



Dietary pattern in a philippine village : its determinants and improvement

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論文内容の要旨

INTRODUCTION

Many studies have done to understand the problem of malnutrition especially in developing countries where 20% of the people have inadequate food intake. Since resources are limited in developing countries, these researches must be relevant and applicable to the solution of the problems. In the Philippines, protein-energy malnutrition, and deficiencies in vitamin A, iron and iodine are being solved through researches and the implementation of a nationwide nutrition program launched in the early 1970's.

The following study attempts to understand the dietary pattern in a Philippine village and to provide recommendations in improving it. Specifically, the objectives are: (1) to determine the quality and quantity of food articles in the diet; (2) to find out the interrelationship between food articles; (3) to look for the food pattern determinants; (4) to relate the dietary pattern to some socio-economic components; and (5) to come up with recommendations in improving the diet.

METHODS

In July, 1983, a 24-hour dietary survey (calling for the age, sex, occupation and educational attainment of each member of the household; the household income, food ex-

penses and food sources; and the amount of intake of the different food articles) was conducted by a volunteer resident health worker in the village of Hanggan. He visited 15 randomly-selected households (10% of the total village households) after each meal.

The data were brought to and analyzed at the University of Tokyo three months later to determine (1) the amount of per capita daily intake (in grams) of 18 food articles (rice, bread, noodles, other cereals, confectionaries, potatoes, sugar, fats and oils, fish, meat and poultry, eggs, milk and products, beans and products, vegetables, fruits, seasoning, beverages, and alcohol); (2) the interrelationship between food articles using Pearson's correlation coefficient; (3) the food pattern determinants using multifactorial analysis; and (4) some socio-economic components using analysis of variance.

The methodology of Toyokawa was used. The interrelationship between food articles as reflected in the so-called "food consumption structure" refers to the synergism and antagonism between food articles. Two or more food articles are said to be synergistic when they are taken qualitatively and quantitatively together in the meals for one day. Antagonism, on the other hand, means that when a food article is eaten, another will not be eaten; or if the latter is also consumed, it will be at a lesser amount than the former.

Food pattern determinants are the food articles which characterize the dietary pattern. These articles are also referred to as factors.

Some socio-economic components determined in this study include age, sex, educational status, occupation, income, food expenses and food sources.

The Village

Barangay (Village) Hanggan is situated 2 km east of the town center of Bay in the province of Laguna. The town is 70 km south of Manila. The village which has a land area of 1.49 sq km had a population of 778 (1983) distributed in 149 families and 133 households.

The village is mainly a rice-producing area. The rice land is owned by non-residents of the village. Residential land belongs either to a big landowner or to the government by virtue of an unused national railroad track.

Subjects

In this study, there were 36 respondents who were 17 years old or more, the eldest being 87 years old. One half were males. Seventeen reached elementary school; high school, 10; vocational, 1; college, 5; no formal schooling, 3. Most of the male respondents were farmers while most of the females were housekeepers. The monthly income ranged from 141 to 1,600 with an average of 611 (\$1=18). The monthly expenses for

food ranged from 200 to 800 with an average of 439. Fourteen respondents bought their food while 22 produced and bought them (mixed).

RESULTS

Amount of food intake

The intake of energy foods is almost double the recommended by the Food and Nutrition Research Institute, body-building foods about two-thirds and the regulating foods only about a third of the recommended.

Food consumption structure

A combination of food articles, rather than a single one, provides human nourishment. It is necessary to determine the established combination of food articles in a population. This combination is a reflection of the culture of the people and is already identified as the synergistic and antagonistic relationships of food articles.

The food consumption structure of the subject population was calculated. The following pairs of food articles were synergistic: (1) other cereals and sugar, (2) eggs and milk & products, (3) noodles and fruits, (4) milk & products and alcohol, (5) milk & products and fruits, (6) eggs and alcohol, (7) noodles and milk & products, (8) rice and fish, (9) bread and seasoning, (10) noodles and confectionaries, (11) fats & oils and vegetables, (12) eggs and fruits, and (13) noodles and beverages. The food-pairs appear in their order of decreasing significance. The following were antagonistic: (1) meat & poultry and seasoning, and (2) fish and meat & poultry.

Food pattern determinants

In order to clarify the factors comprising the dietary pattern, principal factor analysis was calculated from the correlation matrix. The contribution rate of the first factor is 29.8%, that of the second is 19.5%, and that of the third is 13.7%.

The first factor can be deduced as the factor relating to eggs, milk & products and alcohol. Their absolute values are the highest in the first factor loading. Other cereals and sugar have the largest values in the second factor loading. Thus, the second factor is the factor relating to these food articles. In the third loading, noodles is the factor. The principal factors decisive in the dietary pattern of the village have been identified.

Some socio-economic determinants

Various occupational groups differed in terms of rice and alcohol intake, respectively. Various educational levels of attainment differed in meat & poultry intake. The smaller the family, the more was spent for food per individual. The more food

bought (as against food produced or the combination of food bought and produced), the more was the food expense.

DISCUSSION

The diet was deemed to be more than adequate in terms of energy food (e.g., rice and sugar) which are relatively cheaper in cost and readily available. Most farmers produce rice and do not have to buy them. Sugar cane is grown in near-by villages and milled in a neighboring town. Energy foods are more filling to the stomach and satiety is achieved more easily.

Body-building and regulating foods are expensive and not readily available. The food articles in these groups are bought more often than not.

The socio-cultural situation of the village can also explain some results of the food consumption structure. Other cereals and sugar are synergistic. The people have the habit of taking snacks (in-between meals). They take sweetened pounded rice called *espasol*, biscuits with sugar on them, and corn with sugar in ice.

Fish and meat & poultry are antagonistic. Because of the high cost of food, families usually have only one viand per meal (aside from rice, the staple food). Therefore, as source of protein, it is either fish, meat or poultry. If another food article is added, it is usually the cheaper or more readily available vegetables. Only during the one-day-in-a-year village feast where guests usually come, a variety of food articles are served.

By analysis of variance, various occupational groups differed in terms of rice consumption. Farmers eat much rice. As mentioned previously, rice is more filling and farmers need to be full in order to keep up with the rigors of farm work. While housework may be considered a light task, the housewives also help in the fields. They tend to eat less viand and more rice, especially the left-overs.

The various occupational groups also differed in terms of alcohol intake. Farmers and those engaged in other occupations (e.g., drivers, mechanics) are usually male-dominated work. Men are usually the ones who drink alcohol in the village.

The various levels of educational attainment differed in the consumption of meat and poultry. The higher the educational attainment, the more meat and poultry consumption. People with the higher educational background are more aware of the prestige foods like meat and poultry and therefore, they make it a point to include these foods in their diet. Another could be their being more aware that meat and poultry are good sources of protein which is perceived to be very essential component of the diet. Or, the people

with higher educational attainment can have higher-paying jobs which enable them to procure the more expensive foods like meat and poultry.

Smaller families spent more for food per individual. Given two families with the same income, the one with the more mouths to feed may spend more for clothing, education and other expenses. The smaller family uses the same money for food.

The more food bought, the more was the food expense. If food is produced, i.e., the family has its own garden or raises poultry, the less will be the expenditure for food since only those not available will be the ones to be bought.

The role of food consumption structure and food pattern determinants

In this study, it was found that there was too much intake of rice. A health worker in the village of Hanggan, observing the overconsumption of energy foods (rice in particular), among the population might be tempted to promote the reduction of rice intake without considering its relationship with the other food articles. He himself must be trained on the synergism and antagonism between food articles and be able to recognize that in the village, rice is synergistic with fish. A decrease in rice intake might concomitantly result in a lowered fish consumption. This will aggravate the lack of body-building foods in the diet. But since fish is antagonistic with meat and poultry, the latter may compensate for the decrease in fish intake. However, meat and poultry are more expensive and people might shy away from buying them.

As countries develop, new food habits are acquired and new health problems emerge. Since cardiovascular diseases are predominant in developing countries, these diseases are expected to increase in the Philippines. A study, in fact, shows that they are on the rise. Eggs and milk and products are synergistic and both are body-building foods needed by the people of Hanggan. But eggs and milk have been implicated in the etiology of cardiovascular diseases, particularly atherosclerotic heart disease. Therefore, it is a matter of moderating the amount of intake, i.e., enough for body-building and the prevention of atherosclerotic heart disease.

By means of factor analysis, food articles like eggs, milk & products and alcohol were found to be determinant factors in the diet. These food articles, as factors, can characterize the population. People can be grouped according to their relationships with these food articles. If these can be done, common characteristics including disease patterns of a group may be found to be associated with certain food articles. The diet may then be modified so as to prevent related diseases. Such studies are going on in Japan. Developing countries must be aware of these studies because, sooner or later, they themselves will develop and will face similar health problems.

Dietary improvement

In developed countries like Japan, the application of researches such as the one on food consumption and food pattern determinants might be easier. It may just be a matter of educating individuals, families and communities to promote healthier dietary patterns.

But in developing countries, the whole food chain or nutrition system must be considered. This chain traces the flow of food from their production to the utilization by the human body. In many areas of the developing world, the availability of food is confronted by numerous problems: droughts, inequitable distribution of land, expensive fertilizers and pesticides, export-oriented economies, low income, high food prices, predominance of infections, poor sanitary conditions, etc.

The nutrition system may be viewed as a summary of the multiple ways by which social, political, economic, medical and biological forces interact to affect the nutritional status. The system must be developed, i.e., by overcoming the problems and bottlenecks. Malnutrition, by taking such a comprehensive approach, will not be seen merely as technical or biomedical problem. Thus, it will require multidisciplinary interventions. The solution will have to strike down at the root causes rather than just touch the symptoms. For Barangay Hangan and for other developing communities, this holistic approach is recommended.

論文審査の結果の要旨

現在地球人口の75%は、発展途上国の都市の下町及びスラム、そうして農漁村に住む草の根人口で、近代医学を以てすれば予防乃至早期発見早期治療の可能な主として感染症に罹患し、そして死亡して居り、その背景には貧困と栄養不足乃至失調があることは周知の事実である。

本研究者は、そのような発展途上国の草の根人口に共通な貧困と疾病の悪循環の鎖を絶つ為の Comprehensive Community Health Program 包括的生活共同体健康計画のフィリピンに於ける現場で、健康問題とその要因の研究から始め、諸問題を共通解決することに関わる食生活改善対策の基本を、食事パタンを現地調査しその背景要因を解析研究することにより、究明することを目的とした。

現地調査方法は、オペレーション・リサーチの手法を用い、フィリピンの他の地域及び他の発展途上国の草の根人口に対しても適用出来ることを目指し、草の根ボランティアによって実施可能な方法を、訓練された草の根ボランティアを中心に栄養専門家統計専門家の参加を得て、年間の季節変化を背景とした違った週の異った日に行う24時間法として創出し、調査実施の度毎に本研究者が現場

点検を行い、データの信憑性を高めつつ、調査法の検証を行った。

調査対象は、20年来モデル・デイベロプメントのフィールドとなり、本研究者自らも10年来関与して地域住民の信頼を得て居るフィリピン農村の中で、社会・経済改良及び教育普及が中位に達した村を選び、政治状況の安定した時期に、その村全世帯の10%に相当する15世帯を無作為抽出し、24時間調査法を実施し、そのデータを解析研究した。既ち、調査の結果出て来た18種類の食品について、1人当たり1日摂取量、Pearsonの相関係数を使った摂取食品間の相互関係、多変量解析による食事パターン決定因子を社会経済教育要因を加えて解明した。

その結果、此の草の根人口の食品摂取量は、フィリピン食餌・栄養研究所による標準量に対して、energy 食品群は2倍、body building 食品群は3分の2、regulating 食品群は3分の1であり、食品消費構造の解析の結果を食品組み合わせ別貢献度から更に解析して、経済生活の向上に教育が伴った場合に起き得る食事パターンの構造的改善の内容が明らかになった。更に、産業・社会構造の変化が起きつつある中で草の根生活文化の基本である生活共同体構造を強化しなければ、栄養システムが崩壊して行く過程も明らかになった。

本研究は、包括的生活共同体健康計画の現場でオペレーション・リサーチの手法を用い、草の根のボランティアを訓練して調査した家族別個人別の食事パターンを、社会・経済・教育の関連した文化要因をも加えて多変量解析・決定因子解明を行い、他の発展途上国の草の根現場にも適用出来る調査・研究法のシステムを開発し、発展途上国の草の根健康問題解決の基盤である社会・経済改良・教育普及・栄養改善対策の基本について、従来ほとんど行われてなかった研究法を用いて重要な知見を得たものとして価値ある業績であると認める。よって、本研究者は医学博士の学位を得る資格があると認める。