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A systematic review study on common determinants of smoking among Pacific countries

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Abstract

Introduction: The high prevalence of smoking and its adverse health consequences are known as one of the main public health issues worldwide. Smoking is currently responsible for the deaths of one in ten adults, worldwide. The current and increasing trend of smoking in Pacific countries beats the bell to health planners to prevent smoking through recognizing its determinants. This study is aimed at understanding common determinants of smoking consumption among Pacific countries using a systematic review method.

Methods: A broad systematic search of published articles was applied using the Cochrane Systematic Review Guideline. Studies searched were published between 1st January 2000 to 1st January 2017, written in the English language, and in Pacific countries. Pacific, smoking, tobacco, cigar, and determinants were the keywords used to achieve the relevant studies using databases such as Medline, Embase, Web of Science, PsychInfo, and Scopus. After screening the titles of the articles and omitting some, the abstracts of the remaining studies were reviewed by two independent reviewers, omitting more, and finally the full text of the remaining articles were printed for more reading and extracting of the essential information to build the data extraction sheet. Descriptive analysis was applied and the results were shown and frequency of the studies was reported using tables and graphs.

Results: Twenty-seven articles met the study inclusion and exclusion criteria. Ethnicity (22.2%) was the most common determinant of smoking, followed by gender (males) in 4 studies (14.8%), age (older age) in 3 studies (11.1%), and influence of family and peers in 3 studies (11.1%), as determinants of smoking. Pacific is the most common determinant of being a smoker, according to the studies. Environmental factors was the most common determinant of smoking among Pacific communities, while ethnicity was the most common determinant in schools among Pacific island students. Pregnancy, English fluency, and acculturation (adaptation to the host countries ways) as determinants of smoking status were more common determinants of smoking in the hospital based studies.

Conclusion: Despite the growing trend of smoking prevalence in Pacific countries, there is limited research focusing on the potential determinants of smoking in Pacific. Considering the results of this study, encouraging the health planners to develop healthy policies, along with smoking prevention programs with a focus on building an awareness of the dangers of smoking, are essential. Further research into how to provide effective smoking prevention and intervention programs for the Pacific can assist health promotion professionals in providing targeted and more effective programs.

Keywords: Smoking, Pacific countries, determinants, systematic review study

INTRODUCTION

Globally, tobacco use ranks first as the leading cause of preventable death and is responsible for a death toll of nearly 6 million deaths per year, with the current trend showing

it to cause more than 8 million deaths annually by 2030 [1]. The East Asia, South East Asia, and Eastern European regions have the highest prevalence of smoking among males, while Europe has the highest prevalence of smoking among women [2]. It has been found that in developed countries, smoking is more common among ages 30-40, while in developing countries it is more common among ages 45-49 [3].

Although smoking prevalence has reduced in high-income countries, there is an exponential rise of tobacco consumption in low and middle income nations [4]. This places a huge constraint on the health care system. The dangers of smoking impact the Pacific peoples' health including cancer, heart disease, stroke, lung diseases, diabetes, and chronic obstructive pulmonary disease (COPD), which includes emphysema and chronic bronchitis. Smoking is also known to cause tuberculosis, certain eye diseases, and problems with the immune system, including rheumatoid arthritis. A couple of studies also show smoking as a risk factor for erectile dysfunction in males [5, 6].

In New Zealand alone, tobacco smoking or second-hand smoke, is directly attributed to approximately 5,000 deaths each year. The Pacific peoples, Maoris, and those with lower socioeconomic status, carry a greater burden of smoking-related illness [7]. Smoking is common in Niue, with rates of 31% to 38% among men and 14% to 16% among women. With its harm to health and expenditure on tobacco, it is also likely to be holding back the social and economic development of Pacific communities [8].

To date, there have been no systematic review studies published, hence this study aims to understand the common determinants and health consequences of smoking in the Pacific. It is imperative that more studies are needed to be conducted within the Pacific to identify the common determinants of smoking among the Pacific people so that possible control measures can be addressed and implemented to reduce the impact among the health of the Pacific people.

METHODS

This systematic review study was conducted based on the Cochrane Library guidelines. The articles were searched for in different databases which are more frequently used for other systematic review studies in the field of smoking. They were Medline, Embase, Web of Science, PsychInfo, and Scopus. Studies published between 1st January 2000 to 1st January 2017 and written in English language were included; while those that did not meet those criteria were excluded. A broad time period was used to include all published articles, to give us an insight into the determinants of smoking in Pacific countries. All types of studies, including quantitative and qualitative studies, were included. Keywords were used to find the articles and were chosen based on the main objectives of the study and medical subject headings (MeSH), which were suggested by some databases. Pacific, smoking, cigar, tobacco, and determinants were the main keywords and were combined using AND and OR to help search for all relevant studies. The studies were reviewed by two coders to remove the selection bias. All titles of the studies were scanned at the first stage and those not relevant were omitted. The abstract of the remaining articles was reviewed and some articles were removed at the second stage. Finally, the full text of the remaining articles (23 studies), which met the study inclusion and exclusion criteria, were reviewed to make the data extraction sheet (**Figure 1**). After gathering the final articles, the bibliography of the those studies were searched to find articles which were related to our search, that had not been found within the searched databases (4 studies).

The information related to the study, participants, methodology, and results of each article were inserted into the data extraction sheet for further analysis (**Table 3**). Descriptive analysis, using percentage of the studies, was used and the results were reported using tables and graphs.

RESULTS

As the results of **Table 1** show, more than half of the studies (55.6%) were conducted after 2011. Most of studies (74.1%), were quantitative studies, while two-thirds were conducted in South Pacific countries.

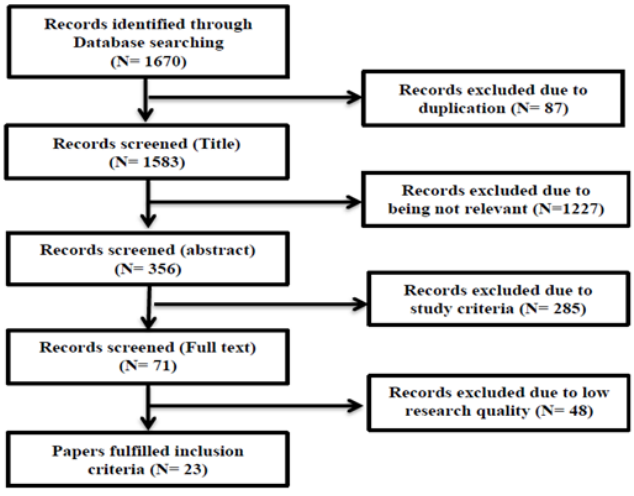

Figure 1. Article selection process.

The pool number of participants who participated in 27 studies was 864,788 people. **Table 2** shows the results of sampling methods and data collection tools, which were used in the 27 studies. Most studies (66.7%) were applied purposive sampling and 74% used questionnaire for collecting the data. In-depth interview was a common data collection method where a qualitative study was applied.

Approximately 50% of the studies were conducted among participants aged less than 18, and only 7.4% of the studies were over 31 years old (**Figure 2**).

The results of the study also show that 45.5% of the studies were conducted as community based, which was followed by school based studies (40.5%), and hospital based or community and school based (7.5%, respectively) (**Figure 3**).

Table 1. General characteristic of studies.

Variable	Number	Percentage
Year of the studies		
2000-2005	4	14.8
2006-2010	8	29.6
2011-2016	15	55.6
Type of the studies		
Quantitative	20	74.1
Mixed Method	1	3.7
Qualitative	6	22.2
Region of conducting studies		
American Pacific	10	37
South Pacific	17	63

Table 2. Frequency of studies based on the sampling and data collection methods.

Variable	Number	Percentage
Sampling method		
Purposive sampling	18	66.7
Random sampling	6	22.2
Stratified sampling	1	3.7
Snowball Sampling	1	3.7
Not specified	1	3.7
Data Collection Method		
Questionnaire	20	74.1
Focus group discussion	1	3.7
In-depth interview	4	14.8
In-depth and focus group discussion	1	3.7
Questionnaire and interview	1	3.7

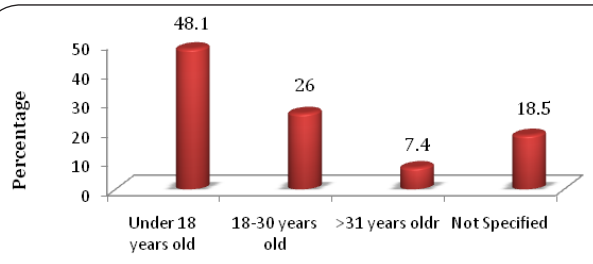

Figure 2. Frequency of studies based of age of particioants.

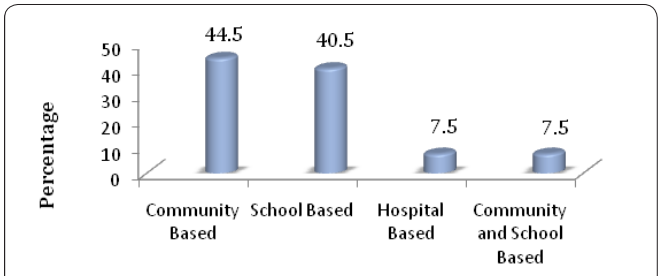

Figure 3. Frequencey of studies based on the study setting.

From the 27 articles reviewed, several factors have been found to be the most common determinants of smoking among Pacific islanders. Overall, it was found that ethnicity (Pacific) is the most common determinant of being a smoker in the Pacific region. Six studies (22.2%) stated ethnicity as the most common determinant of smoking, followed by gender (males) 4 studies (14.8%), age (older age) 3 studies (11.1%), and influence of family and peers in 3 studies (11.1%), as determinants of smoking.

The determinants are distributed accordingly, based on the study setting; community based, school based, hospital based, and both school and community based. For the 12 community based studies, 3 studies (25%) found that an environmental factor (peers, family, accessibility to cigarettes) is the most common determinant of smoking among Pacific communities. Ethnicity comes in second, as stated by 2 studies (16.7%). The remaining 8 (66.7%) of the overall community based studies have determinants that occur only once. These include gender, alcohol and drugs, and diabetes mellitus (those with the disease smoke less).

In the school based studies, 4 out of 10 studies (40%) found ethnicity to be the most common determinant in schools among Pacific island students. Ethnicity was followed by gender (males) and age (17 and older), found in 3 studies (30%), then family and peers in 2 studies (20%), lack of awareness and students having weekly allowance of NZ$20 or more per week in 1 study (10%).

For the 3 hospital based studies, it was found that pregnancy, English fluency, and acculturation (adaptation to the host countries ways) are determinants of smoking status. All determinants are homogenous in their occurrence, each constituting 33.33% of the overall hospital based studies.

Furthermore, 2 studies (66.7%) were conducted in both community and school and 1 study (33.33%) was conducted in a workplace. For studies conducted in both

Table 3. Data Extraction Sheet.

N	Article/Study	Participants	Methodology	Results
1	Maglalang et al., [24] **Year**: 2016 **Type**: Quantitative-cross-sectional **Country:** California (USA)	**Number**: 501 **Male:** 39 % **Female:** 57% 4 % gender not reported **Age:** Mean 21 years (SD 2.2) Range: 18–25 years	**Place:** School based (College) **Sampling Method:** Snowball Sampling **Data Collection:** Online Survey	**Determinants:** Sources of ENDS Awareness: • Social venues- Common among Mixed-Ethnic Groups- 30% (p<0.001)
2	Girin et al.[25] **Year**: 2014 **Type:** Cross-sectional Secondary Analysis **Country**: Wallis & Futuna	**Number:** 487 **Male:** 222 **Female:** 265 **Age:** Mean Age of 45 years (SD= 15.6)	**Place:** Community Based **Sampling Method**: Random Sampling **Data Collection**: questionnaire and Blood test and HT measurement	**Determinants:** • Individuals with DM were also less likely to smoke on a daily basis than their non-DM (OR=0.58)
3	Kaholokula et al.,[26] **Year**: 2006 **Type**: Cross-sectional **Country**: Hawaii, USA	**Number**: 1,158 **Male**: 535 **Female**: 623 **Age**: Mean 18.8 (SD= 13.9)	**Place**: Community Based **Sampling Method**: random selection **Data Collection**: Questionnaire, Personal History Data form,	**Determinants** Ethnicity (OR=0.73)
4	Tareg et al [27] **Year:** 2015 **Type**: Quantitative **Country:** Yap, Federated States of Micronesia	**Number**: 406 **Male**: 178-44% **Female**: 228- 56% **Age**: Range 18 to >60	**Place**: Community based **Sampling Method**: Purposive **Data collection Tool**: Questionnaire	**Determinant:** Older adults felt quitting tobacco or betel-nut use would be significantly more difficult because of social reasons and withdrawal Problems (p<0.001)
5	Erick-Peleti et al [28] **Year**: 2007 **Type**: Cohort **Country:** New Zealand	**Number**: Mothers of 1398 Infants **Male**: Not specified **Female**: Not specified **Age**: 6 weeks-12 Months	**Place**: Hospital Based **Sampling Method**: Purposive Sampling **Data Collection Tool**: Questionnaire, Interview	**Determinants**: English fluency (p<0.05), association between smoking and cultural alignment (p<0.05),
6	Scragg et al. [29] **Year**: 2003 **Type**: Cross-sectional Survey **Country**: New Zealand	**Number**: 29,271 **Male**: 14,341 **Female**: 14,930 **Age**: 14-15	**Place:** school-Based **Sampling Method**: Not specified **Data Collection Tool**: Self-Administered questionnaire	**Determinants:** • Effect of both parents smoking on the risk of daily smoking by students varied significantly (p<0.0001) between ethnic groups, • Intermediate for European (RR=3.11) and Pacific (RR=3.05) students, and weakest for Maori (RR=1.74).
7	Teevale et al [7] **Year**: 2013 **Type**: Quantitative **Country**: New Zealand	**Number**: 5471 **Male**: Not specified **Female**: Not specified **Age**: 13-17 Years	**Place**: School- Based **Sampling Method**: Random Sampling **Data Collection Tool**: national Survey, multimedia Questionnaire	**Determinants:** Ethnicity (p<0.001) Gender (girls p<0.001) Age (17 and older p<0.02)
8	Yang et al.[30] **Year**: 2013 **Type**: Cross-sectional **Country**: USA	**Number**: 6,311 **Male**: Not specified **Female**: Not specified **Age**: 11-18 years and older	**Place**: School Based **Sampling Method**: Purposive Sampling **Data Collection Tool**: Questionnaire	**Determinants:** Ethnicity (PI p<0.001) moking in peers increased the odds, while friends disapproval of cigarettes decreases the odds- (p<0.001)

Continuation Table 3.

9	Nosa et al.,[31] **Year**: 2014 **Type**: Cross-sectional Survey **Country**: New Zealand	**Number**: 2,208 **Male**: Not specified **Female**: Not specified **Age**: 10-13 Years	**Place**: School-Based **Sampling Method**: Purposive sampling **Data Collection Tool**: Questionnaire	**Determinants:** Ethnicity vs Having ever Smoked: • Cook Islands-(p<0.0001) Odds ratio: 1.91 for those children receiving more than $NZ20 per week as pocket money/allowance
10	Butler et al.,[32] **Year**: 2004 **Type**: Cohort **Country**: New Zealand	**Number**: 1398 **Male**: Not specified **Female**: Not specified **Age**: Infants 6 weeks and older	**Place**: Hospital based **Sampling Method**: Purposive **Data Collection Tool**: Questionnaire, Interview	**Determinants:** • reduction of moderate/heavy smokers once pregnant-(p<0.001)
11	Chen et al.,[33] **Year**: 2004 **Type**: Cross-sectional Survey **Country**: Marshall Islands	**Number**: 3,294 **Male**: 1,558 **Female**: 1,700 36 non-respondents for gender **Age**: 9-20, mean age 14	**Place**: School based **Sampling Method**: Stratified Sampling **Data Collection Tool**: Survey Questionnaire	**Determinants:** • Age (p<0.0001) • Gender (Male p<0.0001) • receiving or wearing tobacco-labelled equipment or clothing and –(p<0.0001)
12	Pokhrel et al.,[34] **Year**: 2016 Type: Cross-sectional Country: Hawaii, USA	**Number**: 435 **Male**: 39.4% **Female**: 60.6% **Age**: Mean age=25.6, SD=8.3;	**Place**: Both community and School based **Sampling Method**: Purposive sampling **Data Collection**: Online Survey	**Determinants:** • larger social network size was directly associated with higher social support and lower recent cigarette use among Native Hawaiians but not among East Asians or Filipinos (P<0.02)
13	Wu et al., [35] **Year**: 2013 **Type**: Cohort **Country**: USA	**Number**: 355,498 **Male**: Not specified **Female**: Not specified **Age**: ≥ 12 Years old	**Place**: Community **Sampling Method**: Multistage area probability sampling **Data Collection**: Survey Questionnaire	**Determinants:** Native Hawaiian Pacific Islander • Gender (Male p<0.05) • Alcohol use (p<0.05) • Drug use (p<0.05)
14	Wilson et al.,[8] **Year:** 2010 **Type:** Qualitative **Country:** New Zealand	**Number:** 1,376 **Male:** Not specified **Female:** Not specified **Age:**	**Place:** Community based **Sampling Method:** Purposive Sampling **Data collection:** Survey	**Determinants:** • Ethnicity
15	Price et al [36] **Year:** 2002 **Type:** Mixed **Country:** USA	**Number:** 220,251 **Male:** Not specified **Female:** Not specified **Age:** 12-26 and older	**Place:** Community based and school based **Sampling Method:** Purposive sampling **Data collection:** Survey	**Determinants:** • Mixed race AAPIs were 1.48 times more likely to have smoked cigarette than unmixed race AAPIs (OR=1.48)
16	Smith et al.[37] **Year:** 2007 **Type:** Cross-sectional survey **Country:** Tonga, Pohnpei, FSM and Vanuatu	**Number:** 8,777 school students **Male:** Not specified **Female:** Not specified **Age:** 11-17	**Place:** School Based **Sampling Method:** Cluster Random Sampling **Data collection:** Survey questionnaire	**Determinants:** • Age (Older age p<0.01) • Gender (Male p<0.01)
17	Tanjasiri et al [38] **Year:** 2013 **Type:** Descriptive **Country:** USA	**Number:** Not specified **Male:** Not specified **Female:** Not specified **Age:** 15-25 years AAPI youths	**Place:** Community Based **Sampling Method:** Purposive sampling **Data collection:** Mixed-method of geographic information system (GIS) mapping, Photo voice and individual youth surveys	**Determinants**: • Association between proximity (in miles) pro-tobacco influences and youth smoking (p<0.05)

Continuation Table 3.

18	Kim and McCarthy [39] **Year**: 2006 **Type**: Cohort **Country**: California, USA	**Number**: 226,267 **Male**: Not specified **Female**: Not specified **Age**: Mean age 14.3 for Pacific Islanders	**Place**: School-based**Sampling Method**: Purposive sampling **Data Collection Tool**: Questionnaire, Survey	**Determinants:** Ethnicity (RR=3.6)
19	Gifford et al. [40] **Year:** 2016 **Type:** Qualitative **Country:** New Zealand	**Number:** 10 Maori and 10 Pacific young adults **Male:** Not specified **Female:** Not specified **Age:** 18-26 years who smoked	**Place:** Community based **Sampling Method:** Purposive sampling **Data collection:** In-depth interview	**Determinants:** Environmental factors include: Level of awareness Peer pressure Accessibility
20	Hale et al. [4] **Year:** 2012 **Type:** Qualitative **Country:** New Zealand and Niue	**Number:** 12 (Niue = 4 and New Zealand = 8) public health, tobacco control, public policy experts. **Male:** Not specified **Female:** Not specified **Age:** Not specified	**Place:** Community based **Sampling Method:** Purposive sampling **Data collection:** In-depth Interview (face-to-face and online)	**Determinants:** Political support and community engagement
21	Tautolo et al [41] **Year:** 2016 **Type:** Qualitative **Country:** New Zealand	**Number:** 30 PI in New Zealand (Cook Islands, Samoan and Tongan) **Male:** 13 **Female:** 17 **Age:** 18-54 years with Pacific smokers and non-smokers. **Mean age:** 33.3 years	**Place:** Community based **Sampling Method:** Purposive sampling **Data collection:** Focus group discussions	**Determinants:** Purchase of duty-free cigarettes while traveling. Culture Availability
22	Martin and de Leeuw [42] **Year:** 2013 **Type:** Qualitative **Country:** Cook Islands, Vanuatu, Palau & Nauru	**Number:** 39 **Male:** Not specified **Female:** Not specified **Age:** Not specified	**Place:** Community based **Sampling Method:** Purposive sampling **Data collection:** Observation, Interview and Document analysis	**Determinants:** Limited capacity, Limited anti-tobacco coalition and l Limited political commitments.
23	Lanumata et al.[43] **Year:** 2010 **Type:** Qualitative **Country:** New Zealand	**Number:** 18 **Male:** Not specified **Female:** Not specified **Age:** Not specified	**Place:** Community based **Sampling Method:** Purposive sampling **Data collection:** In-depth interview	**Determinants:** More focused on the need to change attitudes towards smoking through education rather than government regulations. Families and churches are major avenues for change.
24	Treiber et al. [44] **Year:** 2012 **Type:** Qualitative **Country:** Central Los Angeles, USA	**Number:** 69 apartment complexes/managers **Male:** Not specified **Female:** Not specified **Age:** Not specified	**Place:** Community based **Sampling Method:** Purposive sampling **Data collection:** Focus group discussions, Observations, Telephone survey and In-depth phone interview	**Determinants:** Significant reduction of tobacco litter in parking areas, garages, entrance ways, courtyards, balcony, walkways and community halls after implementation of tobacco policies.
25	Tapp and Thomson, 2009[45] **Year:** 2009 **Type:** Qualitative **Country:** New Zealand	**Number:** 9 MPs **Male:** Not specified **Female:** Not specified **Age:** Not specified	**Place:** Work based **Sampling Method:** Purposive sampling **Data collection:** In-depth interview	**Determinant:** General opposition to giving smoke-free car legislation a current priority
26	Waqa et al.,[46] **Year:** 2015 **Type:** Qualitative **Country:** Fiji	**Number:** 30 Fijian students **Male:** 15 **Female:** 15 **Age:** 14-17 years	**Place:** School (High School) based **Sampling Method:** Purposive sampling **Data collection:** In-depth interview	**Determinants:** Lack of awareness
27	Diane B. Mitschke et al. [47] **year:** 2008 **Type:** Qualitative **Country:** USA and Hawaii	**Number:** 54 multi-ethnic youth **Male:** 19 **Female:** 35 **Age:** 10-14 years	**Place:** School based **Sampling Method:** Purposive sampling **Data collection:** Focus groups and Demographic surveys	**Determinants:** • Family • Peers

community and schools, the determinants found included larger social network sizes and ethnicity (Pacific).

In addition, several of the studies were focused on barriers or determinants affecting the development and implementation of smoking and tobacco control policies. The determinants found to be associated with the development and implementation of smoking and tobacco control policies include; limited resources of Pacific Island Governments, a limited anti-tobacco coalition, and limited support and political commitment.

DISCUSSION

This study's results show that ethnicity (Pacific Islander) is a common determinant of smoking. People of Pacific Island descent are more likely to be smokers, as compared to non-Pacific islanders. These findings are consistent with other studies conducted in in the Pacific islands and the United States, which states that Pacific islanders are among the ethnic groups most susceptible to smoking and other health risk behaviors [9, 10]. The results also highlighted that gender (males), age, along with family and peer pressure, are also closely associated with smoking. Studies from all over the world, including Asia and the United States, also confirmed smoking to be more common in males, hence the reason the male gender is a determinant for smoking [11, 12]. Our findings regarding age (older), peer, and family influence as determinants of smoking is consistent with other studies in the US and Australia [13, 14].

The results also show that within communities, environmental factors such as peer pressure, family influence, and accessibility to cigarettes are the primary determinants of smoking among community members, as confirmed by other studies [13-15]. In addition, ethnicity (Pacific islander), gender (males), and alcohol and drugs are other factors which influence smoking among people within communities, as supported by other studies from around the world [9, 11, 16].

Moreover, the results show that smoking among students is commonly linked to ethnicity, gender, peer, and family influence. Other studies also show that ethnicity, gender, peer, and family influence are all determinants of smoking in schools [7, 11, 13, 17].

The result for hospital based studies found pregnancy, English fluency, and acculturation status (adaptation to the host countries ways) to be the main determinants for smoking status. Pregnancy is a determinant of smoking cessation and is supported by other studies [18, 19]. English fluency and acculturation are determinants for smoking consumption, as confirmed.

In addition, the results shows that for studies that were conducted in both schools and communities, the primary determinant for smoking is having a large social network size and ethnicity (Pacific islander) [2, 20].

Furthermore, the results also included the barriers and determinants for smoking policies in Pacific island countries. It was found that the main barriers affecting the development and implementation of smoking cessation policies in the Pacific are limited capacity (resources) of Pacific Island Governments, limited anti-tobacco coalitions, and limited support and political commitment [21]. The finding of this study are consistent with studies conducted in both developed and developing countries from around the world [22, 23].

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