

Food consumption among malaysian students

Nutrition



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FOOD CONSUMPTION BEHAVIOR, NUTRITION AND HEALTH KNOWLEDGE AND
DIETARY CHANGES AMONG MALAYSIAN STUDENTS AT OKLAHOMA STATE
UNIVERSITY By SffiW-ING HIT Bachelor of Science Oklahoma State Universiil:

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UNIVERSITY Thesis Approved: -bMIIA~~ . . J./(. l...-~ ~ , fl. The~s = Dean

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n. vi CHAPTER I INTRODUCTION Food

habits of the parents are often adopted by their children. ! f food habits are to improve as promptly and as effectively as possible, the interrelationship of certain aspects influencing nutrition practices must be investigated.

Malaysian students often adopt the food habits of their parents, while they are young. As a result, eating habits have complex origins in childhood and cultural traditions (Irons, 1974). According to Kurt (1943), a young child does not form rigid " habits" but forms food patterns, learned from adults, to eat certain foods and not others. Individuals' eating habits do not remain the same for long periods of time, but are continually in a state of transition.

Food availability causes changes in an individual's food habits and as a consequence, the amount of food consumed. The college years are a time of transition for Malaysian students who are enrolled for further studies in the United States. Living in the United States is a transitional period between living at home with parents and living independently in an international setting. Food consumption and food selection have to be decided by the students themselves and the decisions may lead to habits that are likely to be maintained (procter, Gregoire, Holcomb,. & Reeves, 1992). Learning or resistance in developing new food habits might occur. Students may also have difficulty in adopting the new foods (Mead, 1943). As a result, food

habits need to be studied, so that, we may know how well these habits are relative to optimal health as patterned by the students' culture, or the type of individual experience permitted by the general information, food consumption behavior, nutrition and health knowledge (procter, et al, 1992).

Purpose and Objectives The purpose of this study was to determine the food consumption behavior, nutrition and health knowledge, and dietary changes among Malaysian students at Oklahoma State University. The specific objectives were as follows: 1. To determine if food consumption behavior is related to the students' demographic characteristics. 3. To determine if

nutrition and health knowledge is related to the students' food consumption behavior. **Hypotheses** The following hypotheses were examined: H1: There

were significant associations between food consumption behavior (section II Meal Pattern and Missed Meals) and students' demographic variables: 1.

Gender 2. Age 3. Ethnic classification 4. Major 5. Educational level 6. Marital Status 3 7. Religious preference 8. Family 9. Length of stay in the United States 10. Geographic location of residence in Malaysia. H2: There were no

significant associations between food consumption behavior (Section I- Snacks) and nutrition and health knowledge (Section III-Daily consumption)

Assumptions and Limitations The following assumptions and limitations are identified in this study: 1. The students will be honest in providing

appropriate information regarding actual nutrition and health knowledge, and food consumption behavior. 2. The students have enough knowledge about selection and preparation of food to accurately answer the questions.

A limitation in this study is that only Malaysian students enrolled during fall 1996 semester at Oklahoma State University was studied. Generalizations regarding results of this study will only apply to this group of students.

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Definitions 1. Food Consumption Behavior: It is a behavioral act involving the acquisition of food. Food consumption denotes the purchase, or obtainment by other means, of food (Sanjur, Diva, 1982). 2. Culture: Culture to an anthropologist, is man's way of adapting to and exploiting his physical environment (Niehoff, 1969). 3. Food Habits: It is defined as the patterns into which the available foods are arranged, 4 such as, number and form of meals, and the culture as opposed to the nutritional equivalence which can be invoked within these patterns (Mead, 1941-1943).

I' CHAPTER II REVIEW OF LITERATURE . To understand the food consumption behavior among Malaysian Students at Oklahoma State University, it is necessary to investigate the geographical description and the food and agricultural in Malaysia, in addition, traditional Malaysia foods, food and nutrition in Malaysia, cultural aspects of food, food habits, economics, and acculturation are also needed to be investigated. Geographical Description, and Food and Agriculture in Malaysia Malaysia is located in Southeast Asia. More than half of Malaysia's continental area is forest Agriculture is particularly suited for the river basins, the delta areas and the flatlands. Dry winters and wet summers are typical in this region. The high temperature coupled with heavy rainfall make Malaysia a highly agriculturally productive area. Besides agriculture, this part of Asia is excellent for fishing, particularly fresh water fishing. Most of Malaysians are engaged in agriculture, fishing or simple forestry (Vemury & Levine, 1978). Fish and seafood products are the primary animal protein in Malaysia, which are used in the various curried and fermented fish dishes. Pork is another source of animal protein but consumption is limited among Moslem populations. Poultry are raised mainly for sale and slaughtered for special occasions. 5 : in some regions, eggs are

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eaten to a small extent. Very little beef and milk: are consumed because of the climate and raising of cattle is uncommon in Malaysia. The Orang Asli (aborigines) of Malaya practice shifting agriculture and utilize a wide range of animal species as food. Generally, there is no protein shortage among these people (Vemury & Levine, 1978). According to Vemury and Levine (1978), in developing Southeast Asia, rice is the primary staple.. Because of the relatively high barley production in Southeast Asia, it may be substituted with rice. However, a meal without rice is not complete. The rice will be the judge of the importance and value of other foods. The qualities of rice are determined by its bulk and its filling capacity. Besides rice are consumed as the first meal of the day, flour-cake and coffee are usually eaten by fishermen as the first meal of the day too. Secondary staples are starchy roots and tubers. Pickled or spiced fruits and vegetable~ may also be part of the menu as condiments, which is unlike in the West Salads are rarely consumed. The primary vegetables eaten in Malaysia include cabbage, spinach, wild greens, squash, eggplant, okra and a small variety of legumes especially soybean and groundnuts. To cook all foods, Malaysians commonly use red palm oil. In addition to staples, some foods are considered high status and are associated with wealthy urban dwellers, for example, beef, chicken, turkey, eggs, certain vegetables, and fruits (especially temperate climate varieties like pears, grapes, strawberries, cabbage and spinach), , canned or highly processed foods and canned meats. Others are refined sugar, breads, cookies and cakes and dairy products are considered to be high status foods (Vemury & Levine, 1978). Besides the scientific classification of food stuffs, people in many societies have traditional ways of classifying their food. For example, in some Filipino communities, 7 people

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classify their food stuffs in three different categories: food that satisfy hunger such as rice, food that satisfy appetite such as meat and green leafy vegetables, and for taste such as salt, and pepper (Hartog & Staveren, 1983). In many cultures, foods have their roots in religious convictions and mythology. In certain beliefs, food might be classified as 'hot' or 'cold' beliefs exist to some extent (Vemury & Levine, 1978). For example, in Mexico, the three-course rural meal begins with rice (cold), followed by a soup (hot and cold ingredients) and ending with dark beans (hot). The contrast of hot and cold foods is also present in United States. A hot and cold dichotomy is also known in the folk medicine of China, Burma, India and Sri Lanka. In many rice-consuming countries of Asia, there is a taste for a granular structure in boiled rice. In other parts of the world, however, glutinous staples are highly preferred (Hartog & Staveren, 1985). Traditional Malaysian Food Regional Diet of Ethnic Group Malaysia has three ethnic groups, which have different food habits. The Malay diet is rather monotonous. The Chinese spend more on their diet than the other groups; their diet is slightly better, but quantities are still small. Indians only eat parboiled rice, and Indian dishes, and almost every side dish is cooked with chilis, pepper and salt. The Chinese eat fresh or dried pork in most of the meals. Pork, fish or prawns are generally cut into small pieces, then cooked with spices and vegetables in soup or sauce. Indians cook their foods similar to the Chinese. Eggs are eaten by all groups but in very small amounts and infrequently; scrambled eggs are sprinkled over fish or hard boiled and cut in curry. Pulses and grams are eaten frequently by Indians, soybean by the Chinese, and less frequently by Malays. Vegetables are used by the Chinese at most meals, but usually those with least nutritional value such as cucumbers and cabbage. Malays eat very

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few vegetables. Their meals are usually rice, fish and red peppers. Fruits (usually banana) are eaten as a snack for all groups. Quantities of non-rice food, or, snack food is only eaten in small amounts. Di, ets by Regions in Malaysia Kelantan In Kelantan, according to Whyte (1974), tapioca is the staple food, while rice is eaten occasionally. Marrows, bananas, sugar cane, and maize are also grown and eaten. Hunting and fishing supplement the kelantan diet, and no eggs are eaten. Melanau Community Sarawak The Melanau eat coffee, sago biscuits and dried fish for their first meal. If money is available, water biscuits made of wheat flour from Singapore will be served. The midday meal is comprised of dried fish eaten with boiled rice, a few vegetables, and sauce, which is eaten more as a relish than as a separate dish. The evening meal like a breakfast, includes coffee, sago biscuits and dried fish. If any boiled rice is leftover from lunch, this may take the place of sago biscuits. The Melanau eat more fish than usual during the fishing season, which is in January and February. In times of hardship, less rice is available and more sago biscuits are eaten (Whyte, 1974). Sdangor Wealthier households eat more expensive food such as meat, fish, poultry and vegetables, and also lauk (seaweed). Poorer households usually supplement their diet with home produced fish, vegetables and, occasionally eggs (Whyte, 1974) 9 Perak and Majacca Kampong In Perak and Malacca Kampong, boiled rice is eaten with side dishes like, animal or vegetable foods, or, if not available, sambal which is made of chili, salad and lemon juice which is always present. Flavorings and spices are important in this region. Meat, fish or egg side dishes are preferred over vegetables. Rice is cooked twice daily. The rice is usually cooked early in morning and they will return from the fields to eat their lunch. The evening meal is usually cold

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leftovers. The side dishes are usually prepared once daily before lunch and the extra food are put aside. Coconuts are available in Malacca. They consume the coconuts 3 or 4 time per week. Fried food is common in Perak. Leafy greens such as: spinach, radish, chinese chives, cabbage, mustard leaf, tops of papaya, sweet potato, tapioca, pumpkins are purchased in Perak. Rice, green gram ponidge, biscuits, cakes, and peanuts are eaten as snack food. Fruit is not part of the regular diet (Whyte, 1974).

Malacca Coastal Plain The diet in the Malacca Coastal Plain is essentially rice, with small amounts of wheat, little fish, small amounts of vegetables, and a few highly flavored food stuffs. In time of scarcity, other cereals and root crops are eaten. Malays rarely eat legumes, although they are for sale; eggs are also rarely eaten. The Indians in this region take milk., especially children. Indian cooking is prolonged and tedious, while Malay cooking is fast and easy (Whyte, 1974).

Pahang The diet of most rural Malay families is deficient in protein-fifty-six percent do not consume meat, while others eat meat rarely and in small amounts. However, Dried fish is usually eaten by 90% of the families, which purchases fish in small quantities. Beans and spinach are a good source of protein, iron, and vitamins A and B-10 complex, but the consumption is limited. Regarding infants, fifty-six percent are under 12 months are breastfed, while 44% are on a sweetened condensed milk diet, with some in combination with breast milk. Only 16 percent of Malays' babies receive powdered milk.

Trengganu Trengganu is a fishing village of 550 people whose economy is dependent upon the sea. Rice is also grown in Trengganu. Food intake was observed in a family of five with average income: Their meals was comprised of flour pancakes with sugar, rice noodles in coconut milk., fish curry, fish stew with spices, and rice. For <https://assignbuster.com/food-consumption-among-malaysian-students/>

snacks, corn on the cob, cakes, banana, and green mango with soy sauce were consumed, in addition, tea and coffee were consumed with sugar (Whyte, 1974). Sabah In Sabah, rice from paddies is staples, along with sweet potato, maize local spinach, edible fungi, bananas, and jungle fruits. In addition, most families cultivate gardens and plant trees, for example, sweet potato, greater yam" tapioca, bottle gourd, mung bean, garlic, elephant's ear, tomato, melon, squash, chili, onion, ginger, betel, cowpea, corn mustard, peanut, pineapple, watermelon, eggplant, sugar cane, cabbage, and sago are cultivated by most families. Other plants that are being cultivated are coconut, bread fruit, banana, mango, papaya, Malay apple, durian, lime and other citrus fruits, and coffee beans (Whyte, 1974). In primary jungles, hunting and gathering are usually done. Supply wild fowl, deer, pigs and fish. There, fish and meat are often salted and stored in bamboo containers with rice and herbs for 6 to 9 months. Most jungle animals are considered edible, especially pig, deer, ant eater, bear, gibbon, orangutan and other monkeys, and rats. Jungle fishing is done by bamboo traps in streams, irrigation channels and paddies, and also by nets, lines and poles. In addition, fruits and vegetables are gathered from the jungle, and some vegetables, dried and pickled meat may be marketed. Jungle inhabitants may also keep chickens, ducks and geese for storage. In ritual, chicken, pig and cow are important, and are subsequently eaten, while dried, salted and fresh fish are eaten several times a week. Eggs, vegetables and fruits are also eaten regularly, and rice is taken increasingly to Chinese shops for polishing (Whyte, 1974). Food and Nutrition in Malaysia Food includes the solid and liquid materials which provide for body growth, energy supply and in regulating of body processes. Nutrients are those substances

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present in foods which perform one or more of the function. The nutrients in foods are carbohydrates, proteins, fats, vitamins and minerals: (Chong, 1969). In Malaysia, carbohydrate can be obtained by rice, rice products, products of wheat flour such as bread, noodles, chapatties, tapioca, sweet potato, Irish potato, milk powder, bananas, and papayas. Refined cane sugar (sucrose) in drinks and beverages and milk sugar (lactose) are other important sources of carbohydrates. The protein content from animal sources of some Malaysian foods are dried shrimps, ikan bilis (dried), milk powder (whole), prawns (fresh), lean beef or mutton, poultry (dressed), fish, lean pork, eggs, cockles (kerang), and cow's milk (liquid). The protein content from vegetables comes from soybeans, groundnuts, grams/dhal, bread or Chapatti, soybean curd (tofu), rice (uncooked), fresh beans or peas, bean sprouts (tongkol), and soymilk. Malaysian foodstuffs which are rich in vitamin A in animal foods are fish, liver oils, livers (chicken, beef or pig) butter, eggs and milk. Malaysian foodstuffs which are rich in carotene from 12 vegetables and fruits are red palm oil, ceker manis, carrots, Chinese vegetables such as kailan, sawi (mustard leaves), kowkay (Wolfberry leaves) and bak choy (Chinese cabbage), spinach, kangkong, papaya, watermelon (red variety), sweet potatoes (yellow-orange variety) and mangoes (Chong, 1969). Foods that are rich in thiamin are rice bran, yeast, undernirined rice, parboiled rice, whole meal bread (brown), groundnuts, pulses (example grams), and animal livers, lean pork and bean sprouts. Riboflavin sources are yeast extract (example marmite), animal livers and kidneys, lean meat, cow's milk and eggs, nuts and pulses, dark green leafy vegetables: kale (Saur), Chinese cabbage (Bak choy), kang-kong and ceker manis. Fruits and vegetables that are rich in Vitamin C (ascorbic acid) are papaya, guava,

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rambutan, starfruit, pineapple; drumstick, kailan (chinese mustard leaves) large peppers and c~lies saur, chekor roanis: bayam (spinach), kangkong, bean sprouts (towgeh) (Chong, 1969). Sun-dried fish eaten with its bones such as ikan bilis are excdlent sources of calcium. Soybean products like towhu (bean curd), and soyrnilk require the addition of calcium salts during its manufacturing. Milk and dairy products are other good sources of calcium. Foods that are rich in iron are mainly from animals include ikan bilis, kerang, dried shrimp and balachan. Foods that are rich in iron in plants are dried peas and beans and all dark green leafy vegetables. Iodine-rich foods are sea-fish, shell-fish and seaweeds, ikan bilis and other dried sea-fish, balachan, dried shrimp, mannite and tinned mustard (Chong, 1969).

Nutritional and Health Knowledge Nutrition knowledge can influence people's attitudes, and also enhance the 13 people's ability to mak, e rational decisions about food choices, but such knowledge only function when people are ready to make changes. Knowledge by itself is not the instigator of change. From research on other health-related behaviors, " emotional readiness" is needed for a person to shift from a present to a different kind ofbehavilor in order for factual knowledge to be accepted (Hochbaum, 1981). The factors that influence food choices are the desire to avoid weight gain, limited financial resources, limited access to food; and low levels of nutrition knowledge (Betts, Amos, Georgiou, Hoerr, Ivaturi, Keirn., Tinsley and Voichick,] 995). Providing nutrition information is known to be the traditional approach to effect changes in behavior, however, according to Hochbaum(1981), increases in nutrition knowledge have not been found to improve dietary behavior. This failure of education to promote behavior change may be due to a lack of selection ofthe nutrition education message

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that are relevant to the consumer group. In a study of students at the University of Malaysia, respondents who took home science courses in high school scored higher in nutrition as evidenced by their knowledge of sources and functions of specific nutrients. The respondents were primarily women, however, the study did not show that the improvement of eating habits among women. The food habits of college students might be influenced by many factors and one of them was the type of food service available on campus. The acceptance and rejection of these foods by the students might be determined by the frequency or skipping of meals. Female students tended to skip meals more than male students. The reasons given for skipping meals were lack of hunger, lack of familiarity with food and weight consciousness. The practice of skipping meals has encouraged students to turn to snack foods that might have 14 high calories. This same study also showed that college students have poor intake of ascorbic acid and iron. Half of the students perceived food quality as having the following aspects: nutrient content, appearance, taste, variety and freshness of foods (Mcujon & Choo, 1986). According to Story & Harris (1989), Southeast Asian refugee families living in the United States indicated that their diets are healthier prior to immigration. The primary reasons given for a healthier diet in the United States were an abundant food supply with a wide variety of foods and refrigeration. Einstein and Hornstein (1970) examined the relationships between food preferences and nutritional values of foods. The percent of the RDA provided by one serving of a given food item was calculated for vitamin A, vitamin C, calcium and iron. The results indicated that if food preferences were the sole determination of food intake, then, the dietary intake would be low in vitamin A. The best sources of vitamin A were among the most

disliked foods in the entire survey. The relationship between food preferences and possible vitamin C and calcium deficiencies were not clear-cut. There was little evidence to show food preferences for foods that contain significant amounts of iron, especially liver, one of the best sources of dietary iron (Einstein and Hornstein, 1970). In addition, in order to successfully promote positive, lasting food intake changes in a specific group. Examining the common traits, beliefs, life-styles and interest of the consumer group may be necessary (Senaur, Elaine, and Kinsy, 1991). People who are adapting to the new culture and are unable to obtain the foods they are used to eat at home, might make unsatisfactory substitutions nutritionally in the new cultural setting (Irons, 1974). Cultural diversity does influence food selection and eating habits of persons of 15 in all societies throughout history. Knowledge and understanding of local beliefs, customs and practices are also necessary to be studied, in order to, refine guidelines for planning, developing and designing appropriate and effective nutrition intervention programs for the people who are adopting to the new culture. In dealing with concepts of health and nutrition in the developing world, one must first begin from the perspective of the people in the different culture being studied, in order to implement a nutrition education for the developing countries (Vemury & Howard, 1978). According to Melby, Femea and Sciacca (1986), the major influences on health status are diet and physical activity. Current nutrition education is not the complete answer in changing food habits; however, if the greatest influences on food habits were known, then perhaps future nutrition education could be made more effective (Irons, 1974). Cultural Aspects of Food Today, especially in developing countries, food traditions continued to play an important part of the social, economic

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and religious life of many societies. They often helped to maintain cultural identity and traditional values that are often characterize food habits and point out the necessity of looking at each culture individually on its own terms (Vemury & Levine, 1978). The cultural identity of a group of people or even whole nations may be established by food. Food avoidances or taboos in a society show differences between various groups and as a means of cultural identity. For example, in Moslem countries with Christian communities, eating of pork distinguishes the two different groups quite clearly. Pork is avoided to a greater or lesser degree among the many Moslems in this part of the world depending upon the orthodoxy of the group. The Orang Asli (Native Malaysian), an aboriginal jungle tribe in West Malay, avoided eating certain animals because they may contain kindred spirits (Vemury & Levine, 1978). The same applied until recently in Europe where the eating of fish or meat on a Friday indicated whether people were Roman Catholics or not (Hartog & Staveren, 1983). Nevertheless, as a group, nonwhite ethnic minorities spend more time eating at home. They buy fewer dairy products, and less cheese but more poultry. This is probably because beef is unacceptable to Hindus. Racial structure of the population is implicated in the decline in milk consumption, especially in non white households, where they consume less milk because of cultural differences and inability to digest milk protein (Frank, 1987). According to Hochbaum (1981), food purchasing, preparation, and consumption behaviors are determined by psychosocial, cultural and certain situational factors. Social and cultural factors influence not only what to eat but also when we feel the need to eat. Although the sensation of hunger is produced by the physiological phenomenon of gastric motility, it can also be produced merely

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by the awareness that the accustomed mealtime has arrived (Hochbaum, 1981). What foods we select, how we prepare them, when we eat, and even when we feel hunger, are mostly learned behaviors. Some of these behaviors are deeply influenced by cultural norms and tend to resist any but moderate modifications. Foods that may be considered delicacies in one culture are rejected as odious in others. Even within the United States, wide variations in food preferences can be found in geographic regions and religious and ethnic subculture (Hochbaum, 1981).

17 Food Habits According to Postel, McComber, Hinz and Finley (1993), actual food behaviors are the result of the synergistic relationships among biological, ecological, and socialcultural environments. Food habits which may be defined as standardized behaviors within a given culture must be viewed in the total complex of behavior. .

Food habits were acquired through the processes of acculturation and enculturation, or socialization-learning to do what was expected of one within one's own culture under particular circumstances. A food habit is also behavior, but not all food behaviors can be classified as a food habit. Food habits were repetitive, characteristic acts, largely automatic, that an individual completes in order to satisfy a real or imagined need for food.

Human dietary adaptations involved responses to external factors like environmental change, as well as to internal cultural factors such as patterns of selection exchange, or redistribution of resources. Food habits are related to ethnic identity, culinary tradition, social structure, social status, and cultural changes. Dietary intake are not totally influenced by outside forces. Rather, people make individual dietary intake decisions due to personal ofvalues and goals, most of which are not concerned with nutrition. Personal pr, eferences, tradition and appropriateness, status and prestige, finances

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and economics and the availability and accessibility of stuffs all play a role in determining dietary selection and dietary need. The impact of tradition is great. As a result, the kinds of food considered edible, the way of preparing it, and the manner of consuming it are deeply embedded in the behavioral systems of each culture (Frank, 1987).¹⁸ According to Mead (1964) and Hochbaum (1981), food habits result from past experiences. Food habits are also influenced by genetic characteristics, childhood experience, trauma, and habits of handling inner and outer stimuli. Food choices are deeply rooted in the person's past (Mead, 1966 and Hochbaum, 1981). Brown (1945) and Bass, Wakefield and Kolasa (1979) and Slare & McWilliams (1971) stated that the factors which influence students' food habits were parental influence, especially by the mother, regarding parental policies, concerning food served at meal time. The family community customs are an important influence on children's food habits. Social class influences the family food patterns (Iron, 1974), and variety and appearance of food served (Brown, 1945). According to Brown (1945), Marjon & Chao (1986) and Lion (1974), the factors that influence family's food habits are: Pressures of life, influence of peers, and influence of eating situations. College students represent a group whose food habits are being influenced by many factors, namely peer pressure, pressure of life, living arrangements, financial situations, nutrition knowledge and the food service available (Brown, 1967). Diet may also be affected by availability and acceptability of food. The various phases and functions of economics definitely affect availability while acceptability is determined by cultural and symbolic influences. Economics of Food Invariably, food spending differs significantly between immigrant and indigenous household; possibly because immigrants and the children are more prone than average

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to unemployment. The young are more affected than the old and certain ethnic groups more than others (Frank, 1987). 19 According to Frank (1987), developing countries were concerned about food shortages. However, the causes of widespread malnutrition were often caused by poverty and uneven income distribution in the long term instead of the insufficiency of food production. People can attain sufficient food only if they have adequate incomes. Economic policies, such as, those on internal and external trade, produces prices, and methods of financing and distributing food will cause a countries to be vulnerable to food shortages. On the other hand, higher income provides a variety diet, at the same time growth in domestic production and imports ensures a continuous and sufficient food supply. By any international standard, diets are poorest in the Far East in Africa. Throughout most of this region the daily average per capita intake is considerably below the standard estimated by the Food and Agricultural Organization (FAO) as adequate: While the energy content of the diet in Africa is higher, the quality is poorer due to heavy dependence on carbohydrate foods. Diets in the Near East and Latin America are generally better than those in the Far East and Africa. The greatest need of Far East and Africa is proteins of high nutritive value. Even in the less developed countries, the demand for food often failed to produce a sufficiently nutritious diet because of the existing level of income. Sufficient dietary intake could only be improved by raising the productivity and having higher income. Social and economic development are a necessary condition for improving nutritional standards, for reducing rate of population growth, and ultimately for a stationary world population.. Under conditions common to the less developed regions, excessively rapid population growth tended to

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retard economic growth. Beyond a certain point, provision of cheap food for the poor by income transfers, by aid relief efforts and by other types of food and nutrition programs 20 reduces economic growth and make it harder to finance the measures wanted by the government. Increasing demand for food was closely linked to population growth. Less developed countries were engaged in a race to keep food supplies growing at least as fast as population. Although production of food had grown faster than population, consumption of food had grown even faster because of imports. Food in developing countries' food consumption grew at 3.5% a year between 1971 and 1984, while population grew at 2.0% a year. However, in Africa, consumption grew at only 2.6% a year which was less than the continent's 2.8% annual growth in population (Frank, 1987). Acculturation To a large extent, choice of food depends on what a person has learned to accept. The foods that immigrants choose to eat are quite limited and they tend to resist strange foods. Among all immigrants, a period of adaptation and acculturation is necessary before accepting any food that are unfamiliar to people's culture (Frank, 1987). Immigrants to a new land will give up their food behavior provided the old foods if their ingredients or reasonable substitutes are still available. Immigrants may be pressured to conform to language, dress, and other customs. In the privacy of their home, they can select, prepare, and enjoy foods that meet either old or new expectations. Adapting to those forces at work in an alien environment is a learning process termed acculturation. For some groups, the alteration of food behavior required to maintain health and well-being would be large because the food will be totally different from their country (Bass, Wakefield and Kolasa, 1979). The changes in food habits will depend on the flexibility of

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these habits. One factor related to flexibility is whether a culture's traditional food can be replaced by another food. Changes in availability of food are one obvious cause of changes in food habits (Mead, 1943). To change food habits successfully, we must know something about food traditions in different cultures with emphasis on the fact that the tradition is both meaningful and conservative. For example, in a related study by Yang & Read (1996) discussed the dietary pattern changes, food preparation techniques, food practices, and nutrition beliefs before and after immigration among 124 immigrants. Results indicated that the pre-immigration diet is relatively low in fat, high in carbohydrate and high in fiber. Comparison of post-immigration diet to the pre-immigration diet indicated a significant increase in the intake of cholesterol and fat, especially saturated fat and unsaturated fat intake; conversely, there was a decrease in carbohydrate intake. The survey concluded that: 1) Upon immigration, the Asian immigrants increased fat and cholesterol intake, decreased carbohydrate and fiber intake, 2) Yet, by American standards, the Asian immigrant's current diet is relatively low fat, high carbohydrate and high fiber, and 3) further research is needed to study the health effects of these changes. According to Story and Harris (1989), Southeast Asian refugee families have changed their food buying practices drastically in the United States. In Southeast Asia, the adults have primary responsibility for family meal preparation. In Southeast Asia food is generally purchased daily from independent vendors who sell meat, produce, and other foods in open markets. The study showed that most of them shop for food at least once a day while they were still in Southeast Asia, but there is no one shopped on a daily basis in the United States. The basic meal pattern in Southeast Asia

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consists of breakfast, lunch, dinner, and occasional snacks between meals. Each meal is typically based on rice and is accompanied by a dear or a vegetable soup, fish, or meat and vegetables (fresh and dried). However, after coming to the United States, most immigrants change their meals drastically. Most of them ate all three meals together in Southeast asia, meanwhile, the only meal they eat together after arriving in the United States is the evening meal. The study also showed that most adults preferred eating their native foods, while their children preferred both American and native foods. The research also showed that 30% of the teenagers in the home had major responsibility for meal preparation, and almost 25% of the teenagers did most of the food shopping. As a result, it is necessary to conduct nutrition education for the teenagers regarding general education nutrition issues, and cooking American foods, and the nutrition quality of specific foods. They can then make informed decisions about adapting to new food ways and making healthy food choices in the new environment (Story & Harris, 1989). Given the cultural determinants of food habits, certain attributes of culture should be considered especially by the individual who sees the need to change dietary patterns in a sociocultural system. " 1. One important attribute of culture is that culture is a learned experience, not a biologically determined experience. It is the product of interaction among generations, always with some modification over time. Thus, the notion that culture is learned also implies that it can be unlearned. 2. Change is another attribute of culture, and culture processes change at different rates. Thus, we can view food habits as a dynamic process, always changing, and, 3. Every culture also resists change by self generated mechanism to perpetuate its culture traits and maintain its boundaries. Food

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habits, although far from fixed, like all fundamental habits, are resistant to change (Sanjur, 1982, p. 3- 4)." 23 Many cultures have contributed food habits to the United States: food, food preferences, and general food behaviors have been brought to the United States from every part of the world (Bass, Wakefield & Kolasa, 1979). In contemporary society occurs change in food habits more rapidly and to a greater extent than in the past, because travel, and mass communications are indeed making the world 'smaller', and people today are more aware of other cultures and foods, in addition, they are less bothered by differences in food choices than they were even a few decades ago. Furthermore, traditional diets have undergone dramatic change when they are exposed to outside contacts, and breakthroughs in technology contribute to changes. Food habit changes took place in the various ethnic groups examined, and did so rapidly, the environmental and technological forces brought about to the changes in food habits. Eating patterns also seem to be influenced by changing societal values. Economic changes have such an impact on the behavior and social attitudes of people that a change in economic status altered even the staple food produced and made new products likely to be adopted. Very often, the opening of new roads between rural areas and large urban centers will facilitate food habit modification (Mead, 1943 and Frank, 1987). Likewise, the developed countries consume more meat, milk, and other animal products compare to the developing countries (Frank, 1987). Long Term Dietary Changes According to Frank (1987), the foods that people choose to eat, and the resulting pattern of consumption are determined by events and circumstances in the wider 24 environment. In the past, the availability of food was the most important influence on dietary habits; viewed in the long-

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term it can be seen that: *Consumption of total dairy products has increased; liquid milk consumption has gone up slightly but there has been a vast increase in cheese consumption. *Meat consumption has increased; in recent years there has been a phenomenal rise in the consumption of poultry and game. *The number of eggs consumed has increased. *Butter consumption has increased; since the 1930's consumption of other fats has gone up; margarine consumption, unrecorded before 1909, has increased over a seventy year period. *Sugar consumption has risen. *Consumption of vegetables has almost doubled, and that of fruit has increased. In contrast: *Potato consumption has gone down. *Fish consumption has decreased. *Wheat flour consumption has halved, and other cereals' consumption has fallen. At an individual level, eating habits are influenced by a great many factors including the range of food available, personal lifestyle, family traditions, health concerns, and the level of an individual's knowledge of and interest in food.

Short Term Dietary Changes - 25 It is generally understood that supply and demand can be controlled by a price - that is the purchase pattern of any commodity is governed by price. However, in the short term, the demand for some foods is unrelated to the movement in prices, consumption of expensive products continues to rise independent of the general rise in retail prices. It also appears that consumer attitudes are increasingly affecting people's food consumption habits. Healthy eating and quality products are becoming important determinants of food consumption patterns. Fluctuations in price have some effect in changing eating habits, but they are not the total explanation. On the whole, relative price is less important than it used to be. Patterns of food consumption are no longer determined by economic factors alone, impart.

because health interests also influence the food choice of individuals (Frank, 1987).

CHAPTER II METHODOLOGY

The purpose of the research was to determine the food consumption behavior, nutrition and health knowledge, and dietary changes among Malaysian students at Oklahoma State University. The research design, population and sample, data collection, and analysis of data will be included in this chapter. The study was approved by the Oklahoma State University Institutional Review Board and International Student Services.

Research Design

A descriptive status survey in the form of a mailed questionnaire was used in this study. The purpose in status survey research is to describe, analyze, and interpret conditions that exist. It uses comparison or contrast and tries to discover relationships which exist between variables (Best, 1981). The dependent variables in this study were the food consumption behavior, and nutrition and health knowledge of Malaysian Students. The independent variable included selected demographics of Malaysian Students at Oklahoma State University.

Population and Sample

The population, which was also the sample in this study, was all Malaysian students enrolled at Oklahoma State University, Stillwater, Oklahoma during fall semester, 26 & 27 1996. The labels of the names of students (N= 422) were obtained from the International Students Service, Student Union. Sixteen students did not have Stillwater addresses, hence only 406 questionnaires were mailed out. The questionnaires were sent with a cover letter explaining the purpose of the study and the importance of the students' involvement in the study. Eight questionnaires were returned because of wrong addresses. Perhaps, the students moved out of Stillwater or have graduated. Therefore the total sample/population was N= 398.

Data Collection Planning and Instrumentation

Research plans

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were started during Spring semester 1996, while, the questionnaire was developed during Spring'96 and Summer'96. Specific sections were included based on literature review and adapted from other research instruments (Kuo, 1996, Woody, 1973, Warren, 1962, Abbott, 1957, Hunt, 1973, Plato, 1993, Mujeib, 1949, and Woody, 1968). The content validity, format and clarity of the questionnaire were examined and approved by the graduate committee. The questionnaire was divided into three parts: 1) General Information, 2) Food Consumption Behavior, and 3) Nutrition and Health Knowledge. Part I included questions about demographics, Part II comprised of questions concerning eating habits, meal patterns, missed meals, favorite snacks and while in Malaysia and foods preferred upon arrival in the United States. Part III comprised of questions concerning the Food Guide Pyramid and general nutrition knowledge.

28 Procedures A mini-proposal, cover letters and questionnaires were sent to the Institutional Review Board (IRB) for approval. Five hundred questionnaires were photocopied at North Engineering Department Duplicating services. The questionnaires were folded and stapled and taken to the International Student Office where address labels were provided. The cover letter introduced the researcher, provided the purpose of the study, instructions on how to complete the information sought, and the students were assured that confidentiality will be enforced. Only the researcher will have access to the raw data and she will not know the names of the respondents. The addressed questionnaires were mailed out by the International Student Services, using the University Central Mailing Services. Respondents returned the completed questionnaire to the researcher. Data Analysis All questionnaires received within three weeks of the mailing were included in the data analysis. The data collected

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were transcribed into computer for statistical analysis using the software program PC-File TII. A total of 153 (38. 4%) were return. The data were coded and filed on a PC file and tabulated for analysis. Chi Square analysis was used to determine the association between variables. CHAPTER IV RESULTS AND DISCUSSION The study was undertaken to investigate the relationships between food consumption behavior, nutrition and health and dietary changes among Malaysian students at Oklahoma State University. There were 422 Malaysian students enrolled at Oklahoma State University during fall, 1996, according to the International Students Office, however, 24 did not have updated addresses or may have graduated, hence questionnaires were sent to 398 students. The response rate was 38. 44% (N= 153).

Characteristics of Malaysian Students Gender. Age, Ethnk, Marital Status and Family Size Of the 153 respondents, about two thirds were males (N= 97), and one third (N= 56) were females (Table 1). The age ranged were from under 20 to older than 36, however, the predominant age range was 21-25 (82%). The predominant ethnic composition of the students were Chinese (N= 127, 83%), followed by Malay (N= 23, 15%), and other (N= 3, 2%). Most of the Malaysian students at OSU were single N= 142 (93%) and almost aU N= 130 (86%) did not have any family members in Stillwater (Table I). 29 30 Education level and College The academic level of most of the Malaysian students at OSU were Juniors and Seniors. Forty-five percent (N= 66) of the students were enrolled in the College of Business Administration. Forty-four percent (N= 64) ofthe students were enrolled in the College ofEngineering, Architecture and Technology (Table I). RetiBion Most of the Malaysian students were Buddhist, (N= 64, 42%). Although 21% (N= 52) indicated no religious preferences, 18% (N= 28) were Christians and 15% (N= 23) were

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Muslims (Table I). Length of Stay in the United States The majority of the students (N= 66, 43%) have been in the US less than one year. About 1/3 of the students have been here 1-2 years, while 25% (N= 38) have lived in the US for more than 2 years (Table I). Where Family Lives in Malaysia Most of the Malaysian students were city dwellers (52. 3%, N= 80). There were 41. 2% (N= 63) who resided in towns, while 18. 3% (N= 28) of the students were from village (Table I).

31 TABLE! CHARACTERISTICS OF MALAYSIAN

STUDENTS Characteristics Gender: Male Female ~: N 97 56 16 126 8 1 2 142

10 1304 1 14 127 23 3 % 63. 4 36. 6 10. 5 82. 4 5. 2 36 Marital Status:

Single Married Family Size: None 0. 7 1. 3 93. 2 6. 6 85. 5 2. 6 0. 7 9: 2 83 15

2 7. 5 45. 2 43. 8 2. 7 17. 7 77. 1 5. 2 43. 14 31. 4 24. 8 52. 3 41. 2 18. 3 41.

8 20. 9 18. 3 15 2. 7 Spouse Children(#) Others: Ethnic: Chinese Malay

Others Colleges: College of Arts and Sciences College of Business

Administration College of Engineering, Architecture & Technology College of

Human Environmental Sciences Education: Freshman and Sophomore Junior

and Senior Graduate Length of stay in the United State: 2 Years Family live in

Malaysia: City Town Village Religious: Buddhist No Religion IS Preference

Christian 11 66 64 4 27 118 8 66 48 38 80 63 28 64 32 28 23 4 Muslim

Others 32 Food Consumption Behavior of Malaysian Students Meal pattern of

Malaysian students Forty-three percent (N= 66) of the students ate breakfast everyday. In contrast, 11%, (N= 16) did not eat breakfast at all (Table II).

Almost 2/3 of the students (N= 97, 63. 4%) ate lunch while 77% (N= 118) ate dinner daily (Table IT). TABLE IT : MEAL PATTERN OF MALAYSIAN STUDENT

Meals Breakfast: None 25 a 1 10 9. 09 2. 00 50 11 90. 91 15. 15 66 132

-----+-----+-----+-----+ Total Frequency Missing = 21 STATISTICS FOR

TABLE OF AGE BY BREAKFAST Statistic Prob Value DF

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-----4 Chi-Square 11. 289 0. 024 , l. · l l ---_.

75 .. TABLE OF ETHNIC BY BREAKFST ETHNIC Frequency Row Pct Col Pct

Chinese 13 11. 61 86. 67 2 11. 11 13. 33 15 BREAKFST 0 -----+-----

+-----+-----+-----+-----+-----+ l 11 21 3 12 10. 71 80. 00 3 16. 67 20. 00

15 l 41 Total 112 1 0. 89 25. 00 3 16. 67 75. 00 4 6 5. 36 85. 71 1 5. 56 14.

29 7 21 18. 75 87. 50 3 16. 67 12. 50 24 -----+-----+-----+-----+-----

+-----+ Other 18 -----+-----+-----+-----+-----+-----+ Total

(Continued) 130 TABLE OF ETHNIC BY BREAKFST ETHNIC Frequency Row Pet

Col Pct Chinese 15 13. 39 83. 33 BREAKFST -----+-----+-----+-----

+-----+ 4 3. 57 100. 00 0. 00 0. 00 4 39 34. 82 92. 86 l' 0. 89 100. 00 0. 00

0. 00 1 51 61 71 211 Total 112 Other -----+-----+-----+-----+-----+ 3

a 3 a 16. 67 16. 67 16. 67 7. 14 42 18 -----+-----+-----+-----+-----+

Total 18 130 Frequency Missing = 23 STATISTICS FOR TABLE OF ETHNIC BY

BREAKFST Statistic Chi-Square DF 8 Value 15. 563 Prob 0. 049

----- e " ' , l TABLE OF MS BY BREAKFST MS

Frequency Row Pct Col Pct Single BREAKFST al 11 21 31 41 -----+-----

+-----+-----+-----+-----+ 15 12. 10 100. 00 0. 00 0. 00 4 3. 23 100. 00

0. 00 0. 00 6 4. 84 85. 71 14. 29 14. 29 ~ Total 124 15 12. 10 100. 00 0. 00

0. 00 23 18. 55 95. 83 14. 29 4. 17 24 Married -----+-----+-----+-----

+-----+-----+ a a 1 a 1 -----+-----+-----+-----+-----+ 15 4

7 15 7 Total (Continued) 131 TABLE OF MS BY BREAKFST MS Frequency Row

Pct Col Pct 13. 71 94. 44 Married 1 14. 29 5. 56 18 BREAKFST 51 3. 23 100.

00 0 0. 00 0. 00 4 6 32. 26 93. 02 3 42. 86 6. 98 43 71 211 0. 00 0. 00 1 14.

29 100. 00 1 Total 124 -----+-----+-----+-----+-----+ Single 17 4 40

a -----+-----+-----+-----+-----+ 7 -----+-----+-----+-----

+-----+ Total 131 Frequency Missing = 22 STATISTICS FOR TABLE OF MS

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BY BREAKFAST Statistic DF Value Prob -----0.006 21.260 8 Chi-Square f- . . 'l' l, ' ~ l. " . 1 ----_.... _ . __ . . 77 TABLE OF RELIGION BY DINNER RELIGION Frequency Row Pct Col Pct Buddhist 2 3.45 25.00 DINNER -----+-----+-----+-----+ 53 91.38 45.69 21 84.00 18.10 13 72.22 11.21 29 3 5.17 37.50 4 16.00 50.00 0 0.00 0.00 1 3.23 12.50 58 11 51 91 Total Christian -----+-----+-----+-----+ 0 25 0.00 0.00 Moslem -----+-----+-----+-----+ 5 27.78 62.50 1 3.23 12.50 18 Other -----+-----+-----+-----+ 31 93.55 25.00 116 Total -----+-----+-----+-----+ 8 8 132 Frequency Missing = 21 STATISTICS FOR TABLE OF RELIGION BY DINNER Statistic Chi-Square DF 6 Value 22.979 Prob 0.001 TABLE OF ETHNIC BY DINNER ETHNIC Frequency Row Pct Col Pct Chinese 2 1.79 28.57 27.78 71.43 Total 7 DINNER ' , .. 78' 11 102 91.07 88.70 72.22 11.30 115 51 8 7.14 100.00 0.00 0.00 8 91 Total 112 -----+-----+-----+-----+ Other -----+-----+-----+-----+ 5 !' 13 a 18 -----+-----+-----+-----+ 130 Frequency Missing = 23 STATISTICS FOR TABLE OF ETHNIC BY DINNER Statistic Chi-Square DF 2 Value 21.365 Prob 0.000 TABLE OF MAJOR BY DINNER MAJOR Frequency Row Pct Col Pct DINNER , ; .. - - 91 Total 10 1 -----+-----+-----+-----+ 219 a 10.00 12.50 3 7 11 51 90.00 8.57 50 86.21 47.62 0.00 0.00 58 1.72 14.29 52 -----+-----+-----+-----+ 12.07 87.50 0.00 0.00 Total 8 -----+-----+-----+-----+ 5 a 46 6 88.46 43.81 105 11.54 85.71 7 -----+-----+-----+-----+ Frequency Missing = 33 STATISTICS FOR TABLE OF MAJOR BY DINNER Statistic Chi-Square 120 DF 4 Value 11.360 Prob 0.023 -----~----- TABLE OF MS BY LUNCH MS Frequency Row Pct Col Pct Single 1 0.81 100.00 0.00 0.00 LUNCH -----+-----+-----+-----+ 3 2.44 100.00 0.00 0.00 3 3 2.44

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100.00 0.00 0.00 3 6 4.88 100.00 0.00 0.00 6 6 4.88 100.00 0.00 0.00
6 0 11 21 . 3 1 41 Total 123 Married -----+-----+-----+-----+-----
+-----+ 0 a 0 0 0 7 Total (Continued) -----+-----+-----+-----+-----
+-----+ 1 130 TABLE OF MS BY LUNCH MS Frequency Row Pct Col Pct
Single LUNCH -----+-----+-----+-----+-----+ 12 9.76 100.00 0 0.00
0.00 12 = 23 51 61 71 211 0 Total 123 3 2.44 100.00 89 72.36 93.68 6
85.71 6.32 95 0.00 0.00 1 14.29 100.00 1 7 -----+-----+-----+-----
+-----+ Married a 0.00 0.00 3 Total -----+-----+-----+-----+-----+
130 Frequency Missing STATISTICS FOR TABLE OF MS BY LUNCH Statistic
Chi-Square DF 8 Value 19.668 Prob 0.012
----- 0- , I I' TABLE OF AGE BY WORK AT
MEALTIME AGE Frequency Row Pct Col Pct Under 21 WORK AT MEALTIME 01
16 1 100.00 11.35: 1 11 0 0.00 0.00 9 7.14 75.00 3 27.27 25.00 12
Total 16 -----+-----+-----+-----+ 21-25 117 92.86
82.98 8 72.73 5.67 126 -----+-----+-----+ > 25 11 -----+-----
+-----+ Total 141 153 STATISTICS FOR TABLE OF AGE BY WORK AT
MEALTIME Statistic Chi-Square DF 2 Value 7.192 Prob 0.027 TABLE OF
FAMSIZ BY HATE TO COOK FAMSIZ Frequency Row Pct Col Pct None 108 83.
08 89.26 HATE TO COOK 0 -----+-----+-----+ 22 16.92 70.97 1 11
Total 130 -----+-----+-----+ Spouse 13 59.09 10.74 121 9 40.91 29.
03 31 22 -----+-----+-----+ Total 152 Frequency Missing = 1
STATISTICS FOR TABLE OF FAMSIZ BY HATE TO COOK Statistic Chi-Square DF
1 Value 6.668 Prob 0.010 -----+-----+-----+
_0- -----+-----+-----+ TABLE OF
AGE BY PREFER TO SLEEP AGE Frequency Row Pct Col Pct PREFER TO SLEEP
Under 21: -----+-----+-----+ 15 93.75 12.61 93 73.81 78.15 1 6.25
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2.94 01 11 Total 16 21-25 -----+-----+-----+ 33 26. 19 97. 06 126 Total
~::~----|~~~~~;|---~~~~| 119 34 -----+-----+-----+ 11 153

STATISTICS FOR TABLE OF AGE BY PREFER TO SLEEP Statistic Chi-Square DF

2 Value 6. 652 Prob 0. 036 TABLE OF SEX BY WORK AT MEALTIME SEX

Frequency Row Pct Col Pct Male 93 95. 88 65. 96 48 WORK AT MEALTIME

-----+-----+-----+ 4 4. 12 33. 33 01 11 Total 97 -----+-----+-----+

Female 8 56 85. 71 34. 04 Total 141 14. 29 66. 67 12 153 -----+-----

+-----+ STATISTICS FOR TABLE OF SEX BY WORK AT MEALTIME Statistic

----- OF 1 value 5. 072 Prob 0. 024 ----- Chi-

square 82 TABLE OF SEX BY DIETING TO LOSE WEIGHT SEX Frequency Row

Pct Col Pct Male DIETING TO LOSE WEIGHT -----+-----+-----+ 91' 6 93.

81 6. 19 01 11 Total 97 65. 94 Female 47 40. 00 9 -----+-----+-----+ 56

83. 93 34. 06 Total 138 16. 07 60. 00 15 -----+-----+-----+ 153

STATISTICS FOR TABLE OF SEX BY DIETING TO LOSE WEIGHT Statistic Chi-

Square DP 1 Value 3. 924 Prob 0. 048 TABLE OF RELIGION BY DIETING TO

LOSE WEIGHT RELIGION Frequency Row Pct Col Pct Buddhist 62 96. 87 44.

93 DIETING TO LOSE WEIGHT , 01 -----+-----+-----+ 2 3. 12 13. 33 11

Total 64 | ~ Christian -----+-----+-----+ 22 78. 57 15. 94 6 21. 43 1 28

40. 00 Moslem -----+-----+-----+ 22 95. 65 15. 94 4. 35 6. 67 23 Other

-----+-----+-----+ 32 6 84. 21 15. 79 38 23. 19 Total 138 40. 00 15

-----+-----+-----+ 153 STATISTICS FOR TABLE OF RELIGION BY DIETING

TO LOSE WEIGH1 Statistic Chi-Square DF 3 Value 9.821 Prob 0.020

----- 83 TABLE OF FAMSIZ BY TOO LITTLE

TIME FAMSIZ TOO LITTLE TIME Frequency Row Pet Col Pet None 68 52. 31 80.

00 -----+-----+-----+ 62 47. 69 92. 54 01 11 Total 130 Spouse -----

+-----+-----+-----+-----+-----+ 85 67 17 77. 27 20. 00 5 22. 73 7.

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Chi-Square DF 2 Value 7.981 Prob 0.018

-----~ TABLE OF FOOD HIGH IN FAT BY
 YOGURT FOOD HIGH IN FAT Frequency Row Pet Col Pet No No 36 94.74 29.
 03 86 SNACK3(Yogurt) IYes 2 5.26 8.00 Total 38 -----+-----+-----+
 -----+-----+-----+ Yes Total -----+-----+-----+ 124 25 88 79.28
 70.97 23 20.72 92.00 III 149 Frequency Missing = 4 STATISTICS FOR TABLE
 OF FOOD HIGH IN FAT BY YOGURT Statistic Chi-Square DF 1 Value 4.844
 Prob 0.028 TABLE OF SNACK FOOD BY YOGURT SNACK FOOD Frequency
 Row Pet Col Pet : No No 73 89.02 60.83 SNACK3(Yogurt) IYes Total 82
 -----+-----+-----+ I I 9 10.98 36.00 16 25.40 64.00 Yes -----+-----
 +-----+ 47 74.60 39.17 63 Total -----+-----+-----+ 120 25 145
 Frequency Missing = 8 STATISTICS FOR TABLE OF SNACK FOOD BY YOGURT
 Statistic Chi-Square DF 1 Value 5.193 Prob 0.023

----- _ - - 0_0',- 0 _ -- o .. _ . _ . _ - _
 - _ . ~ . . . _ 87 TABLE OF FOOD HIGH IN CHOLESTEROL BY GUM FOOD
 HIGH IN CHOLESTEROL SNACK6(Gum) Frequency Row Pet Col Pet No No
 -----+-----+-----+ 27 62.79 88 IYes I Total 43 16 37.21 Yes -----
 +-----+-----+ 83.81 76.52 115 17 16.19 51.52 23.48 48.48 105 Total
 -----+-----+-----+ 33 148 Frequency Missing = 5 STATISTICS FOR
 TABLE OF FOOD HIGH IN CHOLESTEROL BY GUM Statistic Chi-Square DF 1
 Value 7.779 Prob 0.005 TABLE OF FOODS HIGH IN FAT BY GUM FOODS HIGH
 IN FAT SNACK6 (Gum) Frequency Row Pet Col Pet No No -----+-----
 +-----+ 24 14 IYes Total 38 G3.16 36.84 41.18 20.87 Yes 91 81.98
 -----+-----+-----+ 79.13 20 18.02 58.82 111 Total -----+-----
 +-----+ 115 34 149 Frequency Missing = 4 DF STATISTICS FOR TABLE OF
 FOODS HIGH IN FAT BY GUM Statistic Value Prob

-----5. 696 0. 017 1 Chi-Square 88 TABLE
 OF FOODS HIGH IN FAT BY CHEESE FOODS HIGH IN FAT SNACK14 (Cheese)
 Frequency Row Pct Col Pet No No 32 84. 21 23. 36 105 94. 59 76. 64 137
 IYes 6 15. 79 50. 00 6 5. 41 50. 00 Total 38 -----+-----+-----+ -----
 +-----+-----+ Yes 111 Total -----+-----+-----+ 12 149 Frequency
 Missing = 4 STATISTICS FOR TABLE OF FOODS HIGH IN FAT BY CHEESE
 Statistic Chi-Square DF 1 Value 4. 122 Prob 0. 042 89 TABLE OF FOODS HIGH
 IN FAT BY CHEESE FOODS HIGH IN FAT SNACK14(Cheese) Frequency Row Pet
 Col Pet No No 32 84. 21 23. 36 IYes Total 38 -----+-----+-----+ -----
 +-----+-----+ Yes 6 15. 79 50. 00 6 105 94. 59 76. 64 137 111 5. 41 50.
 00 12 Total -----+-----+-----+ 149 Frequency Missing = 4 STATISTICS
 FOR TABLE OF FOODS HIGH IN FAT BY CHEESE Statistic Chi-Square DF 1