

An anthropological approach to the study of food and health in an indigenous population

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Abstract

This study of food and health among Aboriginal Australians 50 years old and over in Western Australia is part of a wider cross-cultural study of food habits and health in later life. It was difficult to use a questionnaire approach with this community because of questions that required an understanding of non-Aboriginal concepts. More valid information was obtained by interviewing key informants and groups of selected elderly Aboriginals, which allowed cross-checking or triangulation to reconstruct the typical diet of the elderly. The quantitative food frequency questionnaire was modified, using rapid assessment procedures (RAP), for use with key informants and at the group level, so as to build a consensus statement about group food-intake patterns. Approximate quantities of foods consumed were judged by observation, weighing of food, and information from key informants. Food quality and quantity of consumption were found to be closely connected to the weekly payment of the pension. Apparent total energy intake was about 4,000 kcal per day, of which sugar, fatty beef, and white flour together provided more than 50%. Dairy products, fruit, vegetables, and whole-grain cereals were eaten in small quantities and not every day. Medical records on 48 elderly subjects indicated a high prevalence of diabetes (27%), heart disease (21%), hypertension (44%), and obesity (BMI > 30) (14%). Using RAP methodology, it was possible in a short period to ascertain the major nutritional problems and advice that should be provided by nutrition-education programmes.

Introduction

Aboriginal Australians constitute the world's largest extant group of hunter-gatherers. Granting them citizenship rights in the late 1960s accelerated their urbanization, dependence on welfare payments, Westernization of diet, loss of hunter-gatherer skills, and increasingly sedentary lifestyle. These have been accompanied by proneness to so-called lifestyle diseases such as non-insulin-dependent diabetes mellitus and cardiovascular diseases that has resulted in a reduction in their life expectancy, which is now about 20 years shorter than that of white Australians [1]. It is urgently necessary to document the risk factors, especially dietary, that may be contributing to this deterioration in health.

Our study of elderly Aboriginal Australians is part of a wider cross-cultural study of food habits and health in later life initiated by the International Union of Nutritional Sciences (IUNS) Committee on Nutrition and Aging [2]. Two general approaches are being used to elicit nutritional and non-nutritional information from the respondents: questionnaire (coded answers for scoring) to obtain information on food intake, health, lifestyle, and demography; and rapid assessment procedures (RAP) (open-ended questions) to elicit information on food and health beliefs [3].

It proved difficult to use the questionnaire with elderly Aboriginals. For example, they had trouble with questions that required some understanding of non-Aboriginal concepts like health, time, frequency, and quantity. More valid information was obtained by interviewing groups of key informants (e.g. health workers and selected Aboriginals), which allowed cross-checking or triangulation as outlined in the RAP methodology [3]. The questionnaire was therefore modified, and the RAP approach was extended to include open-ended questions on food intake, health, and lifestyle. These were used when interviewing and observing key informants and in group discussions with other elderly persons to verify the information obtained.

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The RAP approach reliably described the food habits, health, and lifestyle of elderly Aboriginals as a group rather than as individuals. The information was gathered in a total of three weeks; if the questionnaire had also been used, two to three months would have been required to collect similar information.

Sample

We studied elderly Aboriginals living at Junjuwa, an Aboriginal community in the Fitzroy Crossing town site, in a sparsely populated area in the far north of Western Australia. The Fitzroy Valley region has one of the largest concentrations of Aboriginals in the country.

The 1986 Australian census enumerated a total Aboriginal population of more than 206,000, with Western Australia having the third largest number (37,789). Life expectancy at birth is 51 years for males and 59 years for females. The Fitzroy Valley and Kimberley regions boast the highest life expectancies: 61 years for males and 65 years for females [4]. About 40% of Aboriginals are under 15 years old, compared with 23% of the total population. Only 4% are 60 years old or over, compared with almost 15% of the total population [4]. The longer life expectancies at birth in the Fitzroy Valley region enabled the inclusion of a greater number of elderly Aboriginals in the study.

The elderly at Junjuwa were defined as being those over age 50. There were 54 persons over age 50 living in Junjuwa, and they made up 16% (M 7%, F 9%) of the total population ($N = 336$).

A total of 25 people—15 elderly people and 10 other informants—were interviewed to help reconstruct the typical diet of the elderly at Junjuwa. The 15 reliable elderly persons were selected by the local non-Aboriginal nutritionist-nurse, who had nine years' working experience serving the community. She also provided invaluable information about the diet of the elderly. The rest of the sample consisted of daughters of the elderly, the managers of the local food store and supermarket (non-Aboriginals) and Aboriginals who worked the cash registers, a Junjuwa project planner and bookkeeper (non-Aboriginal), and Aboriginal health workers. The information collected from all sources was verified by comparison and triangulation.

Deduction of food habits

Dietary intake in Aboriginal communities has been described qualitatively [5–7]. Determining individual

intakes is difficult, unreliable, expensive, and time-consuming, and the results have not been validated [8–10]. Thus an anthropological qualitative approach is often the preferred method for studying such communities.

In the IUNS study it is intended that extensive health and dietary information on individuals should be obtained for the purpose of correlating each subject's diet with his or her health status. This was not possible with these elderly Aboriginals, since the information they provided was not extensive and reliable enough to allow such analysis. The approach was therefore changed, and the diet and health of the elderly at Junjuwa were described for the group rather than for individuals, using RAP methodology.

A list of commonly eaten foods (including bush foods) considered representative of the community was constructed. The quantitative food-frequency questionnaire was then modified to be usable at the group level, so as to build a consensus statement about group intake patterns. This is not the same as the mathematical treatment of individual data. Portion sizes were estimated using food photographs, food scales, play-dough, and items from the supermarket.

Our figures for the average quantities of food consumed by the elderly are approximations based on observation, weighing of food, and data from key informants. These averages are provided to illustrate the quality of the diet and the marked changes in food and nutrient intake from day to day. Although such data may appear crude at first glance, they provide invaluable insight into the diet of the elderly Aboriginals.

The quality and quantity of consumption were closely connected to the weekly payment of the pension (\$A 100 per week) on Fridays. The food that was purchased with most of the pension was consumed over the weekend. Fewer than half of these Aboriginals ate the lunch provided (on weekdays only) by a government service (Meals on Wheels).

A number of factors contributed to binge eating: a natural inclination to feast or famine, inadequate budgeting skills, and a desire to spend all the money and eat the food before the money could be used by relatives or neighbours to purchase alcohol (excessive alcohol intake is in evidence in the community). In addition, refrigeration and storage facilities in Junjuwa homes are limited.

An average diet for one person for a typical "binge" day (three days a week) and a typical "lean" day (four days a week) would consist of the following:
Breakfast (6 a.m.)

—binge day: 400 g white damper (a mixture of wheat flour and water, fried in oil or cooked in ashes), 170 g tinned corned beef, 55 g fried egg, 2 tbsp (tablespoons; 1 tbsp = approximately 15 ml) jam, 2 tsp (teaspoons; 1 tsp = approximately 5 ml) margarine.

500 ml tea, 2 tbsp full-cream milk powder, 2 tbsp sugar;

—lean day: 200 g fried white damper, 500 ml tea, 2 tbsp full-cream milk powder.

Lunch (11 a.m.–12 noon)

—binge day: 200 g fried white damper, lamb stew—5–6 lamb chops (300 g) with fat, 90 g boiled potato, 30 g onion, 40 g mixed vegetables, oil/fat/margarine/butter (rarely added to stew), salt, curry powder, 40 g tomato sauce—orange, 500 ml tea;

—lean day: 200 g fried white damper, 50 g tinned corned beef; *or* lunch from Meals on Wheels: slice of white bread, 1 cup (approximately 240 ml) boiled white rice, beef stew—80 g beef, 20 g carrot, 20 g pumpkin, 60 g potato, 10 g onion, 20 g zucchini, salt; orange, 500 ml tea.

Dinner (5–6 p.m.)

—binge day: 200 g fried white damper, 2 tsp margarine, 200 g take-away fried chicken, 50 g potato chips, 300 ml soft drink, 500 ml tea, 2 tbsp full-cream milk powder, 2 tbsp sugar;

—lean day: 200 g fried white damper, 1 cup tinned spaghetti, 500 ml tea, 2 tbsp full-cream milk powder.

Bush foods were not eaten regularly (less than once every two weeks). The most commonly eaten native foods were gooseberries, passion fruit, cucumbers, figs, conkerberries, onions, potatos, tree gum, honey, fresh fish (barramundi, black bream from the Fitzroy River), cherrabun (fresh-water crayfish), mussels, goanna (native lizard), and sand frogs.

Ascertainment of health status

It was our intention in the IUNS study to have a statement by people about their perceived health status. However, it was found that the Junjuwa elderly did not seem to have a concept of physical health, but instead the issue appeared to be one of spiritual well-being. Thus we depended entirely on medical records for information on health. The records for 48 subjects provided the following percentages for particular conditions: hypertension, 44%; heart disease, 21%; diabetes, 27%; obesity (BMI >30), 14% (F 12%, M 2%; $N = 42$); alcohol abuse, 10%, cataracts, 33%; arthritis, 21%; leprosy, 10%; breast cancer, 8%; trachoma, 8%; and anaemia, 19%.

Linking food and health data

The main reason for the much lower life expectancy of Aboriginal Australians compared to the total population is the higher mortality (up to four times as high) among young and middle-aged adults. In fact, the limited available data suggest that the mortality of

people in these age groups has worsened over the past 20 to 30 years [4].

A remarkable feature about the health of Aboriginals is how degenerative diseases such as cardiovascular disease and type-2 diabetes have emerged as major problems over the past two decades. This increase is associated with rapid urbanization, Westernization of the diet, and a sedentary lifestyle, even in remote areas of Australia [11].

In the west Kimberley and Fitzroy Valley region of Western Australia, 6.7% of Aboriginal men and 12.6% of Aboriginal women showed evidence of "probable" coronary heart disease, compared with 6% of non-Aboriginal men and 4.8% of non-Aboriginal women who were studied in Busselton, Western Australia. Electrocardiograms showed that 7% of the Aboriginals studied had cardiac ischaemia, compared with 4% of the white subjects [12]. The main risk factors contributing to the high prevalence of coronary heart disease were hypertension (in 40% of men, 34% of women), diabetes mellitus (in 14.5% of men, 20.7% of women), and obesity, which is common in adult Aboriginals, particularly the women [13].

The importance of cardiovascular disease to disease patterns in Aboriginals is illustrated by the fact that in 1983 the males were 1.94 times and females 2.56 times as likely to die of diseases of the circulatory system as their white counterparts [4]. Aboriginals have the highest frequency of diabetes in Australia [14; 15] and one of the highest reported rates in the world, 8%–20%, compared to 2.3% in non-Aboriginals in Busselton [12]. The elderly Aboriginals in Junjuwa also had a high prevalence of diabetes, heart disease, hypertension, and obesity.

Nutrition is implicated in the aetiology of many diseases affecting Aboriginals [16]. As traditional hunter-gatherers, these people were physically active and ate a nutrient-dense diet which was relatively low in energy [17]. Evidence suggests they were slim, well nourished, and physically fit [18]. Sedentary settlement life and its associated energy-dense, nutrient-deficient diet, characterized by high levels of saturated fat and refined sugars and low levels of unrefined carbohydrate and fibre, have led to problems of malnutrition resulting in obesity, diabetes, hypertension, and cardiovascular disease [19; 20].

Lee [21] used extended collection and analysis of store turnover data over six weeks in six remote Aboriginal communities to determine per capita food and nutrient intakes. Indigenous bush foods were not included, since more than 80% of foods are usually purchased from the local store [8]. Alcohol consumption was not recorded, and no attempt was made to apply a correction factor for food wastage. Nevertheless, the study provides important insight into the diets of Aboriginals as well as data that are remark-

TABLE 1. Comparison of apparent intake of nutrients in Aboriginal and wider Australian communities

	Junjuwa elderly		Aboriginal communities ^a		Wider community ^b	
	g	% energy	g	% energy	g	% energy
Protein	100	10	76.5	8	100	12
Fat	200	45	184	45	133	37
Carbohydrate total	450	45	453	50	398	49
refined	200	20	250	27	124	15
Energy						
kJ	16,800		15,385		13,670	
kcal	4,000		3,663		3,255	

a. Based on a study of store turnover in six remote communities [21].

b. Australian Bureau of Statistics [22].

ably comparable to the qualitative findings of the present study (table 1).

We found that the average daily intakes of the following nutrients by the elderly Aboriginals in Junjuwa were excessive in terms of recommended dietary intakes (RDI) [22]: energy, 4,000 kcal (200% RDI); fat, 200 g (300%); refined carbohydrate, 200 g (200%); and sodium (300%). Intakes of the following, on the other hand, were below the recommended amounts: dietary fibre, 20 g (60% RDI), magnesium (40%), zinc (70%), folate (40%), calcium (60%), potassium (50%), thiamine (80%), and vitamin B₆ (60%). Lee's findings [21] were similar; however, in contrast to those from Junjuwa, they showed intakes of calcium, potassium, and thiamine reaching 100% of the RDI, while those of riboflavin and niacin did not, and that of sodium appeared to be lower than in Junjuwa (150% RDI).

In Aboriginal communities fat contributes about 45% of the total energy intake; this is 30% more energy from fat than in the diets of the wider Australian population and 50% more than is recommended. Fatty meat products such as beef, lamb, and manufactured foods provide about 60% of the total fat intake. Beef is the most popular meat, providing about 40% of the total fat intake. The cuts of meat available in Aboriginal communities are notoriously low in quality, with an average of 40% fat by weight, which provides on the order of 80% of all calories available from meat [21].

The current contribution of meat (60%) to total fat intake in Aboriginal diets is similar to the general profile for Australia more than 50 years ago. Currently, less than 36% of the total fat intake in the wider Australian community is derived from meat. Dairy prod-

ucts contribute less than 5% to the Aboriginal diets, compared to 14% in the wider community. Less than 2% of total fat intake is contributed by margarine and oils. Most fat consumed is saturated, and the ratio of polyunsaturated to saturated fatty acids is only half that of the wider community. Similarly, the proportion of energy derived from refined carbohydrate in Aboriginal communities is twice that of the wider Australian community, with white sugar contributing about 70% of all refined sugars consumed, mainly in the form of table sugar. Carbonated drinks, juices, fruit, ice cream, sweets, biscuits, and spreads are more commonly eaten by Caucasian Australians [21-23].

The large quantities of white flour eaten daily (about 500 g), mainly in the form of damper, contribute 25% of the total energy intake, 55% of total carbohydrate and sodium intake, and most of the total daily fibre and unrefined carbohydrate intake, since fruits, vegetables, and whole-grain cereals are eaten only in small quantities and not every day.

Apparent total energy intake is about 4,000 kcal per day. However, on a binge day it can be as much as 6,000 kcal and on a lean day as little as 1,000. Sugar, beef, and white flour together provide more than 50% of the total energy intake. In the wider Australian community a much more extensive range of foods contribute significantly to total energy, especially fruits, vegetables, dairy products, and whole-grain cereals [23].

In summary, intakes of energy, sugar, sodium, and fat appear grossly excessive, whereas intakes of dietary fibre, unrefined carbohydrate, some minerals (magnesium, zinc, potassium, calcium), and some vitamins (folic acid, B₆, thiamine) are inadequate

compared with average recommended dietary intakes for the Aboriginal community as a whole. Only three elderly Aboriginals at Junjuwa were observed to be consuming alcohol, whereas their younger counterparts were heavy consumers. Australian indigenous bush foods made up less than 20% of the elderly Aboriginals' total food intake, and, even though the Fitzroy River is nearby, they did not eat fresh fish regularly (nor did they even eat tinned or frozen fish).

Application of findings

Using RAP methodology, it was possible over a short period of time to ascertain the major nutritional prob-

lems in an Aboriginal Australian elderly community. The results of this study are of particular relevance to nutrition-education programmes in these communities. A significant reduction in the consumption of total fat could be achieved by choosing leaner cuts of meat and removing visible fat, as well as by increasing fish consumption. A dramatic reduction in refined carbohydrate could be achieved by reducing the consumption of sugar per se and increasing the consumption of unrefined carbohydrate and fibre in the form of fruits, vegetables, whole-grain cereals, nuts, and pulses. Aboriginals should also be encouraged to continue eating bush foods. More research is required on the impact of binge eating on the health of these individuals.

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