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Factors influencing nutritional status of rural low income elderly in Trinidad

Isabella Francis-Granderson

Lecturer, Human Nutrition and Dietetics & Human Ecology Degree Programme
Department of Agricultural Economics and Extension, E-mail:
isabella.granderson@sta.uwi.edu

Carlisle Pemberton

Senior Lecturer, Agricultural Economics and Agribusiness Degree Programme
Department of Agricultural Economics and Extension, E-mail: carlisle.pemberton@sta.uwi.edu

Abstract

The purpose of the study is to determine the factors that influence nutritional status among low-income rural elderly in Trinidad. Specifically the study sought to identify factors determining nutrition among low income rural elderly with regard to socioeconomic, demographic and personal characteristics. Using a three-stage sampling design, a structured questionnaire, 300 Old Age Pensioners were personally interviewed from counties St Andrew and St David from the sub-districts of Valencia, Manzanilla and Toco/Matelot, enrolled with the Ministry of Social Development, Social Welfare Division in Sangre Grande. The sample comprised of 155 women, 145 men, aged 65 to 103 years, mean age 75.88. The main predictors that influenced nutritional status among the respondents are age, sex and level of aspiration. These coefficients were significant at p-value = <0.05 percent significance levels (.001, .028, .000 respectively). The results indicate that age, sex and level of aspiration are the factors that positively influence nutritional status among low-income rural elderly. The study concludes that age, sex, and level of aspiration were the only useful predictors that determined nutritional status among low-income rural elderly in Trinidad.

Keywords: Isabella Francis-Granderson, Dr. Carlisle Pemberton, Nutritional Status, Nutritional Assessment, Healthy Eating Index.

INTRODUCTION

As the number and percentage of elderly in Trinidad and Tobago continue to increase, little is known about the social and economic factors that affect the older rural adults' nutritional status. This increasing longevity being experienced throughout the world has generated interest in older persons' nutrition and health. As a result, researchers are trying to determine the factors that influence nutritional status. The demand for good nutrition and health has surfaced as major issues for the elderly, yet, there is little evidence that the provision of these services have increased appropriately.

Attempts at improving nutrition services is underway in Trinidad and Tobago, but the level of care provided to the low income rural elderly does not appear to reflect what is required and there may be concerns with respect to the provision of good nutrition and health for this potentially vulnerable group. According to James, Nelson, Ralph and Leather

(1977) diet affects the health of socially disadvantaged people from the cradle to the grave.   Vitolins, Tooze, Dolden, Arcury, Bell, Davis, Devellis, and Quandt (2007), reported that a vast majority of low socio-economic status, older, southern rural adults are not meeting recommended nutrition guidelines; they had low Healthy Eating Index scores and 98.4% of the participants consumed diets that were poor or needed improvement.

Ryan *et al.* (1992) nationwide household survey to determine nutrient intakes of free-living elderly people (65 and older) reported that a substantial percentage of persons surveyed had inadequate intakes of energy and nutrients.   Over 40% of men had intakes of vitamins A and E, calcium, and zinc less than two-thirds the Recommended Dietary Allowance (RDA).   Similarly, over 40% of women had intakes of vitamin E, calcium, and zinc less than two-thirds the RDA.   In addition, over 20% of older men and women skipped at least one meal a day. These data indicate that the diets of a large proportion of non-institutionalized elderly Americans fail to meet nutritional standards.

Therefore, the problem of this study is to identify the factors that influence the nutritional status among rural elderly in Trinidad and Tobago.

The purpose of this article is to determine if personal and socioeconomic factors affect nutritional status among rural low income elderly in Trinidad.   Our main objective was to discover the factors that determine the nutritional status among low income elderly in Trinidad. This objective was met through three sub-objectives: to measure socio-economic, demographic and personal characteristics of the low income rural elderly; to assess the nutritional status of the elderly; and to measure the levels of aspiration of the rural elderly in Trinidad.

THEORETICAL FRAMEWORK

Nutritional Status

Nutritional status is a measurement of the extent to which the individual's physiological needs for nutrients is being met (Mahan and Escott-Stump 2004), or the state of health as it is influenced by the intake and utilization of nutrients (Smolin and Grosvenor 2000).

Nutritional Assessment

Nutritional assessment is the process used for determining the nutritional status of individuals or groups for the purpose of identifying nutritional needs and planning personal health-care or community programs to meet their needs.   Typically, this process requires a review or evaluation of one or more of the following: past and present dietary intake, medical history, physical examination, laboratory data and anthropometric measurements (Smolin and Grosvenor 2000).   Integration of data collected from the different components provides a more accurate picture of actual nutritional status than does one alone (Bartlett 1996).   For the purpose of this study diet history/intake and anthropometric measurements (height and weight) were used to indicate the nutritional status of the rural elderly.

Diet History

Diet history is a general term for information about dietary habits and patterns of individuals. It may also include a history of eating habits that will determine what people typically eat.

There are four methods commonly used for estimating dietary history/intake in surveys: the 24-hour recall, usual intake, food diary and food frequency.   The 24-hour recall and the usual intake were the

methods used in this study.

Although these dietary assessment methodologies have been recognized to have limitations regarding memory and reliability of the individual, they are the best tools available for evaluating dietary intake to predict nutrient deficiencies or excesses. According to Smolin and Grosvenor (2000):

Anthropometric Measurement

Anthropometric measurement is the external measurement of the body, such as height, weight, limb circumference, and fat-fold thickness. These measurements can be used to monitor changes in an individual over time. If an individual's measurements differ significantly from standards, he may have a nutritional deficiency or excess. Height and weight measurements were the two measures of anthropometric measurement applied in this study. These measures were obtained and expressed as the body mass index.

Body Mass Index (BMI)

The Body Mass Index is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is calculated as the weight in kilograms divided by the square of the height in meters (kg/ m²).

$$BMI = \frac{body\ weight\ in\ kilograms}{(height\ in\ meters)^2}$$

The BMI is a measure of an individual body weight or fat in relation to their height, and an indicator of an individual risk for undernutrition and overnutrition. This measure correlates well with body fat and has become a standard for assessing the degree of body fatness. BMI values are age –independent and the same for both sexes and, as a result may not correspond to the same degree of fatness in different populations due, in part, to different body proportions (WHO 2004). According to WHO (1995), the health risks associated with increasing BMI are continuous and the interpretation of BMI grading in relation to risk may differ for different populations. In addition, Casey (2006/07) reported that the use of the BMI as a measure of nutritional status for older adults should be interpreted cautiously since the BMI does not consider the variable height loss with age. An increase in BMI may not be a true indication of nutritional status, because many older adults lose height without weight loss. In addition, even as older adults body weight and lean body mass decrease, the percent body fat and visceral fat stores increase. As a result, optimal BMI values for US adults (BMI 18.5 – 24.9) may not be appropriate for the population age 65 years and older. In fact, the Committee on Diet and Health of the Food and Nutrition Board (1989) suggests that a desirable BMI is slightly higher in older adults than in younger adults. Bartlett (1996) also reported that a high BMI and a low BMI have been related to morbidity and functional disability, and that older people whose BMI was below the 15th percentile or above the 85th percentile at baseline had significantly increased risks for functional impairment. The author further noted that a high BMI increased the risk of disabilities in both young-old and old-old women (over 80 years of age). For the purpose of this study the following BMI classification for older adults in Table 1 on page 23, will be applied to determine the nutritional status of rural elderly.

Factors Affecting Nutritional Status

According to (Watson, Ronald 2001) the factors affecting nutritional status are multi-dimensional and interrelated. The multi-factorial risks for nutritional deficiencies associated with ageing include poverty,

appetite changes, taste and smell changes, ill-fitting dentures, underlying illness, drug interactions and side effects, and impaired digestion and absorption (Casey 2006/07). For the purpose of this study the following personal and socio-economic factors were explored.

Age

According to Vitolins, Tooze and Golden *et al.* (2007), a vast majority of low socioeconomic status, older, rural adults in the United States are not meeting recommended nutrition guidelines; 98.4% consumed diets that were poor or needed improvement. Nickols-Richardson and Johnson (1996) found that centenarians in the United States had significantly more biting or chewing problems when compared with elders in their 60s and 80s, and that elderly in their 80s and 100s wore dentures at a significantly higher rate than did elders in their 60s. Similar findings were reported by the USDA Center for Nutrition Policy and Promotion (1999), with an increase with age there is a slight, but gradual increase in the percentage of elderly with a poor diet or an indication of poor nutritional status. In addition, a number of studies have reported that nutrient absorption and utilization may be diminished by age (Vitolins, Tooze and Golden *et al.* 2007).

Gender/Sex

Although a vast majority of low socioeconomic status older, rural adults in the United States consume diets that are poor or needed improvement, the women were found to have higher mean healthy eating index scores than their male counterparts. Men were found to have higher consumption of meat, fish, poultry, beans, and eggs and more servings of oils, sweets and snacks than women (Vitolins, Tooze and Golden *et al.* 2007). In a

nationwide household survey conducted by Rayan *et al.* (1992), to determine nutrient intakes of free living elderly people (65 years and older) it was reported that a substantial percentage of community dwelling elderly had inadequate intakes of energy and nutrients. Over 40% of men had intake of vitamins A and E, calcium, and zinc less than two thirds the Recommended Dietary Allowance (RDA). While 40% of women had intakes of Vitamin E, calcium, and zinc less than two thirds the RDA. In addition, over 20% of older men and women skipped at least one meal a day. In addition, based on 1994-96 Continuing Survey of Food Intakes by Individuals and the Diet and Health Knowledge Survey that evaluates nutrient intake among single elderly women residing in rural areas, female rural elderly were found to have lower average nutrient consumption levels of protein, vitamins A, C, E, B6, B12, calcium, phosphorus and magnesium (Sharpe, Huston and Finke 2003).

Ethnicity/Race

Black elders in the United States were found to be at significantly greater nutritional risk than were Whites elders because of illness that interfered with intake, reduced appetite and caused biting/chewing difficulties. They were more likely to have gained or lost weight (Nickols-Richardson and Johnson 1996). Food insecurity was found to be higher among racial and ethnic minority rural populations than among white rural elderly. Black residents from low-income rural communities are three times as likely, and rural Hispanics are twice as likely, to be food insecure compared to their white, rural, low-income peers (ADA 2005).

Income/ Household Income

Study findings indicate that rural and lower income single elderly women were significantly less likely to eat a nutritionally adequate diet than were their non-rural and higher income counterparts. Insufficient funds constrain purchase of more food and better quality foods. Single elderly women who work are less likely to eat a nutritious diet—perhaps because of constraints on time and lower levels of economic resources (Sharpe, Huston and Finke 2003).

Lower levels of economic resources are associated with a greater risk of experiencing hunger and food insufficiency among the elderly (Sharpe, Huston, Sandra and Finke 2003). Quandt and Rao (1999) and Bartlett and Codispoti (1996) reported that having an income less than 150 percent of the poverty level was a relatively strong predictor of food insecurity for elderly age 65 and older residing in rural Kentucky. Whereas, Quinn, Johnson, Poon, Martin and Nickols-Richardson (1997) noted that low economic resources can also affect the quantity and quality of food purchased, especially if an increasing portion of the budget must be devoted to health care and prescription medications.

Other research conducted in the United States has suggested that low income can restrict not just the quantity, but the nutritional quality of food purchased, and that it can also reduce consumers' ability to substitute market-produced meals for home cooked versions, as their desire and ability to shop and prepare meals decline. Low income has been identified as a risk factor for poor diet in the elderly, and that consistent with other research, lower-income elderly consume fewer calories than their higher-income counterparts, fewer servings of major Food Guide Pyramid food groups, and most nutrients (Guthrie and Biing-Hwan 2002).

With regard to the diet quality of the elderly, findings indicate that their mean Healthy Eating Index score decreased as income levels decrease, indicating a greater risk for a poor diet quality among lower socio-economic groups (USDA Center for Policy and Promotion 1999). Inelmen, Sergi, Coin, Miotto, Peruzza and Enzi (2003) reported that elderly persons tend to choose cheaper foods because of low income. These cheaper foods are usually rich in added sugars but poor in proteins, and could generate the so called "empty calorie syndrome."

Education

According to Ene-Obong, Enugu and Uwaegbute (2001), education influenced the nutritional status of rural women in Nigeria. The authors found that more educated women had significantly better health and nutrition knowledge, food habits, nutrient intakes, health, self-concept, and less adherence to detrimental cultural practices. Poor education of the women was attributed to lack of money from parents, sex discrimination, and marriage while in school, among other things.

According to Sharpe, Huston and Finkle (2003), in the US lower levels of education have been associated with inadequate nutritional intake in the elderly, and that nutrition knowledge has been found to have a weak, but positive, association with diet quality.

Similar findings by De Henauw, Matthys and De Backer (2003) indicate that education significantly affects the probability of adopting a specific dietary profile, in that it reflects both the economic and cultural levels of individuals. Therefore, education seems to be related to both the quantity and quality of foods consumed: less educated individuals are more frequently "small eaters" and that more educated men and women consume

greater quantities of sweets, biscuits and sugar. As reported by Jacobsson, Pihl, Martensson and Fridlund (2004), ignorance about food and eating can easily lead to undernutrition, and there is an increased risk of patients ending up in a vicious cycle. Misinformation about diet and nutrition is one of the four "pathways" identified among rural Black elderly as being at nutritional risk (Sharp, Huston and Finke 2003).

In addition elderly rural male who had less than an eight-grade education had the lowest healthy eating index score, and stood out as a group at higher risk for poor nutrition (Vitolins, Tooze and Golden *et al.* 2007).

Functional Disability and Impairment

Functional disability refers to the physical limitations experienced by an individual when performing activities of daily living (example basic personal care such as bathing, dressing, going outside) and /or instrumental activities (more complex activities such as climbing stairs, heavy housework, shopping, get to places out of walking distance) that may be short-term or chronic (Bartlett and Codispoti 1996). Increased physical limitations have been identified as one of the four "pathways" of nutritional inadequacy among rural Black elderly (Sharpe, Huston and Finke 2003).

According to the ADA (2005), arthritis is the leading cause of disability, affecting approximately 59% of all older adults. Among persons 70 years of age and older with arthritis, 50% need help with activities of daily living, and 71% require assistance with instrumental activities of daily living, compared with 23% of persons of similar ages without arthritis. The author further noted that in 2000, 34.7% of all persons 65 years of age and older had a limitation of activity caused by a chronic condition, and the percentage increases with age. Functional disability, falls, and decreased

bone density, are linked to sarcopenia, the loss of muscle mass with ageing (ADA 2005). Therefore, a functionally impaired older person can be at great risk for poor nutritional status and malnutrition, since the person's ability to perform activities such as grocery shopping, cooking and eating becomes limited and requires assistance (Bartlett and Codispoti 1996).

Social Isolation/Loneliness and Living Arrangements

According to Sharpe, Huston, and Finke (2003), loneliness due to the death of spouse or friends can diminish the social reasons for, and pleasures associated with eating. Studies have found that eating regular meals and having an adequate diet have been found to depend, at least in part, on eating with others. Having few shared meals has been associated with higher levels of nutritional risk among rural elders and with higher risk of food insecurity.

Findings from the National Urban Institute study also found that elderly people who live alone may skip meals and eat poor-quality, reduced-calorie diets. It was also reported that even up to two years after the death of their spouse, widows had significantly poorer diet quality than nearby couples, and their caloric intake was 28% lower than that of married women (Bartlett, and Codispoti 1996). Typically, fewer calories are consumed at meals eaten alone than those eaten with others people. This results in a reduction in dietary variety, (the consumption of foods from the six food groups) also associated with factors like poverty which is associated with reduced energy intakes (Food Security Institute Center on Hunger and Poverty (2003).

Also Green and Fitzhugh (1993), show that being married, living with someone, and having close neighbours were all associated with higher intakes of nutrients. In addition, the authors found that those

who lived with a spouse had a more favourable dietary pattern.

Drugs/Medication

According to Mason, Pamela (2002) vitamin and mineral deficiencies can result from a drug affecting the absorption, metabolism or excretion of nutrients. The author noted that there are relatively few drugs without the potential to cause nausea, sickness, diarrhoea or other gastrointestinal side effects in some individuals. Drugs can influence nutrient intake by causing taste disturbances (angiiotensin-converting enzyme inhibitors, allopurinol, metronidazole, penicillamine) and affecting appetite (e.g., digoxin and fluoxetine reduce appetite while tricyclic antidepressants and valproate can increase it). Also, multiple or long-term drug regimens have greater risk of drug-nutrient interactions which can lead to nutritional deficiencies or diminish the nutritional status.

Location

According to Sharpe, Huston and Finke (2003), living in rural areas also requires reliable personnel transportation to procure food, often at distances of greater than 20 to 30 miles. This makes purchasing easily perishable foods difficult. Supermarkets are generally smaller in rural areas and may not carry large volume food items or private-label brands. In addition, many very small towns may offer little more than a convenience store selling staples and nonperishable items.
Lack of nearby supermarkets, with an adequate selection of healthful foods or access to support programs such as Meals-on-Wheels may also serve as important constraints to healthful eating for the rural elderly. Reports from the 1994-96 USA Continuing Survey of Food Intakes by Individuals and the Diet and Health

Knowledge Survey noted that rural residents had lower average nutrient consumption levels, measured as a percentage of the Recommended Dietary Allowance (RDA), for protein, seven vitamins (A, C, E, B6, B12, riboflavin, and folate) and three minerals (calcium, phosphorus and magnesium) as compared to their non-rural counterparts (Sharpe, Huston and Finke 2003).

Level of Aspiration

As cited by Pemberton (1985), level of aspiration is a generalized measure of the strength of human motives with respect to goal achievement and the expectancy of success. In other words, it measures the motives the individual sets and the reactions to one's performance and evaluations of that performance by others. This measure has been used widely in the study of factors involved in and the processes of goal setting. A similar measure of motives with respect to goal achievement is the "need for achievement."

Hypothesis of the Study

The research literature points to a number of factors which influence nutritional status. Figure 1 on page 30 illustrates the nature of the personal characteristics - age, gender, marital status, ethnicity, level of aspiration; and socio-economic factors - income, employment, education, social class, loneliness and living arrangement considered in this study. Then, Figure 2 on page 30 illustrates that personal characteristics and socio-economic factors are hypothesized to determine the nutritional status of rural elderly.

METHODOLOGY

The population examined in this study consists of low-income persons, (65 to 103

years of age) resident in the counties of St Andrew and St. David and enrolled with the Ministry of Social Development, Social Welfare Division, Sangre Grande. The sampling size was determined on the basis of the population size, knowledge of the geographical distribution of the population, and affordability. A three-stage sampling design was used and 300 community dwelling old age pension recipients, sixty–five years and older participated in the study. Geographic distribution of the sample interviewed was as follows: 100 of the respondents were resident of the main District of Valencia. 100 were residents of the main district of Manzanilla, and 100 were residents of the main District of Toco/Matelot.

Questionnaire

The survey tool was developed and pretested with 15 old age pensioners to determine appropriateness and suitability of the instrument. Face to face interviews were conducted.

The questionnaire was designed to obtain information on the key components related to the study, and the themes were therefore organized into three-sections as follows: The personnel, socio-economic and demographic characteristics of the respondents; dietary history, anthropometric measurements; and level of aspiration.

Dietary History and Anthropometric Measurements

Dietary intake was assessed by a one-day 24-Hour Food Recall and a dietary history. The interviewer asked each participant to give a detailed description of all food and beverages consumed including a description of cooking methods, brand names of products used, the amount/quantity and the time the meals were consumed. The respondents were asked to list all the food items consumed over a twenty-four hour period or about foods and beverages usually consumed at each meal. The amount/quantity of different foods and drinks were expressed in terms of either cups, glasses, tins/cans, empty bottles, bundles, potspoon, heaps or numbers based on the local measuring utensils identified. Weights and volumes were determined with use of a variety of foods and beverages. Information on the respondents' dietary habits and eating patterns was collected. The Healthy Eating Index was used to assess overall diet quality of the low income elderly.

The physical measurement of the respondents' included the weight, standing height were measured and their body mass index calculated. The body mass index (BMI) was calculated by the ratio: weight (kg), height (m²).

Level of Aspiration

Level of aspiration was measured by four variables. The questions were open-ended giving respondents the opportunity to express their wishes and hopes for the future as well as their personal values and success. The Self-Anchoring Scale Method of Kilpatrick and Cantril (Pemberton 1985) was used. A pictorial scale in the form of a ladder numbered from zero to ten, with the top rung of the ladder representing the best possible life and, the bottom rung representing the worst possible life for himself or her self was presented to the respondent. The respondent was asked where he or her thinks his life is on the scale at the present time and then asked where he or she thinks his or her life after 5 years. The present life score provides an index of the individual's evaluation of the current status of their life. The life score after five years provides a generalized

measure of the respondent's level of aspiration.

Statistical Analysis

The data was coded and analyzed using the Statistical Package for the Social Sciences for Windows (SPSS) (Version 11.0, SPSS Inc., Chicago, Ill). Frequency distributions and means ere carried out to measure personnel, socio-economic and demographic characteristics of respondents, and respondents' level of aspiration.

The 1999-2000 version of USDA Interactive Healthy Eating Index (HEI) was used to determine the scores for all components of the diet quality of each respondent. Multiple linear regression analyses were performed to determine the independently associated factors with the HEI score and the Body Mass Index. Several socio-demographic characteristics (eg age, no. of years in school, presently working, live alone, level of aspiration and sex) were used as independent variables. A probability value of *p=0.05* was considered statistically significant

RESULTS

The study sample included 145 (48.3%) men and 155 (51.7%) women. Mean age was 75.88 (ranging from 65 to 103). More male respondents were found in the age group 65 to 74, while female respondents were found to be generally older than the men. The largest ethnic group was African 56.3%, followed by Mixed 22.3 % and East Indians comprised of 19.7 %. The majority of the respondents 73.3 % did not live alone, while 24.7 % lived alone. Most of the respondents, 31.6 % were widowed, 10.3 % were widower, 28 % married, 9.7 percent % separated, 9.3 % single, 9.0 % were in a common-law relationship, and 2.0 % were divorced. The majority of respondents 82.7 % had attained a primary school education, while only 3.0 % attained secondary school education, .3 % attained technical/ tertiary education, and 14.0 % did not attend school.

As shown in Table 1 page 31, the sources from which money were obtained monthly by respondents were derived from full-time jobs to volunteering. In contrast, the main source of monthly income (pension) was concentrated in the $501.00 to $1000.00 range for all respondents. Another source from which 44.6 percent of respondents received money monthly, that was less concentrated in the lower range was national insurance which ranged from less than $500.00 to $1000.00. Sixty eight (11.3%) of respondents received money monthly from gardening, while 16.3% of respondents received money monthly from other sources such as part-time employment, full-time employment, business, transporting, private charity, family and volunteering.

As shown in Table 2 page 31, the majority of respondents, 83.3 % healthy eating index score fell within the range 51 to 80, which indicates a need for diet improvement. Twenty-seven (9.0 %) respondents healthy eating index score ranged greater than 80, which indicates good diet, while 6.3 % of respondents had scores less than 50, which indicates poor diet. The mean healthy eating index score of the population is 66.51 with a standard deviation of 11.35 as shown in Table 3 page 31.

Most respondents 37.07% had BMI's within the desirable/healthful body weight range for older adults as shown in Table 4 page 32. One hundred and five (35.71%) respondents had BMI's within the range of 18 −23.5, classified as average morbidity and mortality risk. Thirty-three (11.12%) respondents had BMI's within the range 29.0 − 32 classified as low morbidity and mortality risk, while 14.96% had BMI's >32

related to increased morbidity and functional impairment. One percent of respondents were at severe risk.

The mean body mass index of the sample population is 26.17 with a standard deviation of 5.997 is shown in Table 5 page 32.

With regard to the dietary history, the majority of respondents 53.7% reported preparing meals for themselves, while 44.7% of respondents did not. Of the 44.75% of respondents who did not prepare their meals 41.7% reported that their meals were prepared by a family member, and the others indicated their neighbours. The majority of respondents 84.3% consumed three (3) meals per day, 11.7% of respondents consumed two (2) meals per day, 1.3% consumed meals five (5) times per day, 1.0% consumed meals four times per day, .7% consumed a meal once per day, and 1.0% reported having more than five meals per day. The majority of respondents 89.3% reported not being on a special diet, while a few respondents 10.7% indicated that they followed a special diet. A total of 8.4% reported consuming the following special diets: a complex carbohydrate, low sodium low fat, low sodium and vegetarian meals. The majority of respondents reported no chewing difficulty and not using multivitamins. A small number 13.7 % reported using alcoholic beverages.

Table 6 on page 32 indicates where the respondents self-reported response for level of aspiration - where their life will be in five years time.

Table 7 on page 33 summarizes the mean value for level of aspiration of the study population is 6.17 with a standard deviation of 3.487.

The multiple linear regressions results for the respondent's nutritional status are presented in Tables 8 and 9 on page 33. It was found that age, sex and level of aspiration were factors significantly associated with elderly nutritional status.

DISCUSSION

The mean healthy eating index score (HEI) for the study population is 66.51. This finding indicates that the study population in Trinidad had a higher than average score and much improved diet quality when compared with their US counterparts (63.8 and 63.9 respectfully) for the1989 and 1990 Continuing Survey of food intakes by individuals. However, although the mean healthy eating index score was higher than the US, the majority of respondents (83.3%) HEI scores were within the range 51 to 80, which ranked their diets as "Needs Improvement." This finding parallel the findings in a study by Vitolins, Tooze and Golden et al (2007) on meeting recommended nutrition guidelines and inadequate intakes of energy and nutrients among older persons. Although the rating for needs improvement was similar, fewer respondents had index scores above 80 and less than 50. This indicates that one-third or less of the people surveyed consumed the recommended number of daily servings from the 5 major food groups. The respondents were most likely to under consume in the fruit, vegetable and grains groups. Variety in their diet was limited and intakes of total fat and saturated fat were above recommended levels for more than eighty percent of the respondents. Variations exist in the average scores among respondents HEI components. Fruits and saturated fat have the lowest average component scores, indicating that the respondents are doing the poorest in these areas.

The mean body mass index for the study population is 26.1 indicating that most of the respondents' body weight was within the healthful weight range, while 14.6% had a BMI greater than 32 which is associated with morbidity and functional disability.

Respondents self-reported responses to level of aspiration "where would your life be in 5 years time" produced mixed responses. Most of the respondents were skeptical about answering the question.

However, most of the respondents 31% ranked their life at 10, the highest point on the scale which indicated that they were highly motivated and looking forward to a full life ahead. About 13.7% ranked their life at 5, which indicated that they were looking forward to their older years but were not sure what was in store for the future, while 8% ranked their life at 1, thus indicating that they had very little hope for the future. These findings are in keeping with Rowe and Khan (1998) who reported that "older persons with a high self-efficacy have a positive perception of their physical and cognitive abilities, and are more likely than persons with low self-efficacy to be highly motivated."

The predictors of nutritional status were age, sex and level of aspiration. Firstly, the predictors of diet quality/healthy eating index scores (HEIS) were measured. The results of the linear regression indicated that the two most significant coefficients were sex and level of aspiration at the *p*-value = <0.05 level of significance (.001, and .028), which had a negative and positive relationship respectively as shown in Table 8. The findings suggest that elderly males had better HEI scores than the elderly females. This may be associated with the cultural socialization of males in society in that the males are better provided for or taken care of by their female counterparts. However, this finding was not in keeping with previous research that found women had higher mean healthy eating index scores than their male counterparts (Vitolins, Tooze and Golden *et al.* 2007). As noted in the literature repeated 24-hour food recalls on the same individuals provide a more accurate estimate of typical intakes than a one day

food intake, and thus relies on memory which may not be accurate. The significance of level of aspiration was associated with high HEI scores implies that if respondents' nutrition is improved there level of aspiration and well-being will be improved.

Secondly, the predictors of BMI were measured. The two most significant coefficients were age and sex at the P-value = <0.05 level of significance (.044, and .000), which had a negative relationship respectively as shown in Table 9. The negative coefficient of age suggested that the young old elderly were more incline to have a BMI closer to the normal or healthful standard than the old and very old elderly. The negative coefficient of sex suggested that males were more incline to have better BMI than females. Studies based on findings in nutrition, support the findings of age and sex regarding changes in body composition and weight (Bartlett and Codispoti (1996). As noted in the literature the BMI is not a good measure for this population, since their lean body mass decreases and body fat typically doubles even if body weight remains the same.

Overall the findings support the literature with regard the use a one day 24-Hour Recall versus a three day 24-Hour Recall and the body mass index as not being useful tools for assessing the elderly nutritional status.

Limitations

Limitations do present some concern in this study of improving nutrition status among low-income rural elderly in Trinidad. Firstly, for better representation of the elderly diet quality a 3-day 24-Hour Recall should have been conducted instead of a 1-day 24-Hour Food Recall. A 3-day 24 Hour Recall would have given a more accurate reflection of the elderly

diet quality.

Secondly, the use of the USDA Healthy Eating Index Interactive Online programme also provided challenges. The progamme is culture specific, thus, many of locally consumed foods were absent from the database, as a result similar foods that appeared on the programme database were substituted. This may have contributed to the low and or high Healthy Eating Index scores obtained by some of the respondents due to differences in the caloric value of some foods.

CONCLUSION AND RECOMMENDATIONS

The nutritional status of low income rural elderly as measured by the Healthy Eating Index and the Body Mass Index reveals that the mean healthy eating index score for the study population had a higher than average score and much improved diet quality when compared with their US counterparts for the same age group. However, although the mean healthy eating index score was higher than the US population, the majority of respondents diets were ranked as "needs improvement". The results indicate that a small number of respondents consumed the recommended number of daily servings from the 5 major food groups. The respondents were most likely to under consume in the fruit, vegetable and grains groups while intakes of total fat and saturated fat were above the recommended levels.

The mean body mass index for the study population is 26.1 indicating that most of the respondents' body weight was within the healthful weight range, while a lesser number had BMI's greater than 32 which are associated with morbidity and functional disability.

The variables that surfaced as the main predictors of nutritional status are sex, level of aspiration and age.

- To address the nutritional needs of rural elderly Trinidadians and Tobagonians a two-tiered approach is warranted. Firstly, targeted strategies for nutrition education and promotion are required. These timely strategies should address issues such as food security, food cost, food modification and recipe development, portion control, use of the food guide in making healthful choices, food safety, nutrition care management of diseases, and physical activity suited to the individual needs. Some of these initiatives can be promoted through the implementation of a national nutrition campaign for the elderly, and ongoing nutrition education programs. However, the message needs to be provided in a focused, low-literacy culturally relevant format.

1. The second initiative, involves the establishment of a Feeding Program, and a Food-Based Assistance Program for the rural community dwelling elderly. The feeding program should be planned to assist the elderly in shut-ins/or those who cannot leave their homes or require assistance with their meal preparation.
2. employment of full time Registered Dietitians and or Consultant Registered Dietitians to plan menus, conduct training in food preparation methods and techniques, portion control and food safety. Develop standards for meal service that meet the Dietary Guidelines for the elderly, nutrition education materials, and conduct continuous monitoring and evaluation of the program. The Food Based Assistance Program involves the provision of a monthly food basket for the elderly who experience difficulty with transportation and grocery

shopping. This initiative must be complemented with nutrition education that focuses on empowering the elderly to make healthful food choices. The integration of nutrition education and research into feeding and food based assistance programs should be a major component of the programs.

- Thirdly, the development and implementation of a nutrition self-assessment monitoring tool such as the "Healthy Eating Index for the Caribbean." This tool will be based on the Food Guide for the Caribbean: "The Six Food Groups" and the "Dietary Guidelines", applying the principles of the USDA Healthy Eating Index. This computer online program will provide a standard via which individuals could evaluate the quality of his/her own diet. In addition, this self-assessment tool would serve as a guide for elderly consumers in helping them to select the types and amounts of foods needed to achieve recommended intakes. As a monitoring tool it will identify changes in dietary pattern and quality and overall trends in Caribbean consumption patterns.

- Further research is required to investigate whether the factors found to affect the low income rural elderly also apply to low income rural population as a whole, as well as low income elderly in urban as well as rural areas.

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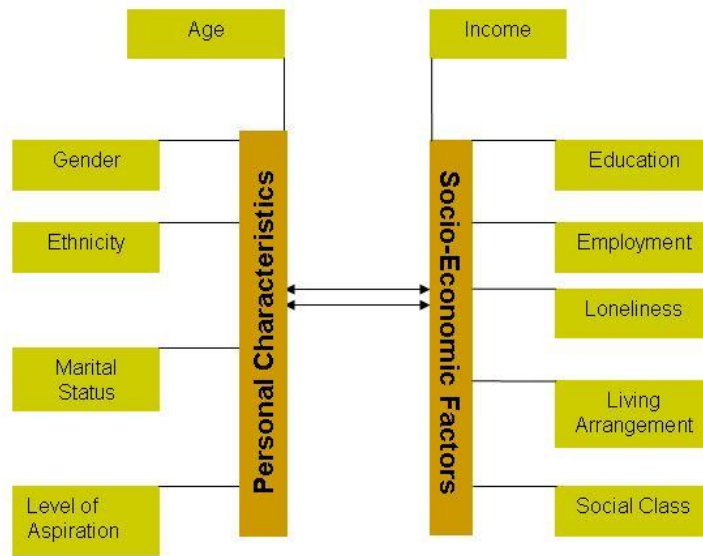
Figure 1:   Illustrates Personal Charactristics such as Age, Gender, Ethnicity, Marital Status, Genetics and Socio-economic Factors such as income, education, employment, loneliness, living arrangement, social class
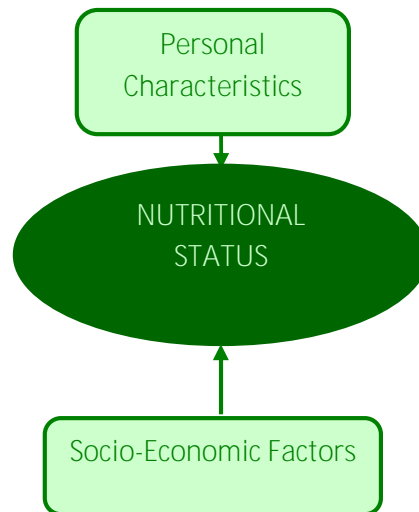
Figure 2: Illustrates Nutrition is Function of Personal and Socio-economic Factors

**Table 1: Cross-tabulation of Respondents' Monthly Labour Productivity
and Source of Income**

	Monthly Income Received					
	Less than 500	$501-$1000	$1001-$1500	>$1501	Frequency	Percent
Full time employment	2	1	1	1	5	1.6
Part time employment	10	3			13	4.3
Business	3	12	3		18	6.0
NIS	29	105			134	44.6
Old age pension		300			300	100.0
Family	4				4	1.3
Gardening	23	9	1	1	34	11.3
Rearing animals	2		1		3	1.0
Transporting			1	1	2	.7
Private Charity			1	1	2	.7
Volunteering		2			2	.7
Total	73	432	8	4	517	172.

Table 2: Healthy Eating Index Score of Respondents

		Frequency	Percent
Valid	**<51 Poor**	19	6.33
	51 – 80 Needs Improvement	250	83.33
	>80 Good	27	9.0
	No response	4	1.3
	Total	300	100.0

Table 3: Mean Healthy Eating Index Score of Sample

	N	Minimum	Maximum	Mean	Std. Deviation
Healthy Eating Score Valid N (listwise)	296	0	99	66.51	11.35

Table 4: Body Mass Index Values for Older Adults

Classification	BMI(kg/m²)
Severe risk	<18.0
Average morbidity and mortality	18 -23.5
Healthy/Desirable Body Weight	24-29
Low morbidity and mortality risk	29.0 – 32
Increased risk of morbidity and functional impairment	>32

Source: The Committee on Diet and Health of the Food and Nutrition Board. 1989

Table 5: Mean Body Mass Index of Sample

	N	Minimum	Maximum	Mean	Std. Deviation
Valid N (listwise)	294	14	55	26.17	5.997

Table 6: Level of Aspiration – Respondents Life in 5 years Time

Number		Frequency	Percent
	10	94	31.3
	9	8	2.7
	8	22	7.3
	7	10	3.3
	6	6	2.0
	5	41	13.7
Valid	**4**	22	7.3
	3	15	5.0
	2	18	6.0
	1	24	8.0
	0	14	4.7
	D.K.	25	8.3
	N.S	1	.3
Total		300	100.0

Table 7: Mean Life in 5 Years Time of Sample

	N	Minimum	Maximum	Mean	Std Deviation
Where do you think your life will be on this scale in five year's time Valid N (listwise)	274 274	0	10	6.17	3.487

Table 8: Dietary Intake/ Healthy Eating Index (HEI) Linear Regression

Independent Variable	Coefficient	Standard Error	T	P-Value = < 0.05
Age	-3.541E-02	.111	-.320	.749
No. of Yrs in School	1.548E-03	.242	.006	.995
Presently working	-.456	2.108	-.216	.829
Live Alone	-2.675	1.715	-1.560	.120
LOA	.484	.219	2.210	.028
Sex	-4.839	1.493	-3.242	.001

Mean Square:387.011, R Square:.074, Adjusted R Sq. .050,
Std. Error of Estimate:11.191.

Table 9: Body Mass Index Linear Regression

Independent Variable	Coefficient	Standard Error	T	P-value = <0.05
Age	-.114	.056	-2.025	.044
No. of Yrs in School	5.419E-02	.123	.439	.661
Presently working	-.832	1.070	-.777	.438
Live Alone	-.105	.871	-.121	.904
Level of Aspiration (LOA)	-8.058E-02	.112	-.723	.471
Sex	-3.410	.760	-4.488	.000

Mean Square:137.744, R Square:.101, Adjusted R Sq. .077, Std. Error of Estimate:5.675