

Obesity in Samoa: Culture, History and Dietary Practices

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Abstract

This paper provides an overview, from an historical perspective, to identify the structural factors that have created an 'obesogenic' environment in contemporary Samoa. The prevalence of obesity among Samoan adults had dramatically increased over the past four decades and is now affecting about 59 % of men and 81 % of women in this small island country, respectively. More alarming is the association of obesity with prevalent non-communicable diseases, such as diabetes, stroke, cancer and heart attack. There are multiple factors at work which include, but not limited to, behaviour related to a nutrition transition, limited physical activities, sedentary lifestyle and cultural food practices. The question is why and how the people of Samoa changed their traditional diet, consisting mostly of taro, breadfruit, coconut, and fish, to meals consisting of mainly imported, processed food items laden with sugar, saturated fat and salt. This dietary change has not occurred because Samoan customs and culture of food has changed; it is the food that has changed.

Keywords: obesity, culture, dietary practices, nutrition transition.

Introduction

The high prevalence of obesity among Samoans has many determinants including the behaviour related to nutrition transition, and lack of physical activities, the influence of colonialism, modernization, globalization, food aid, rapid urbanization and international migration. The increased dietary intake of imported foods characterises Samoa's nutrition transition and epidemiological transition among Samoans. Although the culture of food among Samoans is largely unchanged; the exchange of food gifts to establish and maintain social cohesion, diets have been transformed. The traditional daily meal of *meaai aano* (taro, yam, breadfruit) and *meaai lelei* (palusami, chicken and other birds, fish and other seafoods), as well as foods given ceremonially, have been almost completely replaced by bread, rice, and imported meats such as mutton flaps, turkey tails, fresh, salted and canned beef, and factory-farmed chicken. The drinking coconut has been replaced with sugar-laden beverages.

My general observation, as a clinician living in Samoa is that most of the politicians and government officials in Samoa are either overweight or obese. Unfortunately, most of the church ministers and their wives are also generally obese. Because church ministers and their wives are the modern 'sacred chiefs' of Samoa, they are well fed by their congregations to show love, so tend to be overweight or obese. In addition, most churches do not allow ministers and their wives to play village sport, this being seen as undignified. The fact that so many of these religious and political elites are obese, and in positions of power and influence, it may appear to many Samoans that power and influence are positively correlated with obesity. But, at the same time, Samoans are not immune from globalised cultural trends on what constitutes bodily beauty, propagated by social media.

This article aims to contextualise the grim statistics on obesity that dominate public health discourses, by reflecting Samoan food and customs in the past, and questioning the underlying premise about individual choices in much of the literature on obesity, for example that big bodies are a cultural preference, or that obesity is the result of ignorance or unwise choices which may be corrected by the means of health education. It will suggest that factors contributing to prevalence of

obesity today have accumulated over time and accelerated over the past 50 years as Samoans became increasingly globalised.

Public health statistics

To set the scene from a large literature on Samoa, around 53% of the adult population in Samoa is obese. The published data on the subject shows that in a small Pacific Island country with a population of approximately 200,000 Polynesian people, over the period 1978-2013, the prevalence of obesity increased from 27.7% to 53.1% in men (2.3 % per 5 years) and 44.4% to 76.7% in women (4.5% per 5 years) (Lin et al 2016; Hawley & McGarvey 2015). Obesity prevalence in 2020 is projected to reach 59.0 % of men and 81.0 % of women, making obesity the leading cause of disability in Samoa. The Samoans offer an extreme case, but they also exemplify a global trend. Samoa provides a good case study of the trend to endemic obesity in a population and this article will examine the contextual correlates of cultural practices and values and socioeconomic change leading to the present prevalence of obesity.

Samoa is not alone: In 2000 it was estimated that, for the first time in human history, there were more overweight than underweight people, globally (Mendez, Monteiro, & Popkin 2005). The current obesity epidemic has been called “the greatest public health failure of the past century” (Brewis 2011). According to Kelly et al. (2008), if the current trends continue for the next two decades, the ratio will grow to more than two thirds. This trend has been labelled a “*globesity*” by the World Health Organization, and an “*obesity pandemic*” (Swinburn et al. 1999). It has also been identified as the leading nutritional problem by the U.S Department of Agriculture. Today, after years of trying to mitigate and halt the rising prevalence of obesity, the figures are not showing significant reductions in either affluent or developing countries. The World Health Organization defines obesity as “abnormal or excessive fat accumulation that may impair health” (World Health Organization, 2014: 1) because of its association with other diseases (Centre for Diseases Control 2012; NCD Risk Factor Collaboration 2016; World Health Organization 2000). As simply put by Powers and Howley (2004) “obesity is a result of a consistent prolonged imbalance between energy intake and expenditure”. Obesity is a serious public health concern because obesity is a risk factor for numerous health conditions such as, but not limited to, diabetes, stroke, cancer, and heart attack (Zhang, Rexrode, van Dam, Li & Hu 2008). The prevalence of adult obesity in Samoa and some other small Pacific Island developing countries places a heavy burden on health resources (World Health Organization 2014; McLennan & Jayaweera, 2014). Pacific Island migrant communities in other countries such as New Zealand have similar high prevalence of obesity.

Measuring obesity

In order to compare and interpret variations of obesity across various populations over time, agreed upon standards and measurements for gender and age-structure have been developed. These are the basis of epidemiological comparisons and proposed relationships between obesity and health outcomes. A widely used anthropometric measurement is body mass index (BMI), which is defined as a person’s weight in kilograms divided by the person’s height in metres (kg/m²) (World Health Organization 2015). Generally, a person who has a BMI greater than or equal to 30 kg/m² is considered obese. However, these standard measures do not allow for ethnic differences in body types, so when reporting about BMI in Polynesian populations, researchers have recently suggested that there is a need to correct measurements to allow for a greater amount of lean muscle mass per kilogram in Polynesians, compared to the general global population (Swinburn 1999). Accordingly, there are now new cut off points for measuring BMI among the Polynesians at 26 kg/m² and 32 kg/m² for overweight and obesity, respectively. One of the limitations of the BMI method is that it does not measure body fat. Since half of body fat is stored underneath the skin, it is possible to capture the percentage of fat in the body. This involves grasping and measuring, the skin folds at body locations

such as triceps and biceps on the upper arm. Nonetheless, this method requires equipment and training to stratify those being measured according to gender, age and ethnicity (Malina 1996).

Factors identified as driving the prevalence of obesity among Pacific Islanders

There are a number of factors correlated with obesity among Pacific Islanders.* Brouwers (2016) suggested that of six factors driving the obesity epidemic among the Pacific Island populations (globalization, increased international trade, urbanization, physical inactivity, changing eating patterns, and culture), changing eating patterns, physical inactivity, and urbanization are the most potent drivers of obesity. Galanis et al. (1995) and Keighley et al. (2007) argued that the observed nutrition transition in Samoa today is closely related to (i) economic modernization, (ii) rapid urbanization, and (iii) shifts in lifestyle toward increased total energy intake and sedentary behaviour. Consequently, Samoans are experiencing an epidemiological transition, characterized by the increasing prevalence of obesity, Type 2 diabetes mellitus, and metabolic syndrome (Keighley et al, 2007; Keighley et al. 2006; McGarvey 2001; and Galanis et.al. 1995). The World Health Organization (2015) points to four factors. The first is behaviour related to a nutrition transition, limited physical activity, sedentary life style and cultural practices. The second is early life nutrition and growth. The third includes structural factors, such as globalization and modernization, free trade, rapid economic growth, unplanned urbanization, environmental degradation, and growing inequities within countries. The fourth factor is genetic variation in association with obesity in different populations (World Health Organization 2014:1) Obesity trends have also been strongly linked to societal norms and environmental elements, which promote overeating and lack of physical activity (Sturm 2005; Swinburn, Egger, & Raza 1999). Swinburn et al. (1999) referred to these environmental elements as “obesogenic environmental elements”. Robinson, Thomas, Aveyard, and Higgs (2013) also found consistent evidence that social norms and cultural eating practices are obesogenic environmental elements that influence food intake. Along the same lines, Robinson et al. (2013) pointed to a strong association between eating practices and social identity. Dietary change is a global phenomenon, referred to as the nutrition transition (Baylin et al 2013) and is exemplified by the Samoans. They no longer eat their traditional diets of mainly plantain, root crops, coconut and seafood. These have mainly been replaced by cheap, easily available processed food, consisting of foods such as canned fish and meat, imported mutton flaps, chicken, turkey tails, bread and rice, as well as sugary drinks. However, although the food has changed, the Samoan culture of food related to social status, hospitality, and more recently, to cultural identity, continues to strongly shape Samoan food consumption practices with a strong historical continuity.

Traditional Samoan foods

Until the 1960s in Samoa, when mass emigration and cash remittances began, Samoan people mainly ate food they procured or produced themselves from land, sea and reef food sources, such as coconuts, taro, yams, breadfruits, bananas, fish and other sea food, and occasional chicken and pork. The traditional daily Samoan diet consisted of *mea'ai a'ano* (taro, yam, bananas, & breadfruit) with *mea'ai lelei* (small amount of meat or fish or shell fish) and *palusami* (coconut cream wrapped in green taro shoots and baked in the traditional ground oven). There were two main meals, the first in late morning; usually the leftover food from the previous evening meal, and the second one in the evening with the whole family. The food was always served first to the chief and head of the family. The other members of the family, including the children, did not eat until the head had finished eating (Kramer 1903; Turner 1884; Grattan 1948; Brewis 2012; Tuvala 2016). In Christian Samoa these courtesies were

* The literature on obesity refers to 'Pacific Islanders'. The Pacific Islands comprise different ethnic groups, summarily divided into three main groups: Melanesian, Micronesian and Polynesians. But in many cases the analytical focus is on Polynesians, whose homelands are Aotearoa New Zealand, the independent states of Samoa, Tonga, Cook Islands, and Tuvalu, and the territories of American Samoa, Tokelau (New Zealand), French Polynesia, and Wallis and Futuna (France).

extended to priests and ministers of religion (*patele, faifeau*) and are still practiced in most Samoan households.

Among the responsibilities of the village council was ensuring food supply for the community. The council coordinated the work of the untitled men (*aumaga*) in fishing, planting and raising pigs and chickens. Many varieties of taro were grown, and planting followed an annual production cycle with bananas, yams and breadfruit, so there was always a supply of staple food. In its present form and varieties, breadfruit was probably first domesticated by Polynesians. Fruiting twice a year, it was not only an important staple food but was also processed and stored for times of famine resulting from cyclones. It was laid down in pits where it fermented and could be retrieved when needed, shaped into biscuit-like portions (*masi*) and baked for consumption. Another plant once widely cultivated was arrowroot (*masoa*), a source of edible starch for preparing a variety of traditional dishes. The coconut palm provided not only food and drink but resources for constructing houses, tools, mats, weapons, fishing gear, fuel, toys, and equipment, (Grattan 1948; Tuvala 2016). Samoa had few native fruits aside from the Polynesian apple (*vi, Spondias dulcis*) but foreign tropical fruits such as mango, pineapple and some varieties of banana such as Cavendish and others, were among the early European introductions. There was almost no sugar in the traditional diet; in a very labour-intensive process a sweet substance was obtained for drinks by baking the roots of the *ti* plant (*Cordyline fruticosa*; see Hinkle 2004). The Samoan traditional diet obtained its variety from seafood; a variety of fish, crabs, lobsters, crayfish, seaweed, and a large array of other marine organisms were fished or gathered from reefs. In addition, chicken and pigeons were also part of the traditional diet. Pigeons in particular were more popular for meals than chickens, especially in the months of September and October of every year, when the pigeons were believed to have just put on fat in their bodies (Kramer 1903). Turtles were referred to as ‘sacred fish’ because they must be presented to the highest chiefs before being distributed for consumption (Turner 1884; Kramer 1903; Grattan 1948; Tuvala 2016). Coastal erosion and overfishing have diminished the supply of these foods in recent times. Life in Samoa before the contact with Europe has been described as having a “subsistence abundance” of food (Thaman 1982).

Traditional Samoan bodies

Large bodies and a life of leisure were prestigious in ancient Polynesian societies (Brewis, McGarvey, Jones, & Swinburn 1998). That is, there is an absence of significant negative view about obesity among Polynesian societies. The “fattening rituals” among Pacific island countries in the past is also another witness to this claim (Pollock, 1995). This is an important observation and differences in values compared to Western industrialized societies which regard the ideal body sizes are slim. However the notion that big bodies are a cultural preference, is refuted by Hardin, MacLennan and Brewis (2018:291) based on their research in Samoa and Nauru. Dr Augustine Kramer, a German naval surgeon, made a detailed ethnographic study of Samoa and Samoans in the 1890s, a time at which Samoa had about sixty years of contact with Europeans. He makes no mention of obesity; describing men as about 190 -200 cm (1.9 – 2.0 meters) and women as slightly shorter at 150 – 170 cm (1.5 – 1.7 meters). Women, he observed, had short and heavy legs; whereas the men’s upper body and limbs were more proportionate and slim. Women were more likely to sit inside houses and were not often seen taking part in physical exertion. Their occupations were mainly making tapa cloth, mats and other textile goods. He noted that Samoa had a stratified social system and that men of higher ranks in village and district setting often were of a larger and “nobler” build than the common people, which he attributed to the better care and nutrition they received, with privileged access to the most highly prized foods (Kramer, 1903). Historical sources cited by Keesing (1937) Schoeffel (1979) and Tcherkezoff (2008) describe the practice of secluding chosen sacrosanct virgins (*taupou*), daughters of the highest-ranking chiefs, inside their houses so the sun did not darken their skin. They were kept plump and well fed by their attendants, comprising the unmarried women of the village (*aualuma*). Since these adolescent girls were intended for dynastic marriages, extra body weight was supposed

to provide a biological advantage in becoming pregnant; a fattening practice found in many other traditional societies (Frisch 1988; Pollock 1995). As in many Asian cultures, fair skin in Samoa denoted persons of chiefly rank, indicating that they did not labour in the sun (Schultz 1911; Blair & Hawley 2018). Although a large body was clearly admired by Samoans; the photographs of Samoan chiefly men and women taken in the late 19th century (Museum of Samoa) do not show bodies of exceptional fatness. In traditional Polynesian societies, slimness was the norm and plumpness indicated the high status of a person with access to an abundance of food, the opposite of the contemporary Western idealisation of slim bodies and their association with high social status.



No evidence of obesity among Samoa's chiefs in a photograph from Rev. Dr. George Brown photographic collection c. 1876-1880. Australian Museum.

Food and Samoan cultural practices

A young man could earn the respect of his chief and eventually his place as a future chief of the family and in the village by his skills as a food provider. He would go out fishing, or working in the farm, including hunting for wild boars until this day. The traditional method of cooking used a ground oven (*umu*) in which rocks were heated in a fire until they glowed red, after which food items were placed on them and covered with banana and breadfruit leaves. Food was integral to the exchange of gifts in ceremonial activities for births, marriages, funerals, bestowal of chiefly titles, and the reception of visitors (Turner 1884; Kramer 1903). As McLennan (2014:4) put it "food is not simply a source of energy, but also a means of building and maintaining social relationships, and reinforcing community cohesion".

There were special food rites and practices. For example Turner (1884) described how new-born babies were fed in their first three days of life, with the strained juice of the chewed kernel of the coconut and the mother's breast milk was tested before the child was put to the breast. A famous historical story in Samoa depicts this diet for the new-borns. This is the story of a new-born baby who was stolen by two men, named *Tutuila and Ape*, and this baby was later named Tamaalelagi (child from the heavens) and became one of the early kings of Samoa (Samuelu, F, M 2009). He was fed with coconut juice and chewed kernel for the first few days of his life. However, according to Turner (1884) a new-born of chiefly ancestry was put straight to the breast, and each of its developmental stages, sitting, crawling and walking were celebrated with gifts from maternal and paternal sides, the paternal side providing food.

Turner also recorded that gifts of food, as well as canoes, weapons and tools and "foreign goods" (*oloo*) were 'masculine' in old Samoa, while gifts of textiles such as mats and tapa cloth (*toga*) were 'feminine'. The centrality of food gifts was most clearly demonstrated at weddings where the groom's side exchanged 'masculine' gifts with the 'feminine' gifts of the bride's family. The weddings of high-ranking people were arranged politically. Courting parties (*aumoega*) arranged chiefly marriages after they identified a young woman of suitable pedigree and had gathered together food to present to her family and village. If the chief of the young woman's family accepted the food, the betrothal was formalised, but if rejected, it signified that the prospective bridegroom was also rejected. The presentation of food and other gifts involved a special gift giving ceremony (*ta'alolo*) and weddings lasted for several days.

Kinship networks extended into villages throughout the Samoan archipelago and inter-village visiting parties were part of the old way of life. The visitors never brought food and the feeding of guests was a cornerstone of Samoan culture. For instance, in the old days, once the guests arrived, a special presentation of food was made in the form of a *sua* or a *ta'alolo*. Traditionally it comes in two parts; first is called the *sua talisua* (first meal) consisting of a green drinking coconut (*vailolo*), a cooked chicken (*ta'ailepaepae*), and a wrap of cooked taro or breadfruit (*fa'avevela*). The second step is called a *suata'i* which is a gift of food for the guests to take with them when they leave, consisting of a whole cooked pig and a fine mat (*ietoga*). A *ta'alolo* is a larger form of the *sua* and is presented if the guests are from a chiefly family and accompanied by their whole village. The *sua* is still presented to honour important guests in Samoa today, but the content of the gift has been transformed completely. The coconut has been replaced by a can of soda; a 3lb tin of corned beef replaces the chicken; a box of biscuits for the wrap of taro; and a whole box of corned beef or herrings has replaced the pig.

Food was also the main currency of punishment; village councils punished the families of wrongdoers with fines. Kramer (1903) described an example of a fine consisting of two large pigs and one hundred taro. This custom is still practiced today but the fine is more likely to include cash and now likely to be paid in boxes of canned-food, and take-away food items from restaurants.

Funerals were also a time of hosting guests with food and gifts of food. Burials were usually the day of death, but at times high chiefs were unburied for several days to allow the assembly of the clan (Turner, 1884). Food was taboo in proximity to a corpse and the house in which it was held. The attendants of the deceased were fed by others so that their hands would not touch food and underwent a purification rite before they could eat normally again (Turner 1884). Kramer (1903) witnessed the funeral ceremonies for a paramount chief, Malietoa Laupepa in 1898. For ten to fifteen days, the warriors and families related to Malietoa participated in war games, boxing, wrestling, club duels, spear throwing, and nights of wild dancing and lots of food and feasting.

Variations of these traditions live on today among Samoans in Samoa, as well as in the diaspora, and reinforce the social centrality and value of food. Food and feasting are still cultural expressions of love and respect, and the exchange of food is still the focus of social gatherings, which is thought to bring harmony in the society and to maintain the social fabric.

Nutrition transition

Foreign food was introduced to the Samoans in the mid-19th century in the trade with foreign ships (Tcherkezoff 2008). For example pigs, coconuts and fresh water were exchanged for barrels of brined beef and canned pea soup. These foods became highly prestigious, as it is likely that they were given to the chiefs. Today, these food items are still prized foods among most Samoans in their modern form of *povi masima* (salted beef) and *pisupo* (canned corned beef). While it is unlikely that these foods were consumed in great amounts in the past, as the economy of Samoa became monetised they became accessible to all and affordable to most, leading a trend towards a diet characterized by a heavy intake of imported foods (Hawley et al, 2015; DiBello et al, 2009; Baylin, et al 2013; Seiden, et al 2012). Once isolated, the Samoan islands are now the centre of a global network of families. Its geographical and political boundaries have been permeated by global ideas of development and economic growth, rising incomes, and freedom to choose how to spend these incomes in order to survive in a “globalised world” (McLennan 2014). For instance, the transformation of the labour market produces an increasing number of high status, well paid sedentary jobs, and office based. The increasing reliance on imported food items and more sedentary jobs as developing countries entered the global economy and people have moved away from subsistence farming and fishing to live and work in urban areas (Ulijaszek, 2006).

One of the consequences is a ‘nutrition transition’ and a trend to obesity in the population. The ‘nutrition transition’ refers to the shift from diets rich in vegetables, and relatively lean proteins, to diets based on processed foods laden with sugar, saturated fat, and sodium, and has occurred worldwide at individual, national, and global levels (Brewis & McGarvey 2000). After 150 years of exposure to the industrialised West, the Samoan diet has been substantially changed, but not its cultural practices; new food items such as salted-beef and bread were incorporated into exchange over a century ago, beginning with visiting ships, missionaries and traders. The question is whether dietary preferences have changed.

However, it is also important to appreciate the influence of the concurrent increase in technologies on the reduction in the amount of physical effort spent on food production. For instance, increasing availability of convenience foods which require no direct energy expenditure on the part of the consumer. Another is the increasing use of new agricultural technologies, such as chainsaws and chemical sprays and sprayers which have reduced the amount of physical effort required to produce a given amount of food. Furthermore, the recent explosion in private vehicle ownership, like for instance in Samoa, means that many activities which formerly involved expenditure of physical effort no longer require this effort. Farmers who once walked to plantations can now drive and food which was formerly carried from point of production to point of consumption can now be transported from plantations in vehicles.

Colonial interventions and Nutrition Transition in Samoa

Besides many benefits, European contact brought changing patterns of food production, distribution and consumption. Missionaries changed gender roles in food preparation (Schoeffel 1979). Young people; mainly males, were once the sole providers and food handlers in the family and the village. However, in the 19th century missionaries encouraged new roles for young women, taught in the mission girls’ schools, which they considered more feminine and appropriate for Christian families. This included sewing and cooking using stoves and pots instead of the Samoan *umu*. The new method of cooking contributed towards changing Samoan diet and food preference, introducing dishes now considered to be ‘Samoan’ foods such as dumplings (*kopai*) and steamed pudding (*puligi*), as well as fried foods. Chinese plantation workers also brought new dishes to Samoa, which are now also considered essentially Samoan dishes such as noodles (*sapasui*). Those who worked on plantations in the colonial era were fed with rations which included beef, flour and rice. Meleisea’s (1980) interviews

with Melanesian labour recruits on government plantations revealed that one of the attractions of plantation life in Samoa was the food, particularly the meat they were given. New dishes assimilated into Samoan diets relied on imported ingredients such as flour, sugar, salt, cooking oil, noodles, rice, soy sauce, and beef. The Second World War had a big impact on Samoan tastes and diet (Blair 2018; Schoeffel 1987). Samoa was occupied by thousands of American marines in 1943-4 who brought with them an abundance of food and drinks that were previously unknown or very scarce, such as Spam, canned spaghetti, liquor and carbonated drinks. These food items were used by the soldiers to trade with the Samoans for local artefacts or labour. Imported food quickly became associated with high status. As Hawley and Blair (2018) put it: "If you show up [at a social gathering] with a can of tinned corned beef, you're much well-received than if you show up with papayas from your garden." Over time, as imported foods became cheaper and more available, and as increasing numbers of Samoans gained access to a cash income, imported foods became normal parts as the daily diet for families. A study of Samoan traditional healers report that they have long affirmed a view that imported food items are the cause of ill health in modern Samoans (MacPherson 1990).

Another influence of the Samoa diet was the health system. In the 1960s, nurses from New Zealand sought to change Samoan practices in the feeding of the new born and weaning of the child, with intentions of improving child health, Mothers were discouraged from the use of traditional feeding methods and practices and encouraged to feed babies with cow's milk or milk products and eggs (Parkinson 1982). In 1980s, the policy changed and as the harmful effects of bottle-feeding were realised, mothers were urged to breastfeed and give their children local foods. In this early period when Samoa had become an independent state, but still relied on New Zealand guidance, the concept of a 'balanced diet' was introduced; another example of how foreign messages about a healthy diet may not be the best approach. Parkinson (1982), Thomas and Schoeffel (1977) pointed out that the message was widely misinterpreted to mean 'foreign food', possibly because illustrations of the 'three food groups' included items unfamiliar to Samoans, whose traditional diet was already a balanced combination of a starchy staple with protein and vegetable accompaniments. The problem was the historical assumption by foreign health officials that the Samoan people are 'ignorant' about healthy eating and needed 'healthy food' messages. There was evidence to the contrary. Samoan healers interviewed by C and L Macpherson and reported in *Samoan Medical belief and Practice* (1990) identified imported food as a key cause of ill health in modern Samoans. The idea was, and still is, that obesity is the result of unwise personal choices which may be corrected by the means of health education (Hardin and Kwauk, 2015). Many messages on nutrition were embedded in Western culture and dietary preferences. For instance, the idea of the dessert following a main meal was never part of the traditional diet, but now Western influence is evident when a Samoan main meal is supplemented with a sweetened coconut cream and rice dish, bread and jam, and mugs of sugar-sweetened tea or cocoa. Development programmes for Pacific island women have long been a target for overseas funding, and in the 1960-1970s, women's training involved teaching home economics, which included new cooking methods and baking. The cooking ingredients, mainly flour, butter, dripping and sugar, were imported and were often not readily available in rural areas. Drum ovens (kerosene drums with lids, fuelled by a fire) for baking cakes, pies and bread were promoted as 'appropriate technology' (Schoeffel 1987; Schoeffel and Kikau 1980).

At the same time, certain foods have been pointed to as the cause of Pacific Islander obesity, for example mutton flaps from Australia and New Zealand (see Gewertz 2010) which were once cheap and still considered delicious if less affordable by Samoans, were seen by many public health advocates as foods rejected by Western consumers, dumped by exporters on to island markets. This led to a ban on imported flaps in Fiji, and in Samoa turkey tails, which attracted similar criticism, were also banned from importation. Similarly other foods such as vegetables, most of which were never part of the Samoan diet, have been promoted as solutions to obesity (see Hardin and Kwauk, 2015).

Samoa is vulnerable to tropical cyclones, which routinely ruin staple crops and cause food shortages. As noted previously, the Samoans once had a strategy for such events, by fermenting breadfruit (*masi ulu*) as a reserve food and taro cultivars which were harvested and used only in such circumstances. However, since the 1960s the United Nations agencies and two of Samoa's main aid donors, the New Zealand and Australian governments, have provided food aid. For instance, in 1965, a cyclone damaged crops around the country, and as part of the aid response food, such as flour, rice, sugar, oil and milk powder was donated (Schoeffel 1979). Another popular food item, which was also donated in this period by the New Zealand government, was milk biscuits (*masi susu*). Milk biscuits are small blocks made of sugar sweetened and fruit-flavoured milk powder. Food like this was originally offered as an incentive for the people to return to planting more cash crops. Many Samoans think this was a time when people acquired the taste for European (*palagi*) food. In this period with flour and sugar available, it is likely that pancakes (*panikeke*) fried in oil became a popular 'Samoan' food. In the seven cyclones in the following years, Samoa continued to receive imported food as part of aid. Food aid is obviously helpful, as Samoa today is no longer self-sufficient in food; only about half of the population live in farming households. After the 1965 cyclone, when Samoa was less externally dependant for food, the government encouraged extensive replanting of food and cash crops (Lockwood 1971 cited in Tiffany 2019). However sustained food aid can have the unwanted effect of delaying replanting and giving people an acquired taste for foods with high trans-fat, salt and sugar content. In some cases, although not documented for Samoa, food aid has included food items that are not allowed to be consumed within the donor countries because they are of poor quality or because their consumption dates have expired (WHO 2015).

Findings on the current diets of Samoans

Three different dietary patterns have been identified in contemporary Samoa (Wang et al 2017). First, a modern diet consists of a high intake of imported and processed foods, including pizza, cheeseburgers, margarine, sugary drinks, desserts, snacks, egg products, noodles, nuts, breads and cakes. In addition, there is also a low intake of traditional agricultural products and fish. Second, the mixed-traditional dietary pattern which consisted of a high intake of traditional foods, such as fruits, vegetables, soup, poultry and fish, and imported and processed foods, including dairy products, breads and cakes. The third pattern is called the mixed-modern diet consisting of high intake of imported and processed foods, such as pizza, cheeseburgers, red meat, egg products, noodles, and grains, but also with traditional foods, such as seafood and coconut. The third kind of diet also included a low intake of fish, tea, coffee, soup, and traditional agricultural staples. They concluded that the Samoan people have abandoned their traditional diet and adopted a modern diet mixed with varying amounts of traditional food items (Wang, et al 2017).

Food is a part of daily social exchange among Samoans as in the past, not only in ceremonies but also in daily life. When one Samoan visits another, they take a gift of food, and in the workplace, food accompanies meetings, workshops, and training sessions. Practices have not changed much but the food has, and most of the new foods are conducive to the development of obesity. For example polystyrene caterer's boxes or plastic trays of food are handed out at ceremonies and workplace occasions usually consist of many foods and are judged more on the variety and quantity of food than the quality. A typical food box will contain portions of mainly imported foods; fried chicken, salted beef, fried fish, macaroni salad, vermicelli, potato salad, rice and taro. In recent years there has been an effort to make food boxes 'healthy' by adding an imported orange or apple.

Samoans living overseas seem

to be following the same eating habits and food culture as the people living in the islands. For instance, a study by Tanjasiri and his colleagues looking at the physical activity, nutrition, and obesity among Pacific Islander youth and adults in Southern California, found that Samoans were consuming

a larger daily percent of energy from saturated fat compared to Marshallese (Tanjisiri et al. 2018). Interestingly, an information paper provided by the Queensland Government in Australia (2015) revealed that Samoan people living in Queensland share the same food and cultural practices as the people living in Samoa. Their meals consisted of a mixture of traditional foods (some imported from Samoa) and processed food and fruits. Farmers in Samoa have benefited from the enduring taste among the Samoan diaspora for taro, which is now a major export crop.

Public health interventions against obesity

There have been multiple interventions aiming to control not only the prevalence of overweight and obesity, but also the risk of obesity to health, but those efforts have produced disappointing results (CDC 2012; Thomas et al. 2010; World Health Organization 2015). No country to date has reversed its obesity epidemic (Christina et al, 2015). Even more importantly, countries are led to believe that the interventions that promoted the adoption of healthy lifestyles alone, such as eating five servings of fruit, vegetables, and low-fat products every day have been shown to be ineffective in reducing rates of obesity (Christina et al 2015). The promotion of regular physical exercises alone has also been shown to be ineffective in reducing weight (World Health Organization, 2014). The lack of progress in curbing obesity has been partly attributed to the fact that prevention programs frame obesity as a problem of individual choice and behaviour rather than as a structural problem arising from mass production and commercial promotion and pricing of foods likely to appeal to human tastes for salt, fat and sugar. Therefore most public health efforts have placed emphasis on primary and secondary prevention interventions (World Health Organization 2013) and there is little research addressing the long-term impact and benefits of such programs (Centres for Diseases Control 2012; World Health Organization 2000). Nestle and Jacobson (2000) point out that these past interventions have failed to consider the social context of individuals and the impact of the social context on dietary behaviour. Building on the work of Nestle & Jacobson (2000), Robinson et al. (2013) concluded that eating practices are usually transmitted socially and therefore efforts which are aimed at curbing the problem of obesity must consider the social norms which drive eating practices in various social contexts.

The World Health Organization (2014) posited that the social and cultural fabric of Samoa and other Pacific island countries would be the appropriate platform for promoting health. This refers to the closely knit community settings within various Pacific Island cultures. Understanding the social context of food choice practices and eating habits, along with how they act as determinants of health, is necessary for developing more socially and culturally focused interventions for reducing the prevalence of obesity among Samoan people (Cockerham 2005; Robinson et al. 2013; Williams 2003). One of the on-going challenges faced by the health promotion unit of the Samoa Ministry of Health is the lack of original research which informs and evaluates the health promotion activities aimed at addressing obesity at the national and community level (Government of Samoa 2019).

Conclusion

Any health promotion measure aiming to curb or reverse the obesity problem in Samoan must consider addressing the structural factors, such as the impacts of globalization and modernization; trade practices; rapid economic growth and development; unplanned urbanization; environmental degradation, and growing economic inequities.

One measure has been tried in Samoa since the 1970s; projects to encourage vegetable gardening at the family, village and school level. Most recently a Chinese aid-sponsored vegetable-growing project has improved local skills. But this needs to be accompanied with cooking demonstrations at secondary schools, produce markets and on television, showing how to prepare vegetable dishes.

Arguments that Samoans should return to traditional agriculture for the sake of their health ignores the reality that according to Samoa's agricultural censuses of 1989, 1999 and 2009, declining

proportion, less than half the households in Samoa, rely on agriculture for some of their food (see also Hardin and Kwauk 2019: 381)

Another more controversial measure is to increase the taxes on fatty, salty, and sugar-sweetened food to deter consumers from buying these items. The model used to reduce tobacco smoking by increasing taxes and by banning media advertising offers a good example. In Samoa soft drinks and sugar sweetened beverages are being advertised on billboards facing the main streets and there is a barrage on TV of retailers advertising imported snack foods and other processed foods. Perhaps using the same ideas to ban the food industries from conducting widespread advertisement of sugar sweetened beverages and from sponsoring sports activities of all ages.

A much-needed measure is to promote sports and exercise within the communities and at the village level in Samoa. A recent survey by Schuster and Schoeffel (2018) found that Samoa's urban middle class are the major users of local sports facilities and predominate in various sporting associations. They found that the health and sports subjects in the curriculum are not offered in many rural secondary schools. Also, in rural areas there are few sporting activities for adults; sports activities are mainly rugby for young men and volleyball for youth of both sexes. A few villages offer Zumba-dance-based-exercises for adult women, and one of the national television stations has an hour on air of gym exercises at five o'clock in the evening to encourage people to exercise at home. However this is a time when few rural people would be watching TV, as they would be busy with cooking and cleaning the house. The imbalance between urban and rural access to sports activities and exercise need to be corrected, which is enhanced by the lack of sports facilities such as gyms and playgrounds at the rural setting. The Samoa Ministry of Health had utilised some of the sports celebrities and popular athletes, as "health promotion champions" to appear on billboards and television exercise shows to promote physical activities and healthy diets.

To confront the structural effects of obesity, policy and practice needs to move from being an exclusive concern of the Ministry of Health to become a national goal promoted by communities, churches, government department, business and their leaders. Other areas of potential influence are at the politicians and government officials and church ministers in Samoa. As I noted at the beginning of this article many Samoans in positions of power and influence are obese, so it may appear to many Samoans that power and influence are positively correlated with obesity. Work needs to be done in parliament, the public service to discourage these notions. In theological colleges and Bible schools and to health promotion should be taught as Christian calling. A hopeful sign is that recently, the Government of Samoa and the Ministry of Health have renewed commitment to community development by re-engaging the women's committees into health promotion and protection activities at the village level, which brought about significant changes in public health in the past.

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