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Health behaviour and lifestyle of Pacific youth surveys: a resource for capacity building

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SUMMARY

The changing global socio-economic environment over the last two decades has had significant ramifications for the health and development of youth in lower- and middle-income countries. In the Pacific region, young people are exposed to similar causes of ill-health as their peers in developed countries. This paper describes the development, implementation and major findings of the Health Behaviour and Lifestyle of Pacific Youth (HBLPY) surveys, a regional initiative to obtain representative data about health-related behaviour and needs of adolescents in Vanuatu, Tonga and the Federated States of Micronesia. The Pacific HBLPY is modelled on the WHO Europe Health Behaviour in School-aged Children (HBSC) surveys. The surveys, undertaken in 2000–2001, were built upon strong local partnerships and were undertaken with youth participation to ensure survey ownership. A regional technical group was formed to provide training and support to strengthen health survey capacity of youth and their agencies. The findings showed that tobacco was most commonly used substance, with 29.7% of 15-year-old boys and 15.7% of girls smoking weekly. Over half of the students did not engage in physical activity for at least 2 h per week; these rates are substantially lower than those usually found in Europe. Dietary habits among this group are also of concern, reflecting international trends away from highly nutritious traditional diets. The HBLPY surveys have shown that it is possible to collect population-based data in lower- and middle-income countries so that appropriate youth health programmes and policies can be developed. Implementation of an ongoing surveillance system similar to the HBLPY model in these countries warrants further investigation. Such initiatives should be supported at the regional and global level.

Key words: adolescents; health behaviour; capacity building

INTRODUCTION

Over the past decade there has been growing acceptance that young people between 10 and 24 years of age are a distinct population group with needs that differ from those of infants or adults (WHO, 1993; Coleman, 2001; WHO, 2002b). Youth from marginalized groups and lower- and middle-income countries are especially vulnerable. The increased availability of tobacco, alcohol and other psychoactive drugs, the increased burden of chronic diseases, and the ongoing problems of poverty and conflict are major barriers to adolescent development. These issues

have brought youth health to global prominence in recent years (WHO, 2000a).

In 2000, it has been estimated that approximately 1.4 million adolescents aged between 10 and 19 years lose their lives through injuries and accidents, violence, suicide, pregnancy-related complications and other preventable illnesses (WHO, 2000; Brown, 2001; Ahmed and Andersson, 2002). Tobacco use in many lower- and middle-income countries ranges from 10 to 33%, with use especially high among boys (Warren *et al*., 2000; Flisher *et al*., 2003; King *et al*., 2003). The use of alcohol, marijuana and cannabis is also prevalent among youth (Flisher *et al*., 2003), but available data on the use of these substances by youth are limited in lower- and middle-income countries. The nutrition transitions to lipid-rich diets and a decrease in physical activity have also seen an increasing prevalence in obesity, especially among urban youth (Schneider, 2000; Benefice *et al*., 2001; Denissova and Zavjalova, 2001).

While there is emerging evidence of growing risks to adolescent health, it is also the case that nationwide surveillance of health behaviours in youth populations is not carried out regularly in many developing countries. This may be due to either a lack of resources, a lack of research capacity, or both. In Pacific Island countries, effective youth health promotion interventions are hampered by the absence of up-to-date data on the incidence and prevalence of health problems. The few studies of adolescent health risk factors in this region have been concerned with prevalence rates of substance use by Pacific youth (Meo and Warner-Smith, 1997; Warren *et al*., 2000). Warren and colleagues (Warren *et al*., 2000) report findings from the Global Youth Tobacco Survey (GYTS) with a representative sample of Fijian adolescents aged 13–15 years ($n = 1629$). Among their results were that 33% had ever smoked cigarettes and that 10% had smoked cigarettes during the 30 days preceding the survey. Additional analyses of the GYTS data (UNICEF Pacific/WHO, 2001) revealed that 65% had five drinks or more in a single sitting (defined as binge drinkers) within the 2 weeks preceding the survey and that 7% had used marijuana during the 30 days preceding the survey. However, the Fiji GYTS was confined to tobacco, alcohol and marijuana use. Information on physical activity, dietary habit, injury and violence, and other psychosocial factors were not addressed in this or other studies.

The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) have stressed that promoting the healthy development of adolescents is one of the most important investments that any country can make and that the failure to do so would result in enormous economic and social costs (Pan American Health Organization and WR Kellogg Foundation, 1998; WHO, 1998; WHO, 2000a; UNICEF, 2003). Underpinning this statement is the existence of the best available epidemiological data on the prevalence of health problems, associated risk and protective factors for informing the development of appropriate services, programme and policy intervention. As part of this global effort, UNICEF and WHO supported the implementation of a three-country youth health study to gather evidence on youth health in the Pacific region in 2000–2001. The aim of the study was to collect population-based data on a range of health-related practices, lifestyles and physical and social environments among school-age students and out-of-school youth. The underpinning philosophy of this study was recognition of the importance of empowering young people to take on a key role in this regional initiative. Priority was given to building strong local partnerships with youth agencies, and a strong emphasis was placed on providing support to build the capacity of young people in health research.

This paper reports on the experiences of implementing nationwide surveys of adolescent health behaviour and lifestyles undertaken in Vanuatu, Tonga and Ponhpei in the Federated States of Micronesia (FSM). The paper also presents initial findings of the surveys with a focus on substance use, nutrition, physical activity and sedentary behaviour among school students. These health-related practices are considered key risk factors of adolescent health and precursors to ill-health in adulthood contributing to the rising burden of chronic diseases impacting upon public health in the region. Results on health behaviour among out-of-school youth are presented in separate publications (UNICEF Pacific, 2004a; UNICEF Pacific, 2004b; UNICEF Pacific, 2004c).

BACKGROUND

Genesis of a regional partnership

Pacific island governments and development agencies have long recognized the importance of

addressing the health and developmental needs of young people, but have also recognized the dearth of quality information. The young age structures of Pacific countries further indicated the need for obtaining quality data relating to youth health. Based on requests from countries and youth agencies, the three-country study titled *Health Behaviour and Lifestyle of Pacific Youth* (HBLPY) was established in 2000. The HBLPY was a collaborative effort initiated and planned by a wide range of organizations: WHO Western Pacific Region Office; UNICEF Pacific; Ministries of Health, Youth and Education in Vanuatu, Tonga and FSM; youth agencies in each country, including the Vanuatu Provincial Youth Councils, Tonga National Youth Congress and Pohnpei Youth Council, and; the Australian Centre for Health Promotion at the University of Sydney.

The aims of the HBLPY surveys were to:

(1) collect representative information to profile the patterns and prevalence of health practices and lifestyle characteristics of school students and out-of-school youth, so that meaningful cross-country comparisons were possible; and,
(2) support active participation and training of youth in all stages of the planning and implementation of the HBLPY surveys.

METHODS

The methodology of the Pacific HBLPY is modelled on the Health Behaviour in School-aged Children (HBSC) surveys conducted by WHO Europe since 1982 (Aaro *et al*., 1986; Currie *et al*., 2000). The HBSC surveys involve school students aged 11, 13 and 15 years. The study is designed for comparability of results within and between countries at a population level. Participating countries are required to follow established research protocols and implement the survey in a standard manner, using the same measures. The HBSC is also one of the few surveillance systems available to document and monitor trends across a broad range of adolescent health-related behaviours in a single survey, including substance use, physical activity and sedentary practices, dietary habits and psychosocial well-being.

Although originally designed for use in developed countries, the HBSC framework and measures were selected for adaptation in the Pacific because it has been tried with diverse groups of school students in multiple languages and cultures, is flexible for adaptation to new environments and is designed specifically for cross-national comparability. The reliability and validity of these measures have been tested extensively in earlier studies and across multiple countries and cultures (Forero *et al*., 1999; Smet *et al*., 1999; Booth *et al*., 2001; Currie *et al*., 2002).

The questionnaire

The HBLPY questionnaire comprised core and optional modules. The core module focused on high-priority issues with the same questions asked across all countries. The core module addressed demographic information, substance use, social, family and school connectedness, ease of communication with family and peers, psychosocial health, injury and violence, personal hygiene, physical activity and sedentary practices. The optional module collected information relating to community involvements, future job prospects, body image, use of psychoactive substances specific to each country, consumption of particular foods and drinks and anthropometric measures. The average completion time was 40 min. All surveys were administered in the vernacular of the countries.

Survey piloting and youth training

All participating countries conducted a detailed pilot trial of their national HBLPY questionnaire and its intelligibility with school students and out-of-school youth prior to the survey. As part of a needs assessment to identify relevant youth issues and needs each country carried out a series of meetings with key government and non-government stakeholders. Separate focus group discussions and a series of Photovoice sessions were conducted with local youth to identify other pertinent issues that could be investigated quantitatively in the surveys. In the Photovoice sessions, young people were given hand-held disposable cameras and asked to take photos of conditions, situations or people they considered important in their lives and in the community (Wang and Burris, 1997). The images then became the focus of group discussions.

Teams of eight to ten local youth fluent in English were recruited by youth agencies to form a core team in each country who would participate in all stages of survey development, planning, training and implementation. The core

teams received an intensive 1-week training in all aspects of survey methodology and project management and they in turn trained another 10–20 young people to undertake the field implementation of the survey under the supervision of the core team. At the completion of the surveys, members of the core team as well as nominated youth participated in a 1-week training workshop in data entry techniques.

Study design and sampling methods

The HBLPY survey was a cross-sectional study based on representative national samples of school students in each country. The target population was students aged 11–17 years old. This age range was recommended because of the variable levels of school enrolment at different ages and the variable levels of literacy. Students were selected using cluster random selection of primary and secondary schools; this sampling design was the preferred approach given the widely dispersed locations of schools. International schools with relatively high enrolments of expatriate students and schools located on remote islands or difficult-to-reach parts of the country were removed from the sampling frame. Within each selected school, all students in the school years corresponding to ages 11–17 years were surveyed.

In Vanuatu, approximately 75% of the total eligible secondary schools were selected. Primary schools were excluded from the sampling frame because of the variable literacy levels of students in this country. In FSM, the surveys were conducted in all secondary schools in the State of Pohnpei only. This state was selected both because of its accessibility and because of the interest of stakeholders in collecting adolescent health information. For Vanuatu and Pohnpei, all students in the selected schools were surveyed to account for small populations of these countries and because the age composition of school classes was variable, meaning that the wide coverage of the schools would help to increase the number of respondents in the desired age groups. In Tonga, 20 and 43% of all eligible primary and secondary schools were selected, respectively.

Data collection

The youth teams and their agencies were responsible for overall management and co-ordination of the surveys, including liaising with participating schools and field supervision of survey teams. A detailed protocol was developed for training to ensure consistency of data collection in the field in all three countries (UNICEF Pacific, 2000). The protocol outlined procedures on preparing for and conducting field surveys, guidelines on responding to student queries about the questionnaire, and procedures for data cleaning and management.

For regional consistency, the students completed the questionnaire either in their classrooms or in designated areas under the supervision of survey staff. To ensure students' privacy and to allow for anonymous participation, teachers or any authoritative figures were not present during the survey. Ministry and district-level school and parental permissions were gained prior to the survey.

Between September and October 2000, the first set of HBLPY surveys was conducted in Vanuatu. Tonga followed between October and November 2000 and Pohnpei in April 2001.

Data entry and analysis

All completed questionnaires were cleaned and entered into Epi Info 6.04. All analyses were conducted using the statistical package SAS V8.02. Standard errors and 95% confidence intervals were adjusted for clustering design effect employing the PROC SURVEYMEANS procedure in SAS. In order to define a sample of students that can be compared with similar surveys that have been conducted in other parts of the world, results presented were analysed as point estimates for 13- and 15-year-old boys and girls separately, and for variables that were common to all surveys in the three countries.

RESULTS

Table 1 shows that a total of 4885 students aged 13 and 15 years were included in the analyses. Students under 14 years of age were not considered for Pohnpei because of the small sample size and variable literacy levels. The largest samples were in Vanuatu for both boys and girls followed by Tonga and Pohnpei, with total student response rates of 75, 62 and 80%, respectively. A slightly higher representation of girls was noted at age 13 years in Vanuatu and Tonga and at age 15 yeas in Tonga and Pohnpei.

Table 1: Survey sample size of school students aged 13 and 15 years old, by sex and country

Country	Number of participating schools	Overall student response rate %	13 years old		15 years old	
			Number of boys	Number of girls	Number of boys	Number of girls
Pohnpei	7	80	–	–	230	277
Tonga	48	62	448	468	367	438
Vanuatu	32	75	658	753	675	571
Total surveyed	87	72	1106	1221	1272	1286

Prevalence of substance use

Tongan male students reported the highest rates of *ever tried smoking* (66.7% at 13 years, 67.6% at 15 years). Vanuatu reported the lowest rates at 13 (19.8% of boys, 7.6% of girls) and 15 years (36.5% of boys and 16.6% of girls). Boys were more likely than girls to have ever experimented with tobacco, with the prevalence increasing with age for both boys and girls in all countries (Table 2).

Similar patterns were noted for *weekly cigarette smoking* (everyday and/or at least once a week). Tonga had the highest proportions of male students smoking at 13 and 15 years of age on a weekly basis while Vanuatu had the lowest rates in both age groups. A 2-fold increase in weekly smoking was found among Tongan girls between the ages 13 and 15 years.

Boys in all countries were more likely than girls to have *ever been drunk two or more times*, with students in Vanuatu consistently reporting the lowest rates of drunkenness among both 13- and 15-year-old boys and girls.

Dietary habits

The proportions of students who reported drinking tea, coconut juice and fizzy drinks once a day or more varied widely among the three countries (Table 3). The most striking results were noted in Pohnpei with 58.2% of 15-year-old girls reported drinking coke or fizzy drinks daily, exceeding the prevalence of this behaviour among girls of the same age in Europe (40.0%; data not shown). The lowest proportions of daily fruit and vegetable consumption were reported by 15-year-old students in Pohnpei.

Reported consumption rates for processed foods such as tinned fish or mutton were relatively high with at least 40.0% of students across all countries eating tinned foods daily. The differences between boys and girls in both age groups were minor in all countries, although slightly more girls than boys were less likely to eat tinned fish or tinned mutton on a daily basis.

Physical activity and sedentary practices

Tonga reported the highest proportions of male students at ages 13 and 15 who indicated that they exercised at least twice per week (71.7 and 69.2%), while there was little difference between Vanuatu and Pohnpei among boys at age 15 years (59.1 and 58.2%, respectively) (Table 4). Girls in both age groups across the Pacific countries were less likely than boys to exercise regularly. There were minor differences noted between the three countries in the proportions of students who reported that they exercised at least 2 h per week, with over one-quarter of boys and less than one-quarter of girls in all countries indicating that they exercised at least 2 h per week.

Television watching for at least 4 h or more per day was common among students in Tonga and Pohnpei (over 20%). Vanuatu had the lowest proportions of students spending their time watching television or videos at both age groups.

DISCUSSION

The HBLPY surveys extend the scope of existing monitoring systems in the Pacific by gathering country-specific epidemiological evidence that focus exclusively on a range of adolescent health-related behaviour and lifestyle issues. No previous attempts have systematically measured the behaviour, lifestyles, physical and social environments of youth in this region to compare the prevalence and magnitude of problems among countries in the Pacific.

The results show wide variations in substance use between the three countries, although the

Table 2: Proportion of students aged 13 and 15 years who reported using substances on a weekly basis, % (95% confidence intervals)

Country	Ever tried smoking		Weekly cigarette smoking		Been drunk two or more times		Kava use weekly		Methylated spirits use weekly		Marijuana use weekly		Glue sniffing weekly	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Pohnpei														
15 years old (n = 507)	59.6 (51.8, 67.3)	46.2 (40.9, 51.5)	19.6 (16.7, 22.5)	17.3 (14.4, 20.2)	51.7 (44.5, 59.0)	16.6 (13.5, 19.7)	18.3 (13.0, 23.5)	13.0 (10.6, 15.4)	11.3 (7.6, 15.0)	2.9 (1.0, 4.8)	10.9 (7.4, 14.4)	9.4 (6.8, 11.9)	2.6 (0.0, 7.1)	2.2 (0.7, 3.7)
Tonga														
13 years old (n = 916)	66.7 (58.3, 75.2)	31.7 (25.9, 37.4)	24.5 (19.9, 29.1)	7.5 (4.2, 10.9)	5.6 (3.3, 7.8)	1.7 (0.3, 3.1)	17.0 (13.0, 21.0)	1.5 (0.7, 2.3)	2.0 (0.5, 3.5)	0.9 (0.1, 1.6)	2.2 (0.5, 3.9)	0.2 (0.0, 0.7)	7.1 (4.6, 9.7)	1.3 (0.4, 2.1)
15 years old (n = 805)	67.6 (59.3, 75.8)	48.8 (36.9, 60.8)	29.7 (20.0, 39.4)	15.7 (10.3, 21.0)	14.7 (9.8, 19.6)	4.1 (0.6, 7.6)	18.0 (11.3, 24.7)	2.3 (0.8, 3.8)	4.6 (2.4, 6.9)	0.9 (0.0, 2.4)	9.5 (4.1, 15.0)	0.9 (0.3, 1.5)	7.9 (3.9, 11.9)	0.9 (0.2, 1.6)
Vanuatu														
13 years old (n = 1411)	19.8 (15.3, 24.2)	7.6 (4.4, 10.8)	3.6 (2.0, 5.1)	1.9 (0.2, 3.6)	1.7 (0.8, 2.6)	0.4 (0.0, 0.8)	3.3 (1.6, 5.1)	1.9 (0.5, 3.2)	0.6 (0.0, 1.3)	0.4 (0.0, 0.9)	0.8 (0.0, 1.5)	0.3 (0.0, 0.7)	2.9 (1.7, 4.1)	3.2 (1.5, 4.9)
15 years old (n = 1246)	36.5 (30.0, 43.0)	16.6 (10.9, 22.4)	6.8 (3.1, 10.6)	3.6 (1.3, 5.9)	4.0 (2.3, 5.7)	1.9 (0.5, 3.4)	4.1 (1.6, 6.7)	0.7 (0.1, 1.3)	1.3 (0.1, 2.6)	0.4 (0.0, 0.8)	0.6 (0.0, 1.3)	0.4 (0.0, 0.8)	3.0 (1.3, 4.6)	2.5 (1.1, 3.8

Table 3: Proportion of students aged 13 and 15 years who reported consuming selected food items on a daily basis, % (95% confidence intervals)

Country	Tea		Coconut juice		Coke/fizzy drinks		Fresh fruits		Fresh vegetables		Tinned fish[#]		Tinned mutton	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Pohnpei														
15 years old (n = 507)	27.4 (18.3, 36.5)	21.2 (11.8, 31.0)	42.8 (38.9, 46.7)	33.5 (29.5, 37.4)	49.3 (33.1, 65.5)	58.2 (49.7, 66.7)	48.1 (33.3, 62.8)	47.0 (41.0, 53.0)	45.9 (38.8, 53.0)	43.2 (33.9, 52.5)	42.0 (31.6, 52.4)	41.8 (39.2, 44.5)	41.5 (32.0, 51.0)	50.6 (47.1, 54.1)
Tonga														
13 years old (n = 916)	50.8 (46.3, 55.2)	50.1 (45.7, 54.5)	63.7 (58.1, 69.2)	48.3 (40.5, 56.0)	32.1 (27.1, 37.2)	40.7 (32.3, 49.1)	58.8 (53.2, 64.3)	61.6 (55.8, 67.4)	55.4 (51.1, 59.7)	56.6 (51.5, 61.7)	38.6 (28.2, 48.9)	29.4 (24.4, 34.5)	50.4 (45.2, 55.6)	56.1 (49.0, 63.3)
15 years old (n = 805)	45.9 (35.1, 56.7)	41.5 (28.9, 54.1)	59.8 (47.4, 72.2)	44.2 (37.6, 50.8)	26.1 (19.7, 32.4)	37.3 (27.5, 47.1)	62.3 (55.2, 69.4)	61.5 (55.2, 67.7)	59.1 (54.2, 64.0)	58.0 (54.2, 61.8)	34.0 (20.6, 47.4)	27.2 (23.4, 31.0)	48.8 (42.7, 55.0)	54.4 (47.7, 61.1)
Vanuatu														
13 years old (n = 1411)	82.5 (77.2, 87.9)	79.7 (75.9, 83.4)	39.5 (30.8, 48.3)	31.5 (25.9, 37.3)	17.5 (11.7, 23.3)	13.9 (8.6, 19.2)	51.7 (45.1, 58.4)	48.2 (43.6, 52.8)	69.7 (63.1, 76.3)	65.0 (58.6, 71.3)	40.5 (30.4, 50.5)	39.2 (28.6, 49.8)	17.4 (11.5, 23.3)	14.4 (10.2, 18.5)
15 years old (n = 1246)	80.2 (75.8, 84.5)	79.4 (74.4, 84.4)	33.2 (26.2, 40.1)	28.3 (22.9, 33.7)	12.5 (8.4, 16.7)	16.4 (10.8, 22.0)	47.8 (44.2, 51.3)	50.9 (46.1, 55.7)	69.0 (62.4, 75.6)	70.7 (64.8, 76.6)	42.2 (30.0, 54.5)	40.6 (26.8, 54.4)	21.0 (15.4, 26.6)	17.0 (11.0, 23.0)

[#]Students in Pohnpei were asked about consumption of fresh fish instead of tinned fish.

Table 4: Proportion of students aged 13 and 15 years who reported exercising or watching TV/videos, % (95% confidence intervals)

Country	Exercise at least two times per week (outside school hours)		Exercise at least 2 h per week (outside school hours)		Watch videos/TV 4 h or more per day	
	Boys	Girls	Boys	Girls	Boys	Girls
Pohnpei						
15 years old	59.1	32.9	33.5	17.3	20.4	29.2
(n = 507)	(52.0, 66.2)	(23.9, 41.8)	(22.3, 44.7)	(10.2, 24.5)	(14.8, 26.0)	(24.6, 33.9)
Tonga						
13 years old	71.7	44.2	31.9	20.3	25.4	27.8
(n = 916)	(67.3, 76.0)	(40.0, 48.4)	(28.5, 35.3)	(18.1, 22.5)	(20.8, 30.1)	(21.7, 33.9)
15 years old	69.2	37.0	40.6	19.2	31.3	34.7
(n = 805)	(65.6, 72.8)	(31.5, 42.4)	(35.0, 46.2)	(17.0, 21.3)	(23.7, 39.0)	(30.0, 39.4)
Vanuatu						
13 years old	50.5	29.8	27.4	16.4	16.3	11.7
(n = 1411)	(44.8, 56.2)	(24.3, 35.3)	(21.3, 33.4)	(12.1, 20.6)	(12.4, 20.1)	(7.9, 15.5)
15 years old	58.2	37.5	37.3	23.6	11.9	14.0
(n = 1246)	(52.9, 63.6)	(32.9, 42.0)	(32.4, 42.2)	(19.3, 27.9)	(8.4, 15.3)	(8.7, 19.3)

patterns observed are consistent with what are usually found in other regions (Global Youth Tobacco Survey Collaborating Group, 2003). The rates for drunkenness among Pacific boys aged 15 years (51.7%) were higher than those found in the European HBSC surveys (just above 40.0%). Tobacco was the substance most commonly used (at least weekly), followed by *kava* and other illicit drugs. Overall, adolescents from the less affluent Vanuatu obtained more favourable results than those from Tonga and Pohnpei (more economically developed) in smoking status, drunkenness and marijuana use. This suggests that there may be a broad link between the economic development stage of Pacific countries and health behaviour.

Pronounced gender differences in smoking, drunkenness and *kava* consumption were noted across all three countries, with significant differences reported in Tonga and Vanuatu. The higher proportions of weekly smoking among boys in the Pacific than students of similar ages in Europe in the 1997–1998 HBSC surveys (Currie *et al.*, 2000) could reflect the accessibility of tobacco products in the region, the absence of concerted anti-tobacco campaigns or the lack of regulations restricting the sale of cigarettes to youth, and where such regulations exit, the relaxed enforcement of these regulations (Cornelius, 2001). It is also worth noting that while our results corroborate previous data on tobacco use (WHO, 1997), they are, however, inconsistent with some recent findings (Global Youth Tobacco Survey Collaborating Group, 2003). At least one-half of the GYTS countries, including the Pacific country Fiji, showed no gender differences in current smoking status. The observed differences could again be explained by the relative economic development of the Pacific countries. Despite increased exposure to tobacco marketing, cost and cultural values may result in the gender differences observed in Vanuatu and Tonga, but not in Fiji or Pohnpei, which are considered to be more economically advanced.

Similarly, increased access to electronic media, food availability and accessibility, cost, culture and tradition may explain the patterns of physical activity, food and drink consumption observed. The levels of physical activity documented are not optimal for the majority of students in the countries surveyed. In general over half of the students did not engage in physical activity for at least 2 h a week; these rates are substantially lower than those usually found in the European HBSC data and other countries. The results also indicate less optimal eating habits with high consumption rates of processed food items found in all countries. These data provide evidence of dietary transitions among youth in these countries that are consistent with documented international trends of a nutrition shift away from traditional diets considered to be high in nutritional qualities to diets low in nutrients (Schneider, 2000). These findings warrant further investigation in order to determine their validity and possible causes.

Some methodological limitations of the surveys need to be acknowledged. Overall

student response rates were complete for Vanuatu, but based only on the majority of schools that participated in Tonga and Pohnpei as data were not available on the total enrolment number for a few schools. The reliance upon self-completion of the questionnaire has the potential for bias as adolescents may not recall their behaviour accurately or deliberately provide false information in order to present themselves in a more socially desirable way. However, steps were taken to minimize such influences, including careful piloting of the questionnaire, and interviewing young people at post pilot surveys to examine their level of comprehension. Other measures taken were thorough training of youth in survey implementation and ensuring there were adequate numbers of staff in the field. Confidentiality and anonymity were also emphasized. While the possible effect of bias cannot be ruled out the use of self-report measures offered some important strengths. These included efficiently gaining information at the population level, and measuring factors that are difficult or expensive to study using clinical or observational techniques.

One distinct methodology of the surveys was that, unlike the HBSC surveys, which covered students aged 11–12, 13–14 and 15–16 years, the HBLPY surveys were carried out with whole school populations. This approach was used because the age distribution in school grades is variable in the Pacific. This was also necessary to ensure that there would be adequate samples from the key age groups from each country. For example, the survey strategy sampled almost three-quarters of all secondary school students in Vanuatu. The result was a large sample size of students aged 13 and 15 years, therefore, allowing for comparisons between HBLPY and recent HBSC surveys.

Although some modification to the methodology was necessary, every effort was made to retain the core elements and the design integrity of the study and that data collection methods were consistent with those used in the European HBSC surveys. While this systematic approach was crucial for ensuring the results can be compared regionally, it also enabled results to be compared internationally with the HBSC data. The extensive testing of measures before their application in the field also showed that language and cultural factors that could affect the validity of the data could be addressed. Special care was given to translating and back-translating the questionnaire to ensure that the meaning of the questions was accurately portrayed in the local vernacular. The relatively high student response rates across all countries further confirm the applicability of the HBSC model in the Pacific context.

A feature pivotal to the success of the HBLPY survey was the high level of youth involvement in all stages of the surveys: as participants, consultants, partners, trainers, managers and leaders. This participatory approach not only contributed to the relevance, and ownership of the survey but helped enhance the capacity of local youth to identify and address their needs in the future with confidence. The strong youth capacity-building and empowerment process that was undertaken to carry out the initiative will increase the potential for such surveys to be repeated in future. The HBLPY surveys have also shown that there are opportunities for youth participation in public health research, albeit with the appropriate technical support, training and resources.

The success of the HBLPY surveys depended on identifying local agencies to act as advocates for young people. These agencies also provide forums for youth to express their needs and concerns. It is also important to acknowledge that the surveys involved an extensive network of national, regional and international partnerships. Gaining support at all levels was essential given the challenges posed by the geographically fragmented nature of Pacific countries and the diversity in languages and cultures. There are few examples of such international collaboration around youth health research in other parts of the world, with the exception of the HBSC surveys and the US Youth Risk Behaviour Survey, and the global GYTS initiative in Fiji presenting one instance of this in the Pacific (Warren *et al.*, 2000). The Fiji experience confirmed the need for a system to track a wider range of youth health behaviour and also highlighted the feasibility of establishing such a monitoring system through strategic collaboration between international agencies, technical groups and national governments.

It is essential that youth health programmes in developing countries are based on country-specific data rather than extrapolations from the health behaviour surveys that are carried out with youth in developed countries. In the Pacific situation population-based data, using comparable regional survey methods and measures, that are

unique to the region have been collected that can be applied in monitoring the impact of youth policies and programmes. There is scope for the collection of similar data in many other lower- and middle-income countries. The HBLPY Pacific experience represents a work-in-progress and offers a framework upon which future surveillance efforts can be modelled. Such initiatives should be encouraged and supported so that the long-term benefits will be the availability of comparative global surveillance data to profile trends and help identify youth health and development priorities.

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