.\(^\text{19}\)
The utilisation of Nicotine Replacement Therapy (NRT) and Quitline cessation services have historically not been readily utilised by Pacific communities. Although previous research regarding Pacific peoples knowledge and beliefs about smoking cessation products and services indicated many smokers found services too impersonal and experienced long wait times on the phone, current Quitline services have been specifically oriented to address the needs of Pacific and other ethnic communities. Similarly, large scale quit competitions such as the WERO programme have gained some traction in encouraging Pacific people in the Auckland region to give up smoking.

The PIF Study has many salient strengths, including that it follows a large birth cohort over time, it involves the family triad (mother, father and child) and it has achieved a relatively small attrition rate to date. Moreover, no differential attrition associated with smoking status over time was observed in the study for either mothers or fathers. Thus the missing data were likely to be missing at random, not differentially related to smoking status.

Arguably, the most important limitation of this study is the reliance on self-report of smoking, not validated by any biochemical tests. However, self-reported data on current smoking status can have high validity, and this has been demonstrated in previous research regarding the prevalence of smoking measured using self-report data. Moreover, the question used in the PIF Study—“On average, how many cigarettes did you smoke yesterday?”—differs from the question used in other tobacco surveys in New Zealand, e.g. “On a typical day how many cigarettes do you smoke?” Nevertheless, previous research has utilised this question. Furthermore, additional investigations have established the utility of self-report data as a reliable indicator of smoking status, particularly within population based studies.

The PIF Study is a longitudinal birth cohort study of Pacific children, thus while this study examines smoking prevalence amongst the parents/caregivers of these children, the recruitment procedures allow for new caregivers to be included.

Finally, the use of different questions to measure smoking prevalence for different measurement waves is not ideal and may impact on estimates of prevalence. However, there is a need to explore in further depth the reasoning behind the results found here, thus motivating the need for focus groups and further exploration into the attitudes and behaviours towards smoking amongst Pacific parents.

**Conclusion**

The high prevalence rate of smoking amongst Pacific adults within this study is gravely concerning. The longitudinal nature of the information suggests that past cessation services and interventions have had little impact for these people, and potentially the health of their children and families through second hand smoke exposure.

Current policies and strategies need to be re-developed to address the needs of this population group if they are to achieve the goal of being smokefree by 2025.
Competing interests: Nil.

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References:


