

REPORT OF A VISIT TO MANHIKI ATOLL,
NORTHERN GROUP, COOK ISLANDS
NOVEMBER-DECEMBER 1982

by
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SCANNED

SUMMARY

The SPC nutrition consultant visited the atoll for 3 weeks during November to December 1982 to review nutrition and related health matters on the island. A survey was conducted on eating habits of the school children, and their heights and weights were recorded. Nutrition/Health Education activities were undertaken for the clinic patients, the schools, and the community with the assistance of the public health nurses. The hypertensive and diabetic patients attending the clinic were reviewed, and diet/health advice was given. Prevention and control activities that would suit the local environment were discussed with the health staff.

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1. INTRODUCTION

Manihiki is a coral atoll situated in the Northern Group of the Cook Islands, at a distance of 650 miles from Rarotonga (Figure 1). The land area is 5.4 km, and the main source of income for the people is copra and pearl shell. The large lagoon is almost 8 miles long and is surrounded by a number of motus ranging in size from less than 1 acre to several hundred acres. The two villages, Tauhunu and Tukao, are situated on the two largest motus (Figure 2). The population of Manihiki, as recorded in the Census of December 1981, was 405 persons, of whom 265 live in Tauhunu and 140 in Tukao. More than half the population (230 persons) are less than 20 years of age, and 37 persons are 60 years of age and over. There are 54 persons in the 20-39 age group.

It was recorded in 1976 that of 66 dwellings on the atoll, 43 had iron or asbestos roofing and there were 23 with coconut or pandanus roofs. Most of the households have separate kitchens and eating houses, and the main cooking method is the outside oven. Other methods of cooking are by gas, kerosene or electric stove. Electric power was connected to each dwelling during 1982, and is in intermittent supply. Many families are in the process of buying electric stoves, refrigerators and freezers.

The water supply system is from a community tank, one in Tauhunu and one in Tukao, and some families have their own water tanks. A project is currently underway to install a water tank for each dwelling. The toilets are over the lagoon and there is a new pour flush toilet at the hospital in both villages.

The transport system to the island is by the inter-island boat from Rarotonga. There has been an increase in the number of boats calling at Manihiki, and in 1982, 11 boats visited. There is daily communication with Rarotonga and other islands by the peace satellite system. People travel around the island by motorcycle or walk, and there is a Government tractor. Outboard engines are used to power the boats for fishing, pearl diving and collection of coconuts for copra. Some fishing is done by canoe.

The main work activities that the men are involved in are pearl shell collecting, copra production, diving for paua (clam) and fishing, boat maintenance and building, and carpentry. Women work in the public service, assist with copra production, clean the pearl shell, and do household chores.

Leisure activities for the men include tennis, table tennis, and fishing. Some women collect paua (clam) and go fishing, however, women do not generally play sports.

2. DIET

The most important locally produced foods are fish, paua (clam), coconuts, and breadfruit. There are some fruit trees growing on the island, mainly pawpaw, banana and a few edible pandanus. Vegetables such as Fiji Rukau (*Hibiscus Manihot*) and pumpkin grow well, but are not widely eaten. Coconut is eaten in many forms: flesh of the mature nut, flesh and juice of the immature nut, and uto (sprouted coconut).

Fish and paua are preserved by traditional methods for transport to Rarotonga and the other islands. Paua and flying fish are heavily salted and packed in tins. Sometimes fish is preserved by hanging to dry in the sun.

The main store foods eaten are flour, rice, tinned meat, tinned vegetables, tinned spaghetti, sugar, dripping, seed oil and cabin bread.

Doughnuts and bread are baked on the island. In Tauhunu 220 doughnuts are sold daily and 120 loaves of bread are sold about twice a week. Flour is used in the homes to make pancakes, bread (papa'a) and Maori bread, made with uto.

Puraka (Cyrtosperma or giant taro), the traditional carbohydrate food of atolls, is eaten at special feasts and at Christmas dinner.

Alcohol is available at the Government Bond, 5 days a week, and cigarettes are sold in all stores.

3. FOOD PRODUCTION (AGRICULTURE)

Fowls and pigs are raised for food, for the umukai (special feast) or Sunday dinner. A few families have their fowls in pens, and have a regular supply of fresh eggs.

There is a large puraka plot for Tauhunu on the motu Porea. In Tukao there are several plots of puraka. Some puraka was brought from Rakahanga on the December boat, to be planted for the community under the supervision of the Island Council.

Pawpaws and banana trees are growing near some of the houses, and they produce well. Three families have vegetable gardens, prepared by digging a pit, adding compost such as food scraps, leaves and soil brought from the more fertile parts of the island. They are successfully growing vegetables such as tomatoes and capsicum. Pumpkin vines grow easily, and if cross fertilised bear well. The pumpkin vine tips are not consumed. In Tukao some manioti (cassava), kumara (sweet potato), and katarappa (soursop) are growing. One family had an atoll "cherry" tree. Lemons and guava trees grow, but none of the guavas had yet produced fruit, and only one lemon tree was productive.

The Agriculture Officer is chiefly concerned with the copra production activities, and does not have any immediate plans to intensify vegetable production on the island.

4. FISHING

Methods of fishing used include underwater spearing, trawling, scooping from the traps, and net fishing and rod fishing. Large catches of fish caught by trawling and netting are distributed around the houses in the village.

Some varieties of fish that were caught during the visit, were aturi (snapper), ava and koperu (mackerel), tuna (a'ai), parrot fish, patuki (groper), and small tropical fish such as ti ti.

Fish such as mackerel are often eaten raw at the wharf, when the fishing party returns. The intestines and liver are also eaten.

5. FOOD CONSUMPTION

The main meal is eaten at night when it is cooler and there are less flies. Five families were interviewed as to their daily food intake, and a list of the common foods consumed in the day given below:

Morning: Doughnut, pancakes (fried in dripping), fish (left-over from previous night's meal), cabin bread, bread, butter, jam, tea or coffee with sugar and sweetened milk.

Midday: This was not reported as a regular meal. Some foods eaten are pancake, canned fruit, ice-cream, cabin bread, shellfish, fish (leftover), and uto (sprouted coconut). Ice-cream is made from milk powder, sugar and eggs.

Evening: Fish, shellfish, tinned beef, tinned spaghetti, rice, taro, tarua (a type of taro), coconut sauce, poke (coconut and arrowroot starch pudding), tinned vegetables, pancakes and cabin bread.

Foods eaten at the Sunday meal include - breadfruit, chicken, Fiji rukau, eggs, coconut poke, and Maori bread.

The traditional recipes now include added sugar. For example, breadfruit is cooked in a sugar syrup, and uto bread has added sugar. Sugar is added to most drinks, including milk. Store salt is used liberally in cooking, in coconut sauce, and extra is added to tinned food.

6. HEALTH SERVICES

There are 2 staff nurses in Manihiki, one for each village. Health Department doctors visit from Rarotonga, at least once a year. A doctor was resident on Manihiki for 2 months, from April to June, 1982, in order to complete a general health check on the population, and in particular, a survey for filariasis.

A weekly maternal and child health clinic is held in each village. Tauhunu has 22 children registered, and 7 are under 1 year of age. The SPC nutrition consultant attended this clinic. Two cases of nutrition-related disorders were referred by the public health nurse in Tauhunu; the problem reported was low weight for age (<10% ideal) and recurrent infections such as influenza. Dietary advice was given on provision of adequate energy intake and foods of a high nutritional value.

During the stay, discussions were held with the mamas on maternal and infant nutrition, breastfeeding, nutrition related to non-communicable disease, and the relative nutritional value of local and imported foods.

The health/nutrition benefits of fresh foods such as Fiji rukau, pumpkin vine tips, kumara, pumpkin, pawpaw and banana was emphasised for all age groups. Rukau viti shoots from Rarotonga were distributed to all the women for planting in their home garden, and some guava and katarappa (soursop) plants were given out.

In Manihiki at the time of the visit, out of 15 infants, only 3 are on breast-feeding, and the others are on bottle-feeding, made with powdered milk.

Breast-feeding was discussed in the clinic, and the latest issues reviewed. Some of the mothers reported that they had to stop breast-feeding because of insufficient milk supply. The public health nurse confirmed this, but was unaware of any particular cause of the problem. Factors that affect milk supply were discussed with the mamas and public health nurse.

Hypertension clinics are held weekly in both villages. Tauhunu has 11 patients registered, and 5 attend regularly, while 2 are visited at home. In Tukao there are 13 registered hypertensive patients, and 7 attend the clinic regularly. The numbers reported by the Health Department visiting doctor in 1982 were 25 hypertensive patients in Tauhunu, and 13 in Tukao. In the clinic the nurses take the patients' blood pressure, and check their weight and advise continuing treatment accordingly. Some patients are on dietary management, i.e. weight control and salt restriction alone, however, the majority are on drug therapy with navidrex K and aldomet, the current drugs in use.

In general, the more severe cases of hypertension were found in Tukao village, and among these patients, 6 were very obese. The age group for the women was between 26 and 62 years, and 39 and 57 years for the men. In Tukao the three women patients under 40 years of age, weighed more than 100 kg. A few patients have lost weight since diagnosis, however most have fluctuated around a set high weight. Diet advice was given on an individual basis, and a group discussion was held. A diet advice chart was prepared for future use. (Appendix 1).

In Manihiki there are currently no diabetics under treatment at the clinic. Some persons in the community have been advised to follow dietary treatment to effect weight loss, however, there is no regular follow-up of these cases. The Health Department doctor visiting Manihiki in May 1982, reported 6 cases of diabetes on diet and medication.

Migration to Rarotonga explains some of the discrepancy, in the numbers of diabetic and hypertensive patients found in November-December 1982 and those diagnosed in May 1982.

The antenatal patients (two persons), were given diet advice, with an emphasis on the value of fresh, local foods such as raw fish eaten whole with the liver, and Fiji rukau. An antenatal diet advice sheet was prepared for future reference (Appendix 2).

7. OTHER HEALTH CONSIDERATIONS

During the stay many of the children attending the clinic had flu or bronchitis. Most of the adult attendances were for colds, flu, headache, septic sores, dressings, hypertension and gout.

Open sores were seen on children at Tauhunu School. The recommended plan is that a senior girl is responsible for dressing the sores daily, however, the school had run out of dressing material and a request for new supplies had not been received by the public health nurse.

In Tukao School no open sores were observed. The round worm treatment with conbantrin is continuing, and hair lice treatment with lorexan cream was carried out during the stay.

8. COMMUNITY NUTRITION/HEALTH-EDUCATION

Discussions were held with Ione the Chairman of the Island Council in Tauhunu. He is an active, fit pearl diver and fisherman and is active in discouraging the community from smoking, excessive drinking and promotes fishing and diving activities. Lectures on nutrition were given in the schools and to the Girls Brigade.

9. SCHOOL SURVEY

A qualitative survey of the foods eaten at breakfast and lunch by 54 school children aged from 4-15 years inclusive, out of a total school population of 130, was conducted. In Tauhunu the children were selected randomly from the school population, and in Tukao all the children attending school that day were interviewed.

The results are shown in Table 1 and demonstrate that a lot of refined carbohydrate foods, such as bread, pancake, cabin bread, doughnuts and rice are consumed. A much smaller amount of traditional foods such as breadfruit, uto (sprouted coconut), coconut flesh, and fish are eaten. However, some is still eaten; (for example, some of the children take a drinking nut and uto to school for lunch), and with a local lunch day activity this could be further encouraged. Fish is eaten at breakfast when left-over from the previous evening meal. Tea, coffee, milo and water with added sugar are the usual breakfast drinks, and at school water and nu (drinking nut) are consumed.

Since there is no shop near the school the children are reliant on food brought from home. Nutrition education needs to be directed to the parents to discourage them from giving their children sugar and refined carbohydrate foods in place of natural carbohydrate foods. Foods that are recommended for the children to eat at school include fish, shellfish, coconut (all forms), uto (sprouted coconut), Maori bread (made with uto and flour), uto pancake, coconut poke, breadfruit, taro (if available), eggs and fruit (if available). In view of the limited supply of traditional starchy foods on the island, bread is suggested as the preferred substitute starchy food, and combined with a good quality local protein like fish or shellfish and fruit, if possible.

10. HEIGHTS AND WEIGHTS

The heights and weights of 93 school children in Tukao and Tauhunu between the ages of 4 and 15 years inclusive, were recorded, and are shown in Tables 2 and 3. The results are compared to the Rarotongan school survey (1982) and a survey conducted by Susan Parkinson (née Holmes) in 1954.

The results show the heights and weights of the Manihiki children have increased since 1954 for nearly all age groups. For the Manihiki males there is no real difference in height or weight when compared with the Rarotongan males (1982).

There is some difference in the height of the Rarotongan and Manihiki girls; over the age of 7 years the Manihiki girls are mostly taller, with the exception of the 14 year age group. The weights of the Rarotongan and Manihiki girls are not greatly different except for the 14 year age group.

Rarotongan adolescent girls from the age of 11 through to 17 years of age, were found to be a lot heavier than an Australian group surveyed in Bussleton in 1972 (Rarotonga School Survey, 1982), indicating that adolescent obesity may be a problem in Rarotonga.

Frame size is greater for Polynesian people than Caucasians, however, this large difference in weight did not show in the boys. The results indicate that adolescent obesity in girls may be a problem in Manihiki as well as Rarotonga.

It should be noted that no record was kept of how long the children surveyed had lived on Manihiki island. Immigration back and forth to Rarotonga and New Zealand is not uncommon in the Manihiki population.

TABLE 1 : FOOD FREQUENCY SURVEY, MANIHIKI SCHOOL CHILDREN
Ages 4 - 15 years. 1982.

Frequency of Foods eaten at Breakfast (54 surveyed)			Frequency of Foods eaten at Lunch (54 surveyed)		
Food	Number	Proportion (Percent)	Food	Number	Proportion (Percent)
Fresh Meat	1	1.9	Fresh Fish	1	1.9
Tinned Meat	3	5.5	Egg	2	3.7
Fresh Fish	8	14.8	Paua	8	14.8
Milk	2	3.7			
Taro	1	1.9	Breadfruit	1	1.9
Breadfruit	2	3.9	Pawpaw	4	7.4
Pawpaw	3	5.5	Coconut Flesh	7	13.0
Coconut Flesh	2	3.9	Uto (Sprouted coconut)	5	9.3
Drinking Nut (nu)	2	3.9	Drinking Nut (nu)	12	22.2
Uto Bread	1	1.9			
White Bread	8	14.8	White Bread	12	22.2
Pancake	2	3.7	Cabin Bread	14	25.9
Cabin Bread	15	27.7	Doughnuts	10	18.5
Doughnut	12	22.2	Sweet Biscuits	4	7.4
Sweet Biscuit	1	1.9	Chocolate	1	1.9
Cake	1	1.9			
Jam	1	1.9	Drinks with sugar	3	5.5
Rice	5	9.3	Water	32	59.3
Drinks with added sugar	35	64.8			
Water	7	13.0			
No Breakfast eaten	11	20.3	No Lunch eaten	8	14.8

TABLE 2

MEAN WEIGHT AND HEIGHT FOR MALES ON MANIHIKI (1954 AND 1982) AND KAROTONGA (1982)

Age	Manihiki 1982			Rarotonga 1982			Manihiki 1954			Manihiki 1982			Rarotonga 1982			Manihiki 1954		
	No.	Weight (kg)	SD	No.	Weight (kg)	SD	No.	Weight (kg)	No.	Height (m)	SD	No.	Height (m)	SD	No.	Height (m)	No.	Height (m)
4							5	15.9									5	0.95
5	2	18.1	1.3	10	21.9	2.3	8	17.3	2	1.11	0.01	10	1.11	0.06			8	1.05
6	7	24.5	5.5	18	24.2	3.1	10	19.8	7	1.21	0.02	18	1.19	0.08			10	1.11
7	7	25.2	3.8	10	26.4	2.0	7	21.5	7	1.23	0.05	10	1.23	0.05			7	1.17
8	3	28.0	4.4	12	30.4	4.3	8	23.8	3	1.32	0.07	12	1.30	0.05			8	1.22
9	5	31.3	2.2	11	31.3	4.2	11	28.9	5	1.39	0.03	11	1.33	0.05			11	1.32
10	5	37.2	10.5	17	35.3	4.2	12	27.9	5	1.44	0.11	17	1.39	0.06			12	1.30
11	3	39.3	6.0				7	30.5	3	1.49	0.08						7	1.36
12	3	45.6	15.6	14	42.7	5.4	7	33.9	3	1.49	0.09	14	1.49	0.05			7	1.40
13	5	46.2	4.8	16	49.6	7.2	2	41.3	5	1.56	0.05	16	1.61	0.06			2	1.43
14	-			33	55.1	7.9	2	49.8	-	-		33	1.66	0.08			2	1.59
15	-			20	62.0	8.6	3	39.5	-	-		20	1.74	0.08			3	1.52
TOTAL	40			161			82		40			161					82	

TABLE 3

MEAN WEIGHT AND HEIGHT FOR FEMALES ON MANIHIKI (1954 AND 1982) AND RAROTONGA (1982)

Age	Manihiki 1982			Rarotonga 1982			Manihiki 1954			Manihiki 1982			Rarotonga 1982			Manihiki 1954	
	No.	Weight (kg)	SD	No.	Weight (kg)	SD	No.	Weight (kg)	No.	Height (m)	SD	No.	Height (m)	SD	No.	Height (m)	
4	4	17.7	0.9				8	16.5	4	1.06	0.02				8	1.02	
5	1	19.5	—	10	23.3	3.0	4	18.2	1	1.12	—	10	1.13	0.07	4	1.07	
6	4	20.8	2.3	11	24.5	3.5	16	22.9	4	1.16	0.08	11	1.21	0.07	16	1.17	
7	7	25.0	3.4	10	25.0	2.4	2	19.4	7	1.25	0.06	10	1.21	0.05	2	1.22	
8	6	26.1	0.9	13	27.7	3.1	6	25.5	6	1.31	0.05	13	1.25	0.06	6	1.25	
9	4	33.7	5.5	11	32.0	4.5	5	25.3	4	1.38	0.06	11	1.33	0.07	5	1.26	
10	5	31.8	5.6	10	34.4	4.3	6	26.4	5	1.39	0.06	10	1.38	0.07	6	1.29	
11	7	45.1	10.4	14	41.3	9.3	5	35.0	7	1.53	0.09	14	1.45	0.08	5	1.40	
12	5	50.2	7.7	10	47.4	5.9	6	31.9	5	1.58	0.05	10	1.53	0.05	6	1.38	
13	4	56.0	9.1	17	54.5	7.8	4	43.5	4	1.62	0.07	17	1.57	0.07	4	1.50	
14	4	50.5	14.8	25	58.0	7.6	8	46.4	4	1.53	0.07	25	1.62	0.05	8	1.49	
15	2	61.5	10.6	26	60.9	7.7	2	59.5	2	1.70	0.06	26	1.62	0.06	2	1.55	
TOTAL	53			157			72		53			157			72		

APPENDIX 1MANIHIKI ATOLL, JANUARY 1983DIET/HEALTH ADVICE FOR THE OVERWEIGHT/DIABETIC/HYPERTENSIVE PERSON

1. Cook fish, chicken, eggs in water or bake in oven or umu using leaves or tin foil for wrapping.
 2. Try not to eat:
Fatty tinned meat, fried egg, pork fat, dripping, oil, butter, doughnuts, tinned spaghetti, fried pancake, sugar, icecream, lemonade, jam, biscuits, sugar in cakes and maori bread, sweet milk, sweet drinks, thick coconut cream, a lot of coconut.
 3. Eat 3 foods from these natural starchy island foods every day:
breadfruit, taro, tarua, puraka, arrowroot, green banana, kumara, uto bread (no sugar), uto pancake (no sugar), coconut poke (no sugar), pawpaw poke (no sugar).
 4. Eat only a small amount of these papa'a starchy foods:
bread, rice, cabin bread and flour.
 5. Eat a lot of these foods:
fish, paua, pearl shell meat, crabs, lobster, other sea food, chicken, boiled eggs, skim milk, pawpaw, banana, pandanus, Fiji rukau, pumpkin, kumara, pumpkin leaves, cabbage, fern leaves, tomato, onion.
 6. Drink 6 - 8 cups of fluid a day:
tap water, weak tea and coffee, paw paw juice (to drink without sugar). You may have 3 drinking nuts a day.
 7. You may also have:
1 flesh from drinking nut a day, $\frac{1}{2}$ cup thin coconut sauce, 2 level teaspoons of oil for cooking.
 8. Do not add salt to food after it has been cooked, served and ready to eat.
 9. Do some exercise for half an hour every day like fast walking, swimming, tennis or paddling the canoe.
 10. Enjoy life without a cigarette.
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HEALTH/NUTRITION FOR THE PREGNANT WOMAN AND BREAST-
FEEDING MOTHER

1. Eat protein foods 2-3 times a day; these foods are :
 fish, paua, pearl shell meat, lobster, crab,
 chicken, eggs, milk.
2. Eat fish liver, eggs, Fiji rukau, kumara leaves, pumpkin leaves
 and coconut as these foods have iron and help to make strong blood
 and prevent anaemia.
3. Eat fresh fruit and vegetables every day, like pawpaw, banana,
 breadfruit, uto, pandanus, Fiji rukau, nu; these foods have vitamin
 C which helps to protect you against infections like colds and flu.
 Other good vegetables to eat are pumpkin and kumara.
4. Eat starchy foods every day. The best ones for your health are
 breadfruit, puraka, taro, banana, arrowroot, uto bread, uto pancake,
 coconut poke and pawpaw poke.
5. Eat foods that contain calcium and help to build strong bones, teeth
 and gums; these foods are: dried fish, fish with bones, shellfish,
 paua, crabs, lobster, eggs, milk powder, Fiji rukau, ferns and other
 green leaves.
6. Drink 10-12 cups of fluid every day like nu, water, milk and uto
 drink. (Do not add a lot of sugar to the drinks).
7. Do not smoke as it can make your baby unhealthy. For example, it may
 cause the baby to have a small birth weight. When breastfeeding
 you will make more milk if you don't smoke.
8. Do not drink alcohol.
9. Go for a walk every day for exercise.



