The Impact of Standards of Living on Dietary Adequacy of University Youth in Egypt

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Summary

The impact of the standard of living on dietary adequacy of university youth was assessed, using a clustered multi-stage stratified random sample and a questionnaire "FFQ" was applied online, as 35% of the Egyptian population are within age15-35yrs. Due to extended Covid-19 epidemic era and consequently a low response rate, the number of respondents was 38 university male students, from a state university (Zagazig University), in an agricultural governorate, representing a low income category and a private university (Future University), in Cairo, representing high income category. The criterium was the average deficit or surplus percent of daily per capita food consumption considering the Recommended dietary allowance. The results indicated that the university youth of less income households showed a deficit of 11%, 29% and 5% in daily food-intake of Calories, Protein and Lipids and the youth of high-income households showed a surplus of 20%, 14% and 31%, respectively. Results were statistically significant using Welsh t-test. The study concluded that both categories suffer from malnutrition, but the rich category was due to less nutrition education and simulation of the western countries dietary pattern (Fast-food) and not for lacking income. While the rich category represents a small portion of the population but holds a high portion of purchase power that accelerates the increase in food prices, leading to deep the malnutrition of the majority category that holding much less portion of purchase power. Dietary Fe adequacy showed significant surplus of 18% and 45% in food-intake of both less income and high-income category. However, such surplus wouldn't protect youth from anemic diseases, as the beverages share in their dietary pattern was high. Such unfavorite nutritional attitude could be treated via an orientation program concerning nutrition education to develop the awareness of university youth towards health diet and practicing physical fitness.

Introduction

Food consumption surveys and associated estimates of intake of dietary components provide an important source of information for assessing nutrient adequacy in categories of a population and for monitoring nutrition status, (National Research Council, 1986). Determining the appropriate criteria to use in assigning the nutrient adequacy in diets within a certain population is basic in designing effective nutrition programs and policies, (Jensen, et al., 1991). Despite the widely accepted information of diets consumption data in determining nutritional outcomes, such data are alone cannot identify the proper nutritional programs and policies without assessing the impact of the major socio-economic factors that are affecting the society categories' behavior towards food consumption.

Several studies were conducted in Egypt on dietary adequacy which throw lights on the nutrition status of the society Some focused upon a certain nutrient and others were of wider scopes. El Asfahani, Soliman and Mousa (1989) conducted a study to make a comparison of the dietary adequacy of the university students, between an agricultural society and an oil export society. The hypotheses that a higher income, higher education and/or urban residence assure reasonable level of nutritional awareness ware investigated. The analytical comparative study of dietary adequacy was between the female under-graduate university students (19-25yrs) in Doha, Qatar, and in Cairo, Egypt, to test this hypothesis. The data showed that a high standard of living, level of university education and/or urban residence do not seem to

constitute sufficient conditions for obtaining adequate diet. The limiting factors in the diets of the two groups were energy, iron, and Vitamin A.

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The wider scope of dietary adequacy assessment using the analysis of household Budget surveys in Egypt, was conducted by soliman, Shapouri, (1983) and Soliman, Eid, (1995). These two studies provided a screening of the prevalence of either under nutrition or malnutrition among the Egyptian urban and rural societies, using the data of the national "Household Budget Surveys of Egypt" in 1975, and 1991, respectively. The two previous studies associated the income distribution pattern with energy and protein adequacy. The results showed that in 1975, where Egyptian economy, were still under central planned system, there was an excess in the daily dietary energy consumed above the recommended allowance of about 9.8% and a deficit in daily protein consumption below the recommended allowance of about 6.8% for the 24.4% poorest population of urban region. It was mainly due to lack of income distribution justice, where more than 50% of the population acquired only 25% of the urban population income. Secondly, because of the price distortions that stemmed from the direct and indirect subsidy policies followed with the marketing of the food crops sector, which had not reached the markets of the animal products, fodders, or livestock, where their prices increased rapidly due to almost constant domestic supply of feeds and livestock population size facing a speedy demand. The imported frozen meet policy had not compensated such deficit because of Leakage to the black market, low quality imported meat cuts, poor handling and storage that led to shrinkage in the total imported supply, (Soliman, 2007). Under application of free market economy, started in 1987, the estimated dietary adequacy from, the 1991 household survey, (soliman, 1995b) showed a deficit for the 8.7% of the poorest population of 11.5% and 6.1% in daily dietary per capita consumption of Kcal and protein, below the recommended allowance, respectively. These two studies showed that the higher the household income level the higher was the per capita food consumption, which was not consistent with the consumption level and Engel's curve behavior.

Even though dietary iron (Fe) requirements allowance ranges between 10-20 mgs/ capita/day, any deficit of such nutrient is harmful to physiological and metabolic functions of human, particularly youth, and nutritional vulnerable groups. By the end of the nineties of last century, a technical report was provided to the Egyptian minister of trade and supply proposed applying a food program, that dealt with "Enriching the Subsidized traditional bread flower with Fe during wheat flower milling stage" to eliminate the increase probability of anemic cases in Egypt at that time and then blood disorder diseases. The report based upon a joint/cooperative research project between "The Egyptian National Nutrition Institute and WHO". It was financed by a multinational company. However, the technical research institutes of food sciences in Egypt opposed the project's idea. They raised a fear around the possible inconsistent distribution of the added Fe to the wheat flower during milling process that would lead to exposing the Egyptian consumers to dietary poisoning due to the most probably

concentration of the Fe in a certain portion of wheat flower that might reach a poisoning dose (Soliman, 1999).

Rather than a national survey using (HBS) as shown above, a recent case study of Soliman Ghada., et. al., (2007) applied an "FFQ sample survey" on the Prevalence of anemia in Egypt: on a case study of Al-Gharbia Governorate in Nile-Delta region. They showed that severe anemia (Hb < 7g/dl) was not found in any studied group (mothers or sibling), only moderate to mild anemia was found ((Hb > 7g/dl). The prevalence of anemia in mother's was > 47 %, , while the prevalence of anemia in sibling was 52.25% and 54.03 % for male and female, respectively. The cause of anemia in mothers may be due to menstrual blood loss, increased duration of menstrual blood flow, while in children may reach them from anemic mothers due to poverty, inadequate diet, or bad food habit.

Adequate nutrition for all people away from the income level, color, or race is a must because food is one of the four foundations of the human development (self-esteem, freedom of choice, diversity, and food adequacy). The human development is the front of the sustainable development because the human is the maker of development, and the beneficiary of its fruits,, (Soliman, 2000). As one third of Egyptian population are at age (15- 35yrs), CAPMAS, (2020), the study's objective was the assessment of the dietary adequacy of the university youth and the impact of the standard of living. The impact of the standard of living on the dietary adequacy of university youth was assessed by classifying the sample according to the type of the university investment i.e., type of management. In Egypt there are two types, governmental universities with very low tuition fees and private universities with very high tuition fees. Therefore, most of the students at the private universities supposed are from higher standards of living than governmental universities.

Data Base & Methodology

Data Base

The study applied a Purposive sampling survey as a common sampling design for nonprobability sampling methods. The participants' response was collected by filling up the validated sampling survey questionnaire forms "FFQ". It was validated by "IPAQ" and applied via online (Internet) approach. (FAO, 2013), (FAO/WHO, 1998). The food items of the questionnaire forms were adjusted to fit the Egyptian food basket. The sample respondent students were 38 males and 12 females. They attended a one-day panel survey before filling the online questionnaire survey. designed and applied for individuals, within the age 19– 25 years, across two universities (a private one (Future university, in Cairo) and a governmental university (Zagazig University, the Capital of Sharqya providence). It was a cluster (area) two-stage stratified random sample. The COVID-19 epidemic that lasted for two years limited both the sample size and the sampling response rate. Only 2 female students from the Zagazig university and 10 from the private university gave response. Probably, the social traditions, particularly in agricultural providence (Zagazig University), were behind such attitude. The female stratum was excluded from the analysis because it would be statistically biased and inconsistent. The concerned sample was restricted to the male students. The were at the faculties of medicine, engineering, dentistry, and pharmacology.

Methodology

The study presented the dietary adequacy in terms of relative deficit or surplus in daily/ capita dietary consumption of calories (gm), Proteins (gm), Lipids (gm) and mg Fe. (mg) It was calculated from [equation 1]. The average dietary Intake (DI) was estimated using the data

collected on consumed food, to make the nutritional assessments as the approach of (IOM, 2000), and requirement values for Recommended Dietary Allowances (RDAs), followed the procedure of (Murphy and Barr, 2011) and (IOM, 2001). Dietary adequacy for macronutrients and micronutrients,. for each nutrient, were categorized as students being at risk of inadequate intake based on whether, or not, they met the (RDA)., which was proposed for the Mediterranean population, (Panagiotakos et al., 2006). This study concerned total energy (calories), lipids, proteins, and minerals (Fe). Based on previous studies, the physical activity was classified as walking, moderate, and vigorous activity, (Gholizadeh et al., 2018). However, because of the sample size limitations, it was considered a moderate activity norm for at an average height and weight

$$\left[DAi = \frac{(1/n\sum DI_{ij) - (1/n\sum \mathrm{RDA}ij)}}{\frac{1}{n}\sum DI_{ij}}\right] X100 \quad \text{..... (1)}$$

Where:

DA_i = Dietary adequacy of nutrient i

n = number of respondents

DI_{ij} = daily consumption of nutrient i of respondent j

DCR_{ij} = daily requirement of nutrient i of respondent j

T-test for comparing two estimated sampled means with Unequal variances was applied. The two means are the adequacy criteria (deficit or surplus/Capita/day) of either Kcal, gm protein, gm fats or mg Fe, of both university entrepreneurships. The results are presented in the tables from 5 to 12. While the deficit in nutrients of daily diet was identified by minus sign it was, logically, without in case of surplus, (Equations 2 and 3). For comparisons among nutrients under each category, the estimated averages (± quantity) were also measured as percentage of daily recommended allowance of each gender under each category.

Unequal Variance T-Test was applied. The unequal variance t-test is used when the number of samples in each group is different, and the variance of the two data sets is also different. This test is also called the Welch's t-test. The [formula-1] was used for calculating t-value and estimation of the degrees of freedom for an unequal variance t-test was derived from [Formula 2].

$$t = \frac{\bar{X_1} - \bar{x_2}}{\sqrt{\frac{{\sigma_1}^2}{n_2} + \frac{{\sigma_2}^2}{n_1}}} \quad \text{..... (2)}$$

$$df. = \frac{\left(\frac{{\sigma_1}^2}{n_1} + \frac{\sigma^2}{n_2}\right)}{\frac{(\frac{{\sigma_1}^2}{n_1})^2}{n_1 - 1} + \frac{(\frac{{\sigma_2}^2}{n_2})^2}{n_2 - 1}} \quad \text{..... (3)}$$

Where:

X_1 = The average dietary adequacy value of the population category (1),
X_2 = The average dietary adequacy value of the population category (2),
σ_1^2, σ_2^2 = The Variance of population categories (1) and (2) respectively,
n_1, n_2 = sample size of the two categories, respectively
df. = degrees of freedom.

Results & Discussion

Impact of Standard of Living on Kcal Adequacy

Table (1) shows the daily per capita adequacy in terms of Kcal, of both types of management universities. There was a significant deficit in the per capita diet of male students. The estimate of such deficit counted was about 11% below the recommended healthy requirements for those who are studying in a governmental university in an agricultural providence, while there was a relatively high surplus in the daily kcal intake of the students studying in a private university. The result was statistically significant at a significance level < 0.05.. The major explanation of such result was the difference in the standard of living of the students in both universities. As shown in the sampling design. However, both low and high standard of living categories suffering from malnutrition, either due to lacking to have enough diet to cover the recommended healthy requirements or eating much more than the healthy recommendation, respectively. It should be mentioned that such result implied deep and long run negative economic impacts on the Egyptian society. (1) Having a daily diet less than the healthy requirements, would affect, negatively, the potentiality and capacity of the university youth to Learning and practicing other university activities, and probably would extend to unfavorite temper, (Soliman and Eid, 1995a), (2) Having a daily diet much higher than the health requirements would, also, has negative impact on the university youth, but in a different way than the deficit effect. It is most probably a major cause of obesity, which, in turn a main cause of a set of serios diseases and could expand to psychological disorders, (Soliman and Eid, 1995a), (3) There would be an implicit economic effect on national level. A much higher food consumption than healthy recommendations, means higher demand for food commodities by an effective category of households in the economy of high-income class, even though that category is not the majority but possess a large proportion of disposable income with high purchase power that accelerate the increase in food prices. The other population categories who are the majority possess less share in national income would face such expected higher food prices. Thereof, majority of population categories would face such problem via either shrinking their purchases of some food items, or a shrinkage in the expenditure on other nonfood groups (health, education, culture services, ...etc.) and transform the saved expenses for purchasing food items to fulfill their satisfaction. (Soliman & Eid, 1992).

Table 1. Impact of Living Standard on Dietary Adequacy of University Youth

Nutrient	University Management	Intake (Q)	Requirement (Q)	Adequacy		SE_i	$t_{Cal.}$	df
				Q	%			
Kcal	Govern	2510	2784	-274	-9.90%	172.7	-2.20**	21
	Private	3490	2784	+706	25.40%	409.9		
gm Protein	Govern.	124	160	-36	-22.40%	±11.57	-2.19**	21
	Private	187	160	+27	17.10%	±26.23		
gm Lipids	Govern.	73.9	77.3	-3.4	-4.40%	±9.15	-2.01*	19
	Private	112.8	77.3	+35.5	45.90%	±17.09		
mg Fe	Govern.	18.3	15	+3.3	18.03%	±1.56	2.46**	20
	Private	27.3	15	+12.3	45.05%	±3.30		

(Q) = in Quantity, N= number of observations, (12 Govern. Univ., 26 Private Univ.).
ns = not significant, * = Significant at <0.10, ** = Significant at < 0.05.
Source: Combined & Calculated from the Sample Survey Data

Impact of Standard of Living on Dietary Protein Adequacy

Table (1) showed a significant difference between governmental university students and Private university students with respect to estimated sample average of dietary protein

adequacy at a significance level <0.05. While the governmental university youth showed a deficit in daily per capita consumption about 22%. The private university youth showed a surplus in their daily protein consumption of about 17%. The surplus in the dietary adequacy of the private university youth stems from high share was about 27% of fast-food meals in total protein consumption. Such fast-food meals are mainly burger meal sandwiches ..., etc. They adopt the simulation behavior in food consumption. They simulate irrationally the western lifestyle as a false cultural appearance. However, in western countries, they call such meals "Junk meals", because of their high content of fats, soybean meal and the lowest quality of meat cuts used for processing.. To confirm such results require drawing larger size samples with a broader scope of respondents from university youth categories, after vanishing the restrictions of COVID-19 pandemic crisis.

Impact of Standard of Living on Dietary Lipids Adequacy

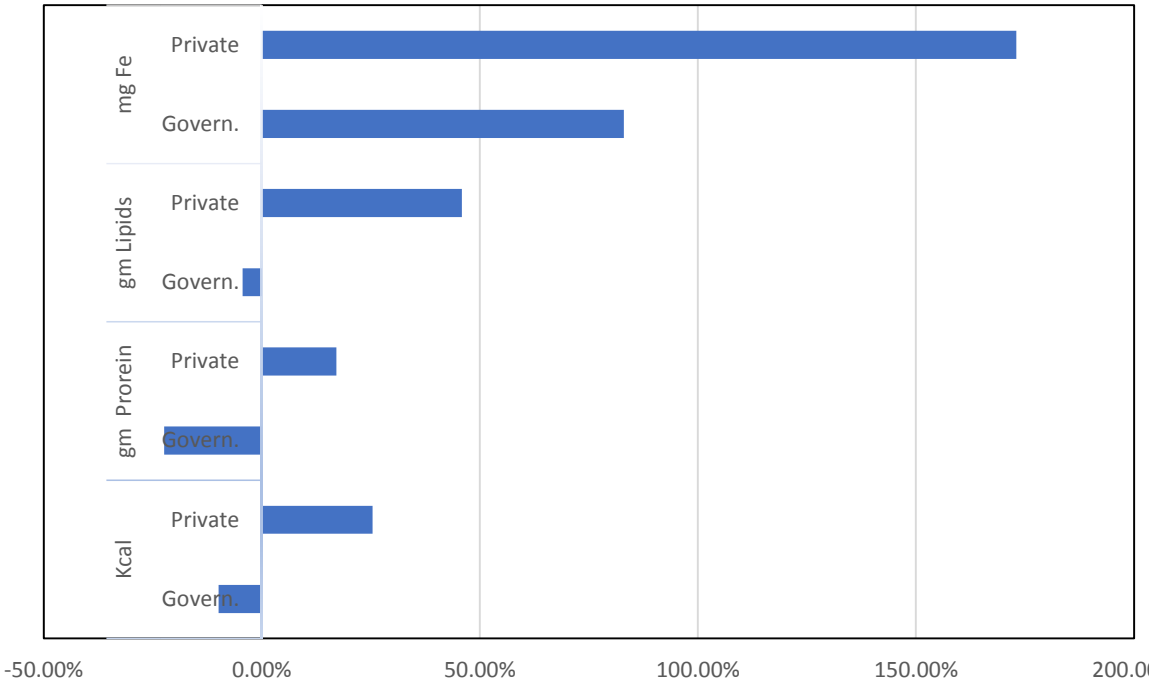
Table (1) showed a significant difference between male student's dietary Lipid's adequacy at both the governmental and private universities at significant level < 0.05. While the governmental university students showed a slight deficit in the daily dietary lipid's food intake at an estimated percent about 4.4% of the average per capita daily lipid's consumption, there was a high surplus in the average daily dietary lipid's consumption intake by about 45% of the private university youth. This high surplus in the daily dietary fat intake is a sign of high exposure of that category of the university youth to obesity, increase in blood cholesterol level and other related nutrition diseases with age, such as arteriosclerosis.. The high share of fast-food meals in the lipids daily dietary pattern in the sample (27%) could be a reason of such high surplus of lipids in daily diet intake. The snacks portion in daily diet was also high, such as chocolates, candys, nuts, fried potatoes' chips, and French fries. These food items are relatively rich in fats and sugar. The fast-food meals and snacks are expensive with high burden on the budget of the households, with negative impacts on health with age, when the physical activity decrease, and income often increase. If such food habits sustained, they would also, add more social costs to the national expenses due to the associated costs of medical treatment.

Impact of Standard of Living on Dietary Fe Adequacy

The results presented in Table (1) showed that daily per capita Fe consumption of youth at both types of universities surpassed the (RDA), Where the governmental university youth achieved a surplus of 18%, such surplus reached 45% above (RDA). The difference between the two average surplus was statistically significant at significance level <0.05. These results could show, apparently, contradiction with with the study conducted at the National Nutrition Institute in Cairo on Prevalence of Anemia in Egypt as a case study from Al-Gharbia Governorate, (Soliman Ghada, et al., 2007) which, provided empirical that the prevalence of anemia was 52.25% and 54.03% among males and females, respectively. Therefore, if this study results were true, it would imply that there was much improvement in dietary consumption over the last decade, and if not it would be due to the sample size limitations of the current study. However, the dietary pattern of the current study showed a high share of beverages in the university youth daily snacks share which represented 27%. The beverages are tea coffee and gaseous water drinks. Thereof, it would destroy the edible Fe, when the youth

have them before two hours of finishing their meals. Also, having beverages frequently daily cause gastritis and slow down digestion and absorbability of nutrients, that may lead to prevalence of anemia among youth. In addition, causes of anemia are numerous, not only lack of adequate dietary Fe.

Fig 1. Impact of Living Standard on Daily/Capita Adeqyacy of Egyptian University Youth



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