

A Nutrition Survey of Koreans in Ann Arbor Area of Michigan, U.S.A.

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= 국문초록 =

미국 미쉬간 주 앤 아버시에 거주하는 한국인의 영양실태 조사

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목 해 문

미국 미쉬간주 앤·아버시에 거주하고 있는 한국 이주민 중 성인 50인을 대상으로 실시된 본 조사의 목표는 (1) 그들의 영양 섭취상태파악과 (2) 외국에서의 식생활 영위에 있어서 경험하는 식습관의 변화나 문제점 등을 연구함에 있다. 열량, 단백질, 지질, calcium, 철분, vitamin A, B₁, B₂, C Niacin 섭취량이 24-hour dietary recall 방법에 의하여 추산되었다. 연구 목적 (2)를 위하여는 식품 섭취 빈도조사와 별도의 질문지를 작성하여 사용하였다. 여자의 calcium 섭취량을 제외하고는 피 조사자의 모든 영양소 섭취량은 조리시 손실량과 sampling error를 위한 안전율을 가산하고도 충분한 것으로 나타났다. 피 조사자들이 성공적인 식생활을 영위함에 있어서 당면하는 대표적인 두 가지 문제점들은 (1) 낯설은 식품에 대하여 저항감을 느끼는 개인에게는 결과적으로 선택할 식품의 폭이 좁아진다는 점과 (2) 가족 구성원중 어른과 아이들이 미국 음식에 적응하는 속도와 정도가 다르므로 주부가 음식 장만에 어려움을 겪고 있다는 점 등으로 나타났다.

I. Introduction

The food habits of a group are the product of a group's present environment and past history. Although a group is subjected to outside influences, the food habits and customs which have become meaningful to a group are carefully held and not easily changed. As a member of an ethnic group living in the United States, it has been a particular interest of the writer to undertake this project to study¹⁾ the adequacy of nutrient intakes and²⁾ the changes in their food habits and the concerns in dietary management of Koreans in the Ann Arbor area, Michigan.

According to the data collected by the Korean Society of Ann Arbor and its vicinity, Inc. in 1975, there were 79 available Korean families

with or without children. Of these 25 families were chosen for this study without a specific pre-selection of ages and dates being interviewed. No subject was on any type of institutional diet outside his or her own house on regular basis. The average age of 50 subjects was 35(Appendix-1). No international marriage case was included in the subjects. All subjects were born in Korea and have been in the U.S. over various time periods ranging from one year to forty three years(Appendix-1). This survey was done during the period from January to April in 1976.

The republic of Korea is one of the developing countries that has the administrative difficulty in undertaking the practical and long-run nutrition improvement programs that have to rely on a price mechanism.¹⁾ In Korea, the chief obstacle to a balanced diet is the excessive reliance on

rice as a staple food. Side dishes are regarded as little more than condiments, so their significance in the diet is not readily understood. As a result, there are widespread deficiencies in Vitamins A and C (particularly during the season when there are few vegetables and fruits), protein intake in many cases is low, riboflavin deficiency is frequent, and calcium intake appears to be suboptimal. In general, caloric intake is fairly adequate, although the intakes of fat is below desirable levels²⁾.

II. Objectives and Procedures

The questionnaire was developed and written in Korean on the left-hand page and in English on the right-hand page to obtain the best answers from the subjects who have different preferences in two languages. The complete answers were translated and collected in English on the right-hand pages of the questionnaire for all subjects (Appendix-2).

A) The evaluation of ten nutrient intakes of the subjects

The 24-hour dietary recall sheet was developed for each subject who was asked to recall what he or she had eaten a day before the interview day. The amount of foods consumed by the subjects was essentially based on the estimation by interviewees and by interviewer. Therefore, the data used in this study should be interpreted with a reasonable margin (<20%) of sampling error for each nutrient³⁾. Among 25 families 16 couples, both husbands and wives, participated in the interview directly. The information on food intakes by husbands of the rest 9 families was provided by their wives. The amount of food given by interviewees was written on the questionnaire in as great detail as it can be described for estimating the amount as precisely as possible. Each food item was then translated into grams or ounces on the work sheet for calculation (Appendix-3). The analysis of raw data was completed on the separate sheet for each subject and the

couple (Appendix-4). The average intakes of nutrients were calculated for the group A, husbands; the group B, wives (Appendix-5). Each average figure was compared with that of Korean Recommended Dietary Allowances and that of United States Recommended Dietary Allowances (Table-I, Graph-I & II).

B) Food habits: Changes and other concerns in dietary management

The questionnaire was developed in four different aspects of their food habits and related concerns as follows.

1) **Food patterns of the subject families:** A list of 81 food items was used for the group-B to answer how frequently each family used each food item on the average since the family came to the U.S.. The data were collected on a work sheet (Appendix-6) to be used as reference for related questions.

2) **The perception of the essential foods of the subjects:** A question (#8) "what foods do you think are essential to a daily diet?" was asked of each subject. The answers were collected and handled by categorizing into basic four food groups to find out the general perception of the essential foods by the subjects and to see whether there was any significant change in their ideas of food selection (Appendix-7).

3) **Preferences for American foods A:** question (#11) was asked to be answered by the degree of preference in American foods in four levels: (1) very favorable, (2) fairly favorable, (3) favorable with some reservation, and (4) not favorable. See Appendix-8 for the detail data.

4) **Advantages and disadvantages in dietary management in the U.S.** The questions with different approaches were asked to find out the common satisfactions and complaints from the subject in dealing with the advantageous and disadvantageous conditions concerning the food and nutrition in their every day life in the U.S.. Three major aspects to be looked carefully in this study were as follows:

- (1) Were the subjects satisfied with their diets in the U.S.?
- (2) What were the difficulties in adapting their food habits in the U.S.?
- (3) What were the significant advantages and disadvantages of their dietary management in the U.S. in comparison to that in Korea?

Information on this part and other miscellaneous supporting information are collected in Appendix-9.

III. Findings and Discussions

A) The evaluation of ten nutrient intakes of 50 Korean adults in the Ann Arbor area

The averages of ten nutrient intakes by the groups-A and B are shown in the Table-I. The comparisons of ten nutrient average intake each group to the Korean Recommended Dietary Allowances⁴⁾ and to the United States Recommended Dietary Allowances⁵⁾ are shown in the Figure-1 and 2. Although there were 58% of the subjects(29 persons) were taking vitamin and/or mineral supplements, neither the regularity nor the amount of the intake of each supplemented nutrient were not objective enough to be included in the total intakes. Thus, the total nutrient intake amount

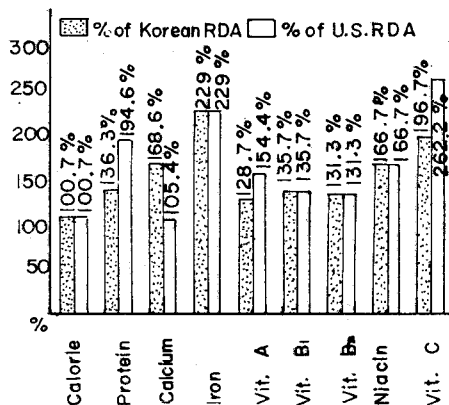


Fig. 1. The comparisons of ten nutrient intakes of male subjects to the Korean RDA and to the U.S. RDA

in this study was strictly based on the foods consumed.

Total calorie intake of both groups were close to the ideal levels(Group A; 2719 Cal, Group B; 2052 Cal) according to the Korean RDA and the U.S. RDA. The balance in the amount of calorie yielding nutrients was also fairly close to that of the prudent diet recommended by the American Dietetic Association: protein 20%, fat 30%, carbohydrates 50%⁴⁾. As shown in the Figure-3 and 4, both male and female subjects consumed slightly lower amount of calories from protein(group A; 16% group B; 18%) than the recommended

Table 1. The ten nutrient intakes of male and female subjects

Description	KCal	Prot gm	Fat gm	Ca mg	Fe mg	Vit A I.U.	Vit B ₁ mg	Vit B ₂ mg	Niacin mg	Vit C mg
KRDA AM ^{a)}	2700	80		500	10	6000	1.4	1.6	18	60
MSA ^{b)}	2719 (±1088)	109 (±40)	98 (±44)	843 (±428)	23 (±9)	7719 (±7677)	1.9 (±0.9)	2.1 (±1.7)	30 (±10.9)	118 (±103)
USRDA AM ^{c)}	2700	56		800	10	5000	1.4	1.6	18	45
KRDA AF ^{d)}	2000	70		500	18	6000	1.0	1.2	13	50
FSA ^{e)}	2052 (±694)	92 (±38)	78 (±43)	682 (±382)	20 (±8)	8506 (±6179)	1.9 (±0.9)	1.6 (±0.9)	28 (±11.2)	147 (±126)
USRDA AF ^{f)}	2000	46		800	18	4000	1.0	1.2	13	45

- a) Korean Recommended Dietary Allowances for adult male(1975)
- b) Male subjects averages
- c) U.S. Recommended Dietary Allowances for adult male(1974)
- d) Korean Recommended Dietary Allowances for adult female(1975)
- e) Female subjects averages
- f) U.S. Recommended Dietary Allowances for adult female(1974)
- g) Standard deviation

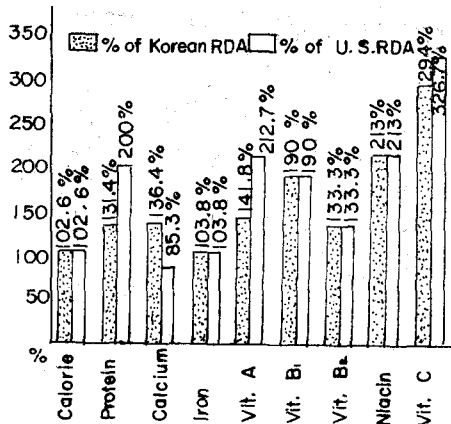


Fig. 2. The comparisons of ten nutrient intakes of female subjects to the Korean RDA and to the U.S. RDA

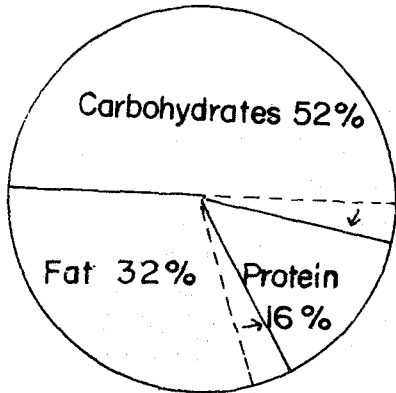


Fig. 3. The proportion of calorie intakes from protein, fat and carbohydrates for male subjects

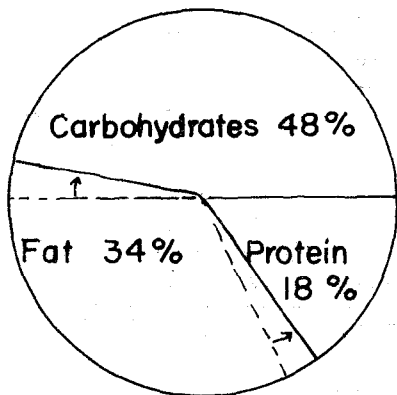


Fig. 4. The proportion of calorie intakes from protein, fat and carbohydrates for female subjects

proportion, 20% of total calorie intake.

It needs to be pointed out that there is 300 milligrams of difference in daily calcium allowances between Korean RDA (500 mg) and U.S. RDA (800 mg). Male subjects consumed 843 mg of calcium which met both recommendations. Female subjects consumed 682 mg which met the Korean RDA. The primary dietary calcium sources for Koreans are fish and fish products eaten with bones rather than milk since Koreans are not traditionally milk drinking population. The subjects were taking advantages of wide varieties of calcium sources by selecting both traditional calcium rich foods and milk on regular basis (Appendix-6).

The major dietary iron sources of the subjects were beef (3.4 mg/100 gm) and rice (0.9 mg/100 gm) which were eaten as frequently as two to three times daily (Appendix-3 and 6). Male subjects showed a significantly higher intake level of iron (22.9 mg) than female subjects (18.7 mg). It would be interesting if the actual hemoglobin levels of male subjects in this study were measured to find out if the result would be contrast to that of the Ten State Nutrition Survey from which an unexpected low hemoglobin level in male was found⁶.

Vitamins A, B₁, B₂ and niacin intakes of the subjects were sufficient in 20~100 percent excess of the recommended allowances. It can be comfortably estimated that the average intakes of those vitamins were satisfactory with more than 20 percent allowance for the amount lost in cooking. But the significantly wide range of individual intakes of these nutrients must be taken into

Table-2. The total amount of fruit consumption in one day by the subjects

Fruits consumed/day	Male (25)	Female (25)
Oranges and other citrus fruits	1292 gm	2961 gm
Apple	2625 gm	2400 gm
Other fruits	100 gm	463 gm
Fruit juices	9920 gm	19344 gm
Total	13937 gm	25168 gm

account before any generalization can be made.

The vitamin C intake level was higher among female subjects than male subjects. The total amount of fruit consumption in one day by the subjects was computed as follows in Table 2(Appendix-3).

The tendency in higher consumption of fruits by the female subjects corresponds to the result from a consumption study of major food group by the students done by Atkins²⁹. In her paper it was concluded that the female ate greater amount of citrus fruits and cheese but less meat, bread and potatoes than the male.

B) Food habits; changes and other concerns

1) **Food patterns of the subject families** : When a culturally standardized dietary behavior of the members of an identifiable subculture of the U.S. has been described and analyzed, it is possible to consider the implications of experiments on the preference manifested for the foods often eaten, or the relevancy of experiments in transfer of learning, etc., and to integrate them so that they will help in determining how to change their food habits³⁰.

The frequency of 81 food items used in cooking was asked to the female subjects to learn the preferred food patterns for the family members. The most frequently used grain and grain products were rice(daily), bread(daily), and noodles (weekly). Milk seemed to be the food used daily for the whole family including children but less frequently for the adults(Appendix-1,3 and 6). Further discussion on milk will be followed in the next objective of this chapter. Foods which were not commonly used in Korea such as yogurt, veal and lamb, creams, avocado and mola-sses were seldom used by the subjects. On the other hand, foods used commonly in Korea such as Kimchee(Appendix-10), soybean products(bean-curd) and seaweeds were used with high frequencies(daily-weekly). The seasonings and spices showed a very distinctive pattern. The most frequently used seasonings and spices were salt and

pepper, soy sauce, red pepper, garlic, sesame oil and sesame seeds, soybean and red pepper paste, and mono sodium glutamate. The herbs and spices such as chili power, bay leaves, basil, oregano, sage, olives and cloves were very seldom used. It gave a strong indication that the foods prepared in these families were more than likely in Korean style.

2) **The perception of the essential foods of the subjects**: An attempt was made to obtain an overall reaction of the subjects to the importance of foods. The degree to which food is considered essential might be of a particular importance in planning changes of food habits³¹. A question "What foods do you think are essential to a daily diet?" was asked to the subjects. The answers were analyzed by the basic four food groups. Forty four percent of the subjects gave food items which cover all the basic four groups. Table-3 shows the number of the subjects answered to each food group.

It was apparent that milk group was not considered as important as other three groups by the subjects. It was also learned that only 46 percent of the subjects had milk(not considering other dairy products) on the 24-hour dietary recall day. But the frequency of milk used for the whole family was high as daily. It might be the sign of the slower food habit changes on milk occurred in the adults than their children.

It was also interesting to learn that 13 subjects specified "kimchee" as an essential food which also indicated as one of the most loved food item in Korean diet by the frequency data(used daily) and by the actual cases in the 24-hour dietary recall(eaten by 88% of the subjects). More than

Table 3. Subjects answered on the basic four food groups

	Milk & milk products	Meats	Vegetables fruits	Grains
No. of subjects	24	39	35	55
%	48	78	70	79

Table-4: Preferences for American foods

Degree of preferences	Score	%
A. I like them very much in most cases	16	32
B. I like many American dishes	20	40
C. I like only a few American dishes	12	24
D. I don't care for them	2	4
Total	50	100

half of the subjects(28) specified rice as an essential food whereas only 9 subjects specified bread as an essential food. As it was discussed earlier, the necessity of rice in the Korean diet seemed to be true to the subjects in the U.S. although the proportion of rice was not as excessive as in the diets of native Koreans.

3) **Preferences for American foods:** A question "How do you like foods in the U.S.?" was asked. The degree of preference in American foods was categorized into four levels as follows in Table-4 (Appendix-8).

Lamb was the most frequently mentioned as a disliked food⁴⁾. Other disliked foods were mentioned as tuna fish¹⁾, frankfurter and sauerkraut¹⁾, spaghetti¹⁾, overcooked vegetables²⁾, instant soups¹⁾, pies¹⁾, various sweet foods³⁾, and

yogurt and cheese²⁾. Beef steak was mentioned as the most popular food by 9 subjects who liked only a few American dishes. Spaghetti²⁾, hamburger²⁾, French fries²⁾, lobster¹⁾, beef stew¹⁾, ham¹⁾, cheese and milk²⁾, olives¹⁾, tuna fish¹⁾, vegetable soup²⁾, juices¹⁾ and pizza¹⁾ were also mentioned as favored dishes.

The reasons given by two subjects who answered to D. (don't care for the American foods) were that the American foods were no spicy enough, tasteless and not appetizing.

*() mentioned frequency

4) **Advantages and disadvantages in dietary management in the U.S:** The majority of the subjects(82%) felt that their food intake in the U.S. was more nutritious than that in Korea. Four subjects(8%) felt no specific difference. Three subjects(6%) felt that their diets were poorer and all of them gave a common reason for it; they have not fully adjusted their diets in the U.S. (Appendix-9, question #12).

Thirteen wives(52%) had few or no difficulties in deciding the menu which, without a special alteration, served both children and adults in their families(Appendix-9, question #14). Seven wives(28%) had a few difficulties because they had to cook separate dishes for the adults and for the children; usually Korean styl dishes for

Table-5: The advantages and disadvantages in dietary management

ADVANTAGES:	Mentioned frequency (out of 50)	%
Good health regulations; better sanitary; better standardization; well-packaged & well-informed products	21	42.4
Reasonable price of meats	18	36.0
Availability of foods in all seasons	15	30.0
Less quantity, better quality	13	26.0
Easy to cook	12	24.0
Greater variety of foods in general	12	24.0
Less spicy and salty foods	8	16.0
More protein foods in general	4	8.0
More milk	4	8.0
Miscellaneous: more vitamin C, easy grocery, cheaper fruits and vegetables, more vegetables, freshness, better preserved nutrients		

DISADVANTAGES	Mentioned frequency (out of 50)	%
Too much fat	10	20.0
Less variety of tastes	10	20.0
Limited oriental food sources	10	20.0
More sweet foods	7	14.0
Expensive oriental foods	6	12.0
Less tasty fish	6	12.0
Limited variety of fish and other sea foods	5	10.0
Less tasty vegetables	4	8.0
Too much processed foods	4	8.0
Too much emphasis on meat	3	6.0
Miscellaneous: more high cholesterol foods, limited shops, expensive foods, limited variety of vegetables, too mild, lack of cooking skills for new foods		

the husband and American style dishes for the children. There were five wives(20%) who had much to some difficulties in cooking different dishes to meet different preferences of their husbands and children with the severer degree. A question was asked if the subjects were ever inhibited from eating Korean foods for social reasons (Appendix-9). Thirty subjects(60%) tried to avoid eating kimchee and other foods contain garlic because of the strong and unpleasant smell. The advantages and disadvantages in their dietary management faced by the subjects since they came to the U.S. were learned as follows in Table-5 (Appendix-9, questions # 17&19).

IV. Conclusion

The calorie intakes of both male and female subjects presented an ideal level showing 100.7% ~102% of the Korean RDA and and the U.S. RDA. The proportions of carbohydrate: protein: fat in the total calorie intake for both male (52 : 16 : 32) and female(48 : 18 : 34) were fairly close to the desirable balance recommended by the American Dietetic Association for the prudent diet; 50 : 20 : 30. When compared to the prudent diet there was a wave of 108 Calories in the balance among three calorie yielding nutrients for the male subjects. They consumed an

excess of 54 Calories(2% of total calorie) from carbohydrates and 54 Calories(2% of total calorie) from fat which resulted in a 4% short in the protein intake amount. Interestingly, the same amount of calorie wave was identified in the female subjects in a different pattern. They consumed proportionally more fat(34% of total calorie) and less carbohydrates(48% of total calorie) than the male subjects. But the differences were not significant enough to indicate any notable differences in their eating patterns. The calcium intake level of female subjects was not as high as that of male subjects. Considering the higher risks of facing an increased need for calcium the female subjects in their child bearing ages it is advisable for those individuals to increase their calcium intake. The average intakes of other nutrients; iron, vitamins A, B₁, B₂, niacin and ascorbic acid by the subjects comfortably met the recommended dietary allowances allowing the margin for the sampling error and the amount lost in cooking.

Although there were two main obstacles to the food habit changes identified as; (1) the fewer food choices for those who have negative reactions to unfamiliar foods and(2) the differences in the degree of adjustment to the American style foods between children and the adults; the subjects seemed to have adjusted their food habits in

the U.S. to improve their diet nutritionally by taking advantages of abundant and easily available foods and to keep part of the traditional eating patterns by maintaining the strong attachments to their past foods habits.

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