

Original Article

The nutrition transition in West Sumatra, Indonesia

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Indonesia, like many developing countries, is experiencing a rapid urbanisation characterised by double burden of disease in which non communicable diseases become more prevalent while infectious diseases remain undefeated. This report describes the nutrition transition which occurred to Indonesia after economic transformation in 1966, based on information gathered from published reports. The major sources of information used in this paper were: a) a series of Indonesian National Socio-Economic Surveys (SUSENAS) conducted regularly by Central Bureau of Statistics (which provided a coherent picture of the nutrition transition in Indonesia) and b) data collected from two relatively smaller surveys conducted in West Sumatra (which demonstrated the changes in food and nutrient intakes over the period 1983-1999). It was found that while Indonesia had a rapid economic growth since 1970s, major dietary changes included an increase in expenditure for meat, eggs, milk and prepared food, and a fall in expenditure in cereal products. Nutrient proportions had changed from carbohydrate to fat and protein but the proportions remained close to the ideal ratio. There was also a dramatic shift in causes of death from infectious to chronic diseases. It is concluded that the nutrition transition in Indonesia is similar to patterns in other developing countries. Although fat consumption increased slightly, there is movement to maintain the traditional diet.

Key Words: nutrition transition, health profile, developing countries, West Sumatra, Indonesia

Introduction

Indonesia, like many other developing countries, is experiencing rapid urbanisation characterised by a double burden of disease in which chronic diseases become more prevalent while infectious diseases remain undefeated. A nutrition transition, where societies suffer the health problems associated with both under- and overnutrition, is a universal trend which is dominating the health profile of increasingly large numbers of people in developing countries.¹⁻³

The epidemiologic transition and concurrent shift in diet, physical activity and body composition in many developing countries has been rapid, unlike the gradual transition in the United States and most European countries.⁴ Reports from Asian countries such as Korea, India, Japan, and from countries in South America indicated that a rapid change in the dietary habits and body composition occurred after their countries achieved dietary sufficiency at the national level.^{1,3,5-8} In India, rapid socio-economic transition has resulted in rapid changes in dietary patterns.⁹ Obesity has become a public health-problem, especially amongst children.^{4,10-11} In Korea, however, after an acceleration in economic growth for three decades, the nutrition transition has been reflected in dramatic shifts in causes of death, although there are movements to keep to traditional dietary patterns.⁵

Since mid 1960s, a remarkable transformation in the Indonesian economy has changed the social demographic structure and contributed to large shifts in overall dietary patterns in Indonesia. Only a few investigators have

discussed aspects of nutrition transition in Indonesia.¹²⁻¹⁴ This report broadly reviews the trend changes in food and nutrition intakes amongst people in West Sumatra over the period of 1983 to 1999.

Subjects and Methods

Three different types of information are included in this report, namely estimates of gross national product (GNP), food and nutrient intakes, and causes of death. The major source of information was the National Socio-Economic Surveys (SUSENAS), conducted regularly by the Indonesian Central Bureau of Statistics (CBS) since 1963.¹⁵⁻¹⁷ These surveys are considered to be an acceptable source for socio-economic data, including food, nutrition and health aspects, and have been used to formulate various policies and programmes.¹⁵

For SUSENAS, one district was chosen purposely by CBS from each of 27 provinces in Indonesia. The selected districts were considered to be representative at a province level, and were generally regarded as a reflection of the heterogeneity of socio-economic conditions among major

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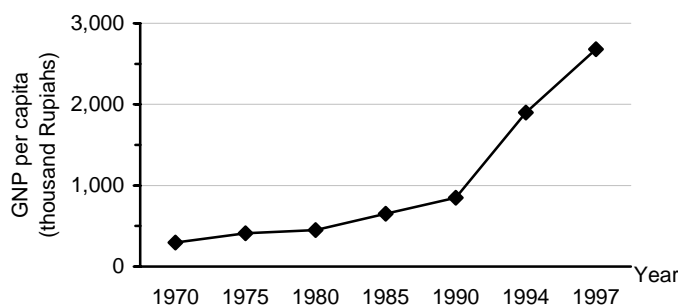


Figure 1. Trends in gross national product (GNP) per capita

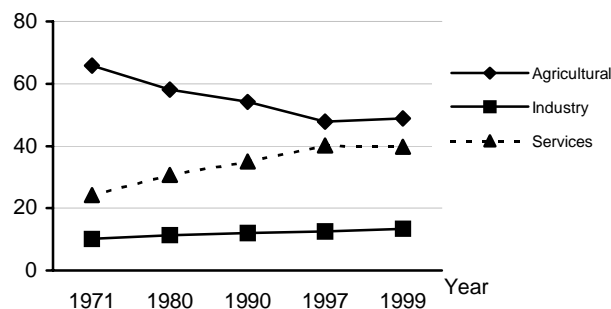


Figure 2. Trends in the distribution of occupation in West Sumatra, Indonesia, 1971-1999

districts of Indonesia.¹⁶ Generally data were collected during the second and the third week of February of the years that the surveys were conducted. A seven-day food recall method using a food list was used to collect information on food items consumed during seven days prior to the interview.¹⁸ Two-hundred and ten food items on the food list were categorised into 13 major food groups, namely cereals, tubers and starchy food, fish, meat, eggs and milk, legumes, vegetables, fruit, oils and fats, condiments, prepared foods and drinks, alcohol beverages, and other foods.¹⁵

Information on food and nutrient intakes of people in West Sumatra came from two different studies. One was conducted in 1983 by Malik in four villages in Kuranji District of Padang Municipality.¹⁹ The dietary data were collected from 48 men and 50 women (aged 15-45 years) using methods of 24-hour food recall and food frequency questionnaire containing 21 food items. Another study was conducted in 220 apparently healthy individuals (128 men and 92 women, aged 35-82 years), during February-August 1999, as part of a case-control study of nutrition and coronary heart disease, and the method of 24-hour food recall of two consecutive days was used to collect food consumption data.²⁰ Participants of this case-control study were from various parts of West Sumatra including Padang, Bukittinggi, Pariaman, Painan, Agam, Padang Panjang, Batusangkar, Payakumbuh and Solok.

Information on causes of death was obtained from the Household Health Survey, which was conducted regularly in Indonesia since 1972 by the Ministry of Health of Indonesia. This survey collected data on health status of Indonesians and causes of death.²¹ Diseases were classified according to the World Health Organization's International Statistical Classification of Diseases and Related Health Problems, tenth revision (ICD-10).²² It should be noted that the disease classification system used by CBS does not distinguish individual diseases. For example, diseases of the circulatory system included rheumatic heart disease, hypertensive disease, ischemic heart disease, cerebrovascular disease, and other diseases of the pulmonary system. The trends in causes of death presented in this report were expressed as percentages of total deaths for four disease categories in which the death rates changed noticeably in Indonesia during the period 1980-1996. These four categories were: (a) infectious and parasitic diseases (e.g. tuberculosis, malaria), (b) diseases of respiratory system (e.g. pneumonia and bronchitis), (c) diseases of the circulatory system

(e.g. rheumatic heart disease, hypertension, ischemic heart disease, cerebrovascular disease, and diseases of the pulmonary circulation), and (d) malignant neoplasm (e.g. cancers of breast, lung, liver, stomach).

It is also worth mentioning that the potential measurement errors of the household health data might lead to the under-reporting of the causes of death. Some respondents with limited education may not have known the exact age of their late relatives. Birth or death certificates may have been misplaced or they may not have been issued. Although the interviews were done by doctors in the villages, the report of clinical signs and symptoms of the illness before death were very dependent on the recollection of the respondents.²³

Results and Discussion

Nutrition transition in Indonesia has been reflected in changes in the proportion of macronutrients and food intakes, and in dramatic shifts in causes of death from infectious to chronic non-communicable diseases.

Indonesian economy

There have been remarkable changes in the Indonesian economy over the past 35 years, including the economic crisis in mid 1997. GNP per capita increased dramatically from 1970 to the mid 1990s (Fig. 1). In 1970, the nominal value of per capita national income was 295 thousand Rupiahs, then it increased to 2,680 thousand Rupiahs before the crisis in 1997.²⁴ This was in line with the high average economic growth of 7.8% in 1970s, 6.5% in 1980s and 7.2% in 1990s. Such high economic growth increased food availability and enhanced purchasing power of the people, which accelerated nutrition transition.²⁴

The rapid shift in income was associated with changes in occupation distribution. The West Sumatra labour force data shown in Figure 2 indicated a clear trend over the four population surveys (SUSENAS 1971-1997). The share of the agricultural labour force fell continually, from almost three-quarters of the total in 1971 to less than one-half in 1997. During the same period, that of industry doubled, while that of services rose by about 75%.²⁵ A shift alteration from labour-intensive occupations in the rural primary product sectors of agriculture, forestry and fisheries, to occupations in the services and manufacturing was in agreement with the marked increase in the GNP of Indonesia. The current occupational structure

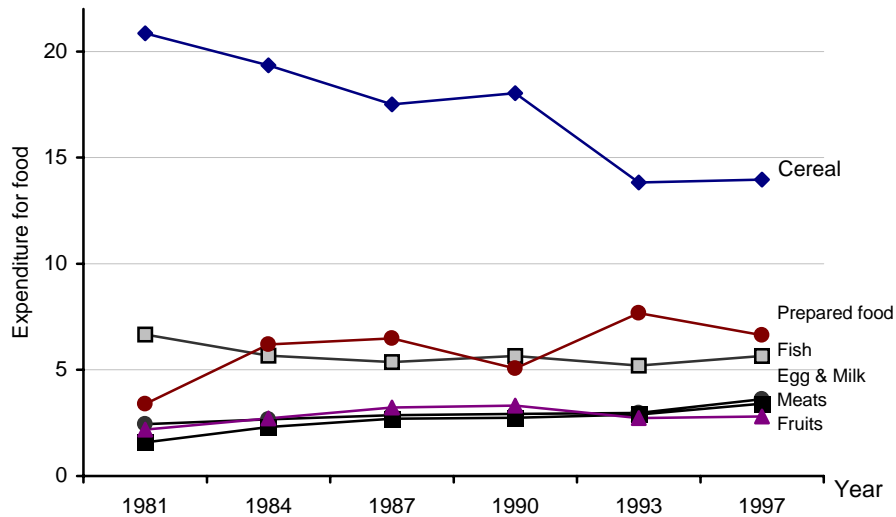


Figure 3. Changes in expenditure by food groups, 1981-1997

of Indonesia is similar to that of most Western countries. This transition is linked to a major reduction in energy expenditure at work.

Food consumption

Trends in the patterns of household expenditure and food consumption confirm the picture on nutrition transition. Consistent with significant improvements in living standards, the proportion of household expenditure on food fell steadily since 1969-1970, with most of the decline accounted for by the cereal and tuberous food groups. Correspondingly, the share of non-food items rose and there was a sharp increase in housing and utilities. Expenditure for meats, eggs and milk increased significantly (Fig. 3). Expenditure for prepared food rose by 100% over the period of 17 years from 1981 to 1997, more than any other food item. This was due to more women entering the labour force, only 32.6% in 1980, 39.6% in 1985 and 49.93% in 1997, and this could have resulted in the reduction in their available time to prepare food at home.^{21,26}

Comparison of food intakes in West Sumatra was made between 1983 and 1999, as shown in Figure 4. Fish consumption remained similar during the period from 52 g/day in 1983 to 54 g/day in 1999. The largest increases were found in soy and to a lesser extent in meat, egg and dairy products. In 1983, soy was not known by the largest part of Minangkabau people. Consumption of soy in 1983 was 10g/day. But in 1999, soy became more popular, the consumption increased to 110 g/day. In contrast, rice and cereal consumption decreased significantly from 1007g/day to 512 g/day in 1999.

There has been only a slight change in food preferences in West Sumatra. Mostly the Minangkabau have not changed their dietary patterns.²⁷ There was little or almost no change in food tastes between younger and older generations. Many studies have indicated that peoples who have deviated from their traditional ways of eating and living, begin to suffer severe consequences in the form of chronic diseases.²⁸⁻³⁰ A study in Japan suggested an association between the increase of Western

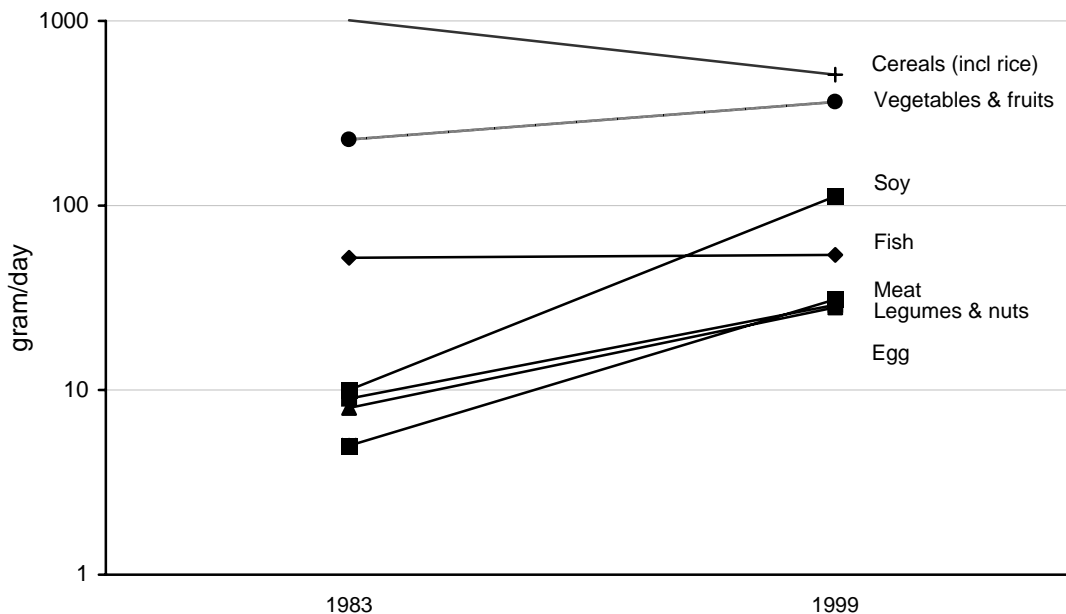


Figure 4. Food consumption in West Sumatra, Indonesia, 1983 and 1999

Table 1. Daily intakes of energy and macronutrients for men and women (mean \pm SD) obtained from 24-hour recall data, 1983 and 1999

	Year 1983		Year 1999	
	Men	Women	Men	Women
	<i>N</i> = 48	<i>N</i> = 50	<i>N</i> = 116	<i>N</i> = 77
Energy (kcal)	2722 \pm 137	1740 \pm 72	1666 \pm 475	1643 \pm 507
Protein (g)	54 \pm 3	40 \pm 2	80 \pm 28	78 \pm 27
Fat (g)	23 \pm 2	19 \pm 2	44 \pm 18	44 \pm 19
Carbohydrate (g)	562 \pm 30	346 \pm 2	206 \pm 50	203 \pm 57
% Energy from protein	7.8	8.8	19.1	18.9
% Energy from fat	9.1	12.1	23.2	23.6
% Energy from carbohydrate	81.5	77.9	57.7	57.4

style fat-rich foods such as butter and margarine, cheese, bread, and ham & sausage with an increase in mortality from cancer and breast cancer.⁶

Nutrient Intakes

A dramatic difference in food usage is reflected in the changing percentage of energy consumed over the period of 1983-1999. Nutrient intake data can be used to capture the nutrition transition in West Sumatra. To demonstrate the trends in proportion of dietary nutrient intakes, results from two case studies from West Sumatra are reported. There was a dramatic change in macronutrient intake (computed as % contribution of total energy intake), as summarised in Table 1. The average total energy intake was significantly different between the two periods; the average total energy intake was 2,722 kcal and 1,740 kcal for men and women in 1983,¹⁹ while it was 1,511 kcal and 1,353 kcal for men and women in 1999. The energy intake for men remained significantly higher than that of women.

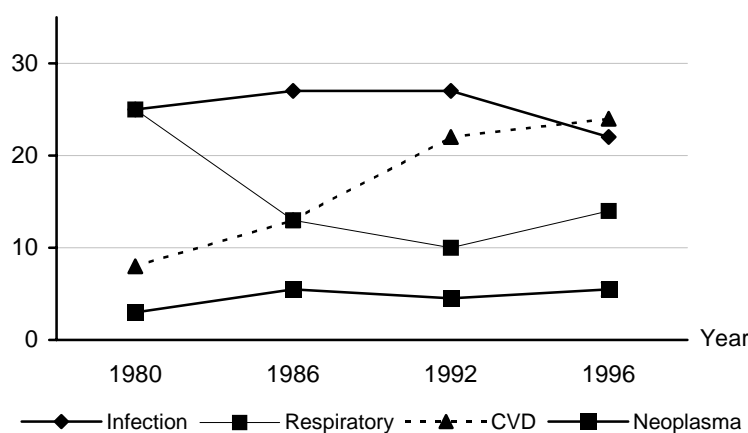
Carbohydrate is the main source of energy for the Minangkabau. In 1983 carbohydrate contributed 81% of total energy intake, where as in 1999 it had dropped to 58%. This was in line with the decrease in rice and cereal consumption. Protein consumption rose from 8% to 19% from 1983 to 1999. The increase in protein intake paralleled the substantial increase in meat and dairy product consumption during the period. Fat consumption

has doubled from 11% to 23% energy intake for the same period. Compared to other countries in Asia, fat consumption in West Sumatra is relatively lower. In China, dietary fat intake ranges from 22% to 33% of total energy intake in rural and urban areas.³¹

The changes in % energy contribution from carbohydrate, protein and fat may give a broad picture of the nutrition transition of Indonesia. The ratio of %energy from carbohydrate: protein: fat was 81:8:11 in 1983, indicating that energy intake was mainly from carbohydrate and that fat or protein did not contribute much. After 16 years, the ratio shifted to 58:19:23, which showed that carbohydrate still contributed a great proportion of energy but to a much lesser extent, and an increase in fat and protein consumption.

Causes of death

The trends in food intakes in Indonesia have shifted from dietary deficit and food insecurity to over-consumption. One therefore could expect concurrent and possibly related shifts in the causes of death. Indeed, changes in the leading causes of death from infectious diseases to chronic diseases in Indonesia occurred significantly since mid 1980s, when death from cardiovascular disease began to accelerate (Fig. 5). In 1986, cardiovascular disease was the leading cause of death accounting for 13% of all mortality and by 1996 it had risen to 24%.^{21,23} In 1992, diseases of the circulatory system were the leading causes

**Figure 5.** Trends in causes of death in Indonesia, 1980-1996

of death, accounting for 24.2% of all mortality, especially in Java and Bali, where rapid economic growth was more dominant. In other provinces, the data in 1996 indicated that the diseases were in the third position as the leading cause of death, accounting for 13.8% of all mortality. Other non-communicable diseases such as cancer, was the fifth major cause of death in Indonesia. Similar trends have been seen in other countries such as Korea, where cancer and cardiovascular-related deaths became predominant since the early 1970s,⁵ and Jamaica where the changes have happened in the past 50 years.³² Changes in demography are also worth considering. Life expectancy has changed dramatically in Indonesia from 42 to 47 years for men between 1967 and 1996, and 62 to 66 years for women.²⁶ The subsequent increase in the relative size of the elderly population may have made the increasing trend in chronic disease apparent. The elderly population (aged 65 years and over) rose from 2.5% in 1971 to 4.2% in 1995.²⁶

In conclusion, Indonesia, like many other developing countries, is experiencing nutrition transition which is being reflected in rapid changes to diet structure, and dramatic shifts in causes of death. The government and the people of Indonesia should encourage research to preserve the quality of the traditional diet and analyse the healthfulness of the diet.

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