BIOCHEMICAL EVALUATION OF NUTRITIONAL STATUS OF ELDERLY PEOPLE IN ELDERLY HOUSES

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ABSTRACT

This work was designed to study the nutritional status for elderly people from two elderly houses. The study samples included 100 males and 150 females aged from 72-104 years. Nutritional status was carried out by using food intake (24 hr recall method was used for 3 day) to determined constituents of foods consumed and comparing with the standard of RDA. Anthropometric measurements included body weight, body height and body mass index (BMI) were measured which compared with standard values. Also biochemical parameters included blood hemoglobin, red blood cell (RBCs), leucocytes or white blood cell (WBCs), hematocrit, blood glucose level, total cholesterol (TC), triglycerides (TG), high density lipoprotein cholesterol (HDL-c), low density lipoprotein cholesterol (LDL-c),very low density lipoprotein cholesterol (VLDL-c) , atherogenic index (AI), aspartate aminotransferase (AST), alanine aminotransferase (ALT), urea and creatinine were determined in blood and compared with standard values. The results revealed that for both genders the energy intakes were below than but protein and carbohydrates were higher than that of RDA. A lower intake from dietary fiber was observed. Intake of vitamin E covered 35 % of RDA, Vitamin C intake covered about 55 and 40 % of RDA and vitamin A intake covered 63 % and 74%of RDA for males and females, respectively. Calcium, magnesium, iron and zinc intake for the both genders was lower than that of RDA. Overweight and obesity was prevalence for all subjects. Anemia prevalence was higher in elderly males than females Serum total cholesterol and triglycerides values were higher compared with that of normal values.The activity of serum GPT was

insignificant between the both genders but the activity of GOT was in elderly males high and significant compared with female values.

INTRODUCTION

In 1992 at the International Conference on Nutrition, a formal recommendation was made that ". . . each country should make a firm commitment to promoting the nutritional well-being of its people, with priority given to the most nutritionally vulnerable groups." It was noted that older people are such a group, and it was further recommended that governments, in collaboration with other concerned parties, should promote caring for older persons (WHO, 1990).

Research of around world has highlighted the nutritional vulnerability of older people and the major, lasting impact that poor nutritional status has on their health, wellbeing and life expectancy. The numbers of elderly people are increasing dramatically, and the ageing of whole populations and societies will influence significantly on the economies and healthcare systems of all countries (Richardson, .2007).

The elderly population is heterogeneous, and the current nomenclature often uses the terms 'elderly' for individuals aged 65 and older, 'young old' for 65–74 years, 'old-old' for 75–84 years and 'oldest-old' for 85 years and older. However, the WHO definition of elderly is 'persons of 60 years of age or older (WHO, 2002). In 2000, those aged 65 and older constituted from 6.0 to 15.5% of the populations in Asia, Europe, and North America. These figures are expected to increase to approximately 12 to 24.3% by 2030 (Woo *et al*., 2007).

Reactive oxygen species (ROS) and peroxides, once regarded only as toxic by-products of metabolism, are now proposed to function as highly controlled mediators of cell signaling as well as regulators of gene transcription, such functions are being found in cells involved with immuno system (Matsue *et al*., 2003). Recent studies confirm that ROS and peroxides play a role in neutrophil, macrophage and microglia intracellular signaling pathways that promote an inflammatory state. Therefore age-associated dysregulation of immuno function, and inflammatory cytokines as well as their metabolism may be caused by an age-dependent increase in ROS and peroxide burden (Bulger *et al*., 2002 and Strassheim *et al.,* 2004).

Elevated serum cholesterol, a risk factor for coronary heart disease in both men and women, is common in older people and this relationship persists into very old age. The incidence of a major coronary event was correlated to serum total cholesterol (TC) and low-density lipoprotein cholesterol (LDL-c) levels in men aged 35 to 70 and postmenopausal women younger than 70. The absolute risk of major coronary events in the older group was higher than in the younger group at any level of LDL-c, whereas the relative risk increased by 1.7% with an elevation of each 1 mg/dl LDL-c level in both groups. In the older group, the risk of major coronary events also increased as triglyceride level increased, whereas the risk decreased as high-density lipoprotein cholesterol level increased above 60 mg/dl (Hisanori Horiuchi *et al* ., 2004) .

In general, aging and malnutrition produce oxidative stress which related to the toxic effects of oxygen free radicals and reactive oxygen compounds these can lead to a wide variety of conditions, including beside aging and malnutrition also atherosclerosis, viral infections stroke, myocardial infraction, diabetes, obesty and arthritis (Ames *et al.,* 1993). Although oxidative stress may not be the fundamental cause of each of these, it can be speculated that a variety of specific pathological and degenerative processes may render cells more susceptible to oxidative damage (Grajeda-Cota *et al,* 2004). Also Verma *et al*., (2007) reported that links between oxidative stress and adverse health effects have been suggested for several groups of diseases such as cardiovascular, respiratory neurological, diabetes. Atherosclerosis as well as for the general aging process. Several drugs, xanobiotics and environmental pollutants are known to case this imbalance between formation and removal of free radicals.

The imbalance between environmental demands for survival and the individual's capacity to adapt to these is defined as stress (Marshall *et al.,* 2000) and such responses are needed in adapting to demands of ever-changing circumstances. Individual's react to stress by shifting resources from other biological activities (such as reproduction or growth toward survival). The degree of these responses related to the intensity and duration of the stress. Midler forms of stress draw on reserve resources, but serve acute or chromic stress may impact on critical metabolic events. This result in decrease capability to adapt to changes in ambient temperature, resist infections agents or tolerate exposure to natural and synthetic toxicants. Physiological effects of the stress induced hormonal changes include diversion of energy to the exercising muscles (such as by mobilization of stored energy and gluconeogenesis) enhanced cardiovascular tone, increasing substrate delivery to muscle and brain, acute stimulation in immune function and shapened cognition with increased cerebral glucose utilization (Hancock *et al,* 2007).

Activities of antioxidative enzymes as well as GSH and MDA level reflect the oxidative status. Also, the serum enzymes like AST, ALT and AP represent the functional status of the liver. Chemical-induced cellular alteration varies from simple increase metabolism to death of cell. The increase or decrease of enzyme activity is related to intensity of cellular damage. Therefore, increase of transaminases activity along with the decrease activity of free radical scavengers may be the consequence of aging induced pathological changes of the liver. The severe hyperglycemia may be due to the effect of glycogenolysis and gluconeogenesis and may be the reason for a significant decrease in liver glycogen. The increased serum AST, ALT and AP activity in serum, suggest that there are hepatic damage which may be through free radical (Manna *et al.,* 2004). It means that, the production of ROS is proposed to be caused by mechanism in which xanobiotic toxicant and pathological conditions may produce oxidative stress and induced various tissue damage (I.e. liver, kidney and brain) (Bagchi *et al.,* 1999). The imbalance between ROS production and antioxidative cell defences has been reported to occur in several pathological conditions (Tavazzi *et al*., 2000).

The aim of the present work was to study samples (men and women) from two elderly houses (Egypt, Cairo, Elmohandsen) the elderly people food intake, as well as some anthropometic and biochemical measurements were determined to evaluate their nutrition assessment.

MATERIALS AND METHODS

Materials:

Characteristics of elderly samples:

The study sample includes 100 males and 150 females elderly people aged from 72-104 years from two elderly houses. (Egypt, Cairo, Elmohandsen) healthy elderly were randomly chosen.

Sources of kits

Kits for determination of haemoglobin[from randox Laboratories Ltd., Diamond Road Crumlin, Co. Antrim, United Kingdom], total cholesterol (TC), triglycerides (TG) high density lipoprotein cholesterol (HDL-c) and low density lipoprotein cholesterol (LDL-c) [from Biocon Diagnostic Company, Marienhagen, Germany] .

Methods:

Nutritional assessment was carried out by using a set of measurements: food intake, anthropometric measurements and determination of some biochemical pramtares.

Food intake

Twenty four hours recall method was applied on the 250 elderly (100 males and 150 females).according to Mahan and Arlin, (1992).

Anthropometric measurements

Body weight (BW), body height (BH) and body mass index (BMI) were measured according to Gibson (1990).

Biochemical measurements

After collecting the blood samples from the fasted elderly, 2 ml of blood was put into tubes containing EDTA for determination hemoglobin and blood picture and 3 ml of blood were used for obtaining serum. The blood samples centrifuged at 4000 rpm for 20 min at room temperature. Serum total cholesterol (TC) was determined according to Pisani *et al.*, (1995), serum triglycerides (TG) determined according to Stein and Myers (1995). Serum low density lipoprotein cholesterol (LDL-c) was determined according to Fossati and Prencipe (1982). High density lipoprotein cholesterol (HDL-c) was determined according to Friedman and young (1997). Determination of alanine amino transferase (ALT) and aspartate amino transferase (AST) were determined according to Reitman and Frankel (1957). Blood hemoglobin determined according to Wintrobe (1965).Count of red blood cells (RBCs) and count of white blood cells (WBCs) according to fankel and Reitman (1963) and hematocrit % according to Campbell (1995), Blood glucose level was determined according to Tietz, (1986). Serum urea was determined according to

Patton and Crouh (1977). Serum creatinine was determined according to Bartels *et al.,* (1972).

Statistical analysis

The recorded data obtained from anthropometric and biochemical measurements were statistical analyzed to introduce mean, standard deviation (SD) according to Johnston, (1995). The means, standard deviations and LSD of each variables were calculated for the males and females by COSTAT˜ 1 program. Anthropometric measurements determined according to Gibson, (1990). Analysis of the nutrients in the consumed food was carried out by using computerized data bank by computer Food Intake Analysis System (FIAS) in Food Technology Research Department, Agricultural Research Center.

RESULTS AND DISCUSSION

1.Food intake

Table (1) shows intakes of elderly males and females, for energy, protein, fat, carbohydrate and fiber .Also Recommended Dietary Allowances (RDA - Institute of Medicine, National Academy of Sciences, 1997-2002) were included. The mean energy intake of the male and female was 1439.46 and 1283.34 Kcal , respectively The mean energy intakes was below the RDA for both gender , the percentage of RDA was 70% RDA for male and 69 % of RDA for female. There was a significant difference in energy intake between male and female. Suriah *et al .,* (1996) resulted energy intake was significantly lower ($p < 0.05$) among elderly age more than 80 years (1255 Kcal) as compared to those aged 60 to 69 years (1389 Kcal) and aged 70 to 79 years (1351 Kcal). Results also showed that mean intake of protein and carbohydrates of male and female were higher than RDA. There was insignificant difference in fat intake between males and females under study. A lower intake from dietary fiber for both genders was noticed. This could be due to the lower intake of fresh vegetables and fruits as rich sources of fiber or the absence of teeth among many of the elderly people under study and. most of them wear dentures. , according to Burtis *et al.,* (1988) incorrectly fitted dentures, which resulted in altered mouth posture, could also play a role in food pattern.

Table (1): Intakes of energy, protein, carbohydrate, fat and dietary fiber for elderly gender.

Items	Males		Females		Total mean N=150	L.S.D 00.05
	SD±Mean N=100	*RDA +71y	SD±Mean N=150	RDA +71y		
Energy (kcal)	1439.46 ±415.72	2054	1283.34 ±328.47	1873	1361.40	303.28
Protein (g)	60.76 ±14.71	56	56.71 ±17.55	46	58.73	13.11
Fat (g)	54.00 ±20.23	…	41.79 ±19.80	….	47.89	16.20
Carbohydrate (g)	181.40 61.73±	130	174.92 ±51.49	130	178.16	26.01
Fiber (g)	5.70 ±2.27	30	6.40 2.15±	21	6.05	1.79

* Recommended Dietary Allowance based on Dietary Reference Intakes (1997-2002) for elderly people

Data in Table (2) shows that total intakes for elderly people from vitamin A and vitamin E was 540.41 µg / day and 5.23 mg/day, respectively. Vitamin A intake for elderly male and female covered 63 % and 74%of RDA, respectively based on Dietary Reference Intakes (1997-2002) .Total intake of vitamin E covered 35 % of RDA. There was insignificant difference of vitamin A and vitamin E intake between the both genders.

Table (2): Values of food intake vitamins for males and females

Items/day	Males		Females		Total mean N=250	L.S.D 00.05
	Mean±SD N=100	RDA 71y+	Mean±SD N=150	*RDA 71y+		
Vitamin A(µg)	563.33 ±279.45	900	517.49 ±229.18	700	540.41	206.88
Vitamin E(mg)	5.27 ±1.92	15	5.18 ±3.16	15	5.23	2.12
Vitamin C(mg)	49.86 ±15.74	90	30.11 ±17.08	75	39.98	13.29*
Vitamin B1(mg)	0.66 ±0.16	1.2	0.48 ±0.09	1.1	0.57	0.10*
Vitamin B2(mg)	0.60 ±0.21	1.3	0.59 ±0.17	1.1	0.60	0.15
Niacin(mg)	9.35 ±2.65	16	6.79 ±2.22	14	8.07	1.98*
Vitamin B6(mg)	0.77 ±0.30	1.7	0.76 ±0.15	1.5	0.76	0.19
Vitamin B12(µg)	1.20 ±0.34	2.4	1.33 ±0.31	2.4	1.26	0.26
Folic acid(µg)	214.11 ±57.61	400	194.68 ±41.22	400	204.39	40.55

* Significance level = 0.05
** Recommended Dietary Allowance based on Dietary Reference Intakes (1997-2002) for elderly people

Table (2) also shows water-soluble vitamin intake of elderly people. Vitamin C intake covered about 55 and 40 % of RDA for males and females, respectively. Vitamin C intake showed significant difference between males and females .Vitamins C and E as well as selenium, are considered a high priority for the overall health of older people, for whom specially designed foods and food supplements may be required to address poor nutritional status (Bates *et al.,* 2002).

Results also show that total intake of vitamin B_1 , B_2 , niacin , vitamin B_6 , vitamin B_{12} and folic acid were 0.57 mg/day , 0.60 mg/day, 8.07 mg/day , 0.76 mg/day , 1.26 µg/day and 204.39 µg/day , respectively . The intake of vitamin B_1 , B_2 , niacin , vitamin B_6 , vitamin B_{12} and folic acid covered 55%, 46% , 58% ,45% , 50 % and 54%of RDA, respectively for male, and 52% , 54% , 49?% ,51% , 55% and 49 % of RDA , respectively for females. Thiamin and niacin intakes showed significant differences between males and females.

A diet rich in fruit and vegetables and thus antioxidant substances including polyphenols is also associated with maintenance of cognition and memory in the elderly (Halliwell, 1994). Positive responses to vitamin supplementation suggest that metabolic evidence of vitamin deficiencies is common in the elderly even with normal serum vitamin levels (Gariballa and Sinclair, 1998). Overall, evidence is accumulating which demonstrates that good nutrition and specific nutrients and food components can play a significant role in maintaining cognitive performance and the functions of the brain.

Results in table (3) shows total intakes for elderly people from calcium , phosphorus, magnesium , iron and zinc which were 502.56 , 814.68 , 170.51, 4.47 .and 6.43 mg/day, respectively . The calcium intake for elderly male and female covered 45% and 39 %of RDA respectively based on Dietary Reference Intakes (1997-2002). Low calcium intakes may be related to low consumption of milk and milk products among elderly under study. Low calcium and vitamin D intake in the diets of many countries, together with declines in the quality of the diet and levels of physical activity associated with nutrition in transition (Katherine *et al* ., 2001) .

Table (3): Minerals and trace elements values of food intake for elderly.

Items/day	Males		Females		Total mean N=250	L.S.D 00.05
	Mean±SD N=100	**RDA 71+y	Mean±SD N=150	RDA* 71+y		
Calcium (mg)	540.14 ±142.45	1200	464.97 ±115.98	1200	502.56	105.15
Phosphorus (mg)	936.40 ±167.70	700	692.96 ±94.54	700	814.68	*110.2
Magnesium (mg)	197.29 ±69.66	420	143.29 ±29.26	320	170.51	*43.25
Iron (mg)	4.82 ±0.96	8	4.12 ±0.81	8	4.47	0.72
Zinc (mg)	7.52 ±2.02	11	5.35 ±0.99	8	6.43	*1.28
Sodium (g)	1.46 ±0.72	1.2	0.87 ±0.31	1.2	1.16	*0.45
Potassium (g)	1.56 ±0.41	4.7	1.52 ±0.40	4.7	1.54	0.33

*Significance level = 0.05

** Recommended Dietary Allowance based on Dietary Reference Intakes (1997-2002) for elderly people

Results also show that iron, zinc and magnesium intake covered 60, 68 and 47% of RDA, respectively for elderly male and 52 %, 67% and 45% of RDA, respectively for elderly female. Anemia is mostly due to a low iron intake and or a low bioavailability of dietary iron (N.A.A.C, 2002). Ascorbic acid, among other factors, enhances dietary iron absorption (Olivaries *et al.,* 2000).

2- Anthropometric measurements

Results in table (4) show that the mean age for all subjects was 86. 73±6.26 yr .The mean height and body weight of both male and female were 161 cm /71.76 kg and 157cm / 72.69kg respectively. The mean body mass index for all subject was 29.23 kg/m^2 (SD ± 3.55, range = 20.80 to 37.05), and the mean body mass index for males was 27.64 kg/m^2 (SD ± 5.01) and the mean body mass index for females was 30.82 kg/m^2 (SD ±3.68). There were insignificant differences in weight, height and BMI between the both genders.

Table (4) Anthropometric measurements of the elderly group studied.

variables	Males N=100		Females N=150		Total mean N=250 ±SD	L.S.D.
	Mean ±SD	range	Mean ±SD	range		
Age (y)	87.07 ±8.36	72-104	86.38 7.06±	75-104	86.73 ±6.26	6.26
Weight(kg)	71.76 ±13.61	48-91	72.69 ±13.67	33-85	72.23 ±11.04	11.04
Height(cm)	161.15 ±7.41	150-175	157.07 ±8.58	143-170	159.11 ±64.49	64.49
BMI (kg/m^2)	27.64 ±5.01	20.8-37.05	30.82 ±3.68	24.6-37	29.23 ±3.55	3.56

Stevens *et al.,* (1998) suggested that although greater BMI was associated with higher mortality from cardiovascular disease in men and women up to 75 yr of age, the relative risk declined with age. Furthermore, after 75 yr of age, the risk for cardiovascular disease did not increase significantly with higher BMI. Other investigators had indicated a risk for cardiovascular disease to be less in Asian people with a BMI of ≤ 25 (Gill, 2001).

Table (5): Percent of elderly males and females according to different body mass

BMI Classification	Males N=100	Females N=150	All Subject N=250
	%	%	%
Under weight (<20k/ m^2)	3.40	4.01	12.50
Normal (20 to 24.9 kg/m^2)	4.88	9.04	15.00
Over weight (25 to29.9 kg/m^2)	62.31	56.52	42.50
Obesity (>30 kg/$m^{2)}$)	29.41	30.43	30.00

Body mass index (BMI) a measure closely associated with body fatness. The distribution of BMI by categories was generally used to represent underweight, normal, overweight and obese is shown in table (5). Underweight and normal weight was constituted 12 and 15% for all subjects under study .Overweight weight and obesity was prevalence for all subject which constituted 42.5 and 30 %., respectively. Obesity acts synergistically with sarcopenia causing disability in the elderly people partly because of the low muscle quality (Villareal *et al.,* 2004).

Mahmoud *et al* ., (2004) recorded that obesity was more prevalence among Egyptian women in Gharbia and Ismalia and represented 53.53 and 49.28 %, respectively.(Fraser*et al*., 2003) resulted that obesity rates in Barbados reached 24% of the elderly population – 11.5% of men and 32.3% of women.

Biochemical parameters

Iron deficiency anemia in older adults usually results from slow blood loss over time. Table (5) shows that the hemoglobin value of the 100 subjects tested were 9.24 g/dl (SD± 1.55, range 6.87 – 13 g/dl) and among the 40 men 9.75 g/dl (SD ±1.75, range 7.1 - 13 g/dl) and among the 60 females 8.63 g/dl (SD ± 0.75, range 7.25 - 9.60 g/dl). Results also show that red blood cell counts for both genders were 4.29 and 3.52 million cell, respectively and their was insignificant difference in red blood cell counts for the both genders. Value counts of red blood cell for males were within the reference value (4.5-6 million). The values of hematocrit for elderly males and females were 38.69% (SD ± 8.03) and 32.69 %(SD ± 6.95), respectively. Hematocrit values had insignificant different for both genders and the values were below the Normal Lab Values (40-54% for both). Results also show the counts of leucocytes for males and females were 5504.76 (SD±1438.67) and 4219.23 (SD±1262.52), respectively and this values within the normal lab values.

Hemoglobin is an abundant blood protein, account for 97% of dry erythrocyte weight (Cha, 2001). Hemoglobin physiologically functions as the carrier of oxygen and CO_2. Additionally, Hb can bind with metal ions such as Fe^{+2} (Huang *et al.,* 1995 and Chang *et al.,* 2004) (which may be explain their decreases in blood after the green drink in the present studies) and metabolites (eigbilirubra) (Yang *et al.,* 2004).

The hematological parameters were decreased (RBCs, Ht and Hb) by anemia. In the current study, the significant of RBCs and Hb might be due to probably to the inhibition of erythrpoiesis and hemosynthesis and to an increase in the rate of erythrocyte destruction in hemopoietic organs. On the other hand, hemoglobin in erythrocytes is a major source of radical production when it interacts with redox drugs or xenobiotics (French *et al.,*1978) giving rise to superoxide radical, hydrogen peroxide and in certain cases peroxy radicals leading to membrane lipid peroxidation and hemolysis (Clemens and Waller, 1987). The increase of LDH activity marker of hemolysis (Kato *et al.,* 2006) and the enhanced MDA levels in erythrocyte suggested that anemia sign.

Also the blood glucose level of the 100 subjects tested was 90.81 mg /dl (SD± 35.95, range 60-239 mg /dl) and among 40 elderly males 78.94 (SD ± 16.61 mg/dl range 60- 127 mg/dl) %) but among the 60 elderly females 110.69 mg/dl (SD ±62.19 mg/dl range70-239 mg/dl). There was a significant difference in blood glucose level between both elderly genders.

Table (6): blood picture for elderly gender.

Variables	Males N=40	Females N=60	Total N=250	LSD 0.05
	Mean ±SD	Mean± SD	mean±SD	
Hemoglobin(g/dl)	9.75± 1.75	8.63± 0.73	9.07	1.20
Red blood cell (RBC) (million)	4.29± 0.88	3.52± 0.78	3.82	0.73
Hematocrit (%)	38.69±8.03	32.69± 6.95	35.09	6.18
Leucocytes (WBC) (n)	5504.76±1438	4219.23±1262	4733.44	*950
Glucose	78.94±16.61	110.69±62.19	97.99	*27.38
GPT(U/l)	6.61±3.22	5.61±1.60	6.01	2.09
GOT(U/l)	12.76±4.02	8.46±2.40	10.18	2.47*
Total Cholesterol (TC) (mg/dl)	228.53±22.37	226.66±41.90	227.40	23.1762
Triglycerides(mg/dl)	216.94±25.78	212.66±28.38	214.37	19.1383
LDL-c (mg/dl)	147.00±9.39	130.15±12.42	136.89	*8.6652
HDL –c (mg/dl)	46.92±3.37	42.69±6.99	44.38	4.8834
VLDL-c	43.39±4.44	42.53±8.40	42.87	
AI	3.87	4.31	4.13	
Urea(mg/dl)	29.07±7.70	30.46±7.89	29.90	6.35
Creatinine mg/dl	0.87±0.19	0.83±0.17	0.84	0.12

* Significance level P< 0.05

Results in table (6) show serum activity of GPT and GOT for both gender. The activity of GPT was 6.61 U/l (SD ±3.22, range 3-15) and 5.61 U/l (.SD ±2.43 range 4-8) for elderly males and females, respectively. There was insignificant in mean serum GPT activity between genders. The serum GOT activity was 12.76 U/L (SD ±4.02, range 7-20), and 8.92 U/l (SD ±2.32, range 5-12), respectively for elderly males and females. Elderly males had significant increased GOT activity compared with female. GPT and GOT activity was within the reference range.

Tajima *et al.,* (1998) suggested that men who are heavy drinkers, hypertensive, obese and aggressive had a high risk of developing liver dysfunction within a few years, even if their liver function tests values were within normal limits in any single year. *Ogawa et al .,* (2002) resulted that mean serum level of GOT and GPT for all subject aged 71 year registered as citizens in Niigata city were 22.62±7.87 U/L and 19.91±7.43 U/L, respectively .

The data in table (6) show that the serum total cholesterol for elderly males and females were 228.53.±22.37, and 226.66 ±41.90 mg/dl, respectively. Serum total cholesterol was insignificant between elderly males and females. Serum total cholesterol values was higher compared with normal lab values (below 190 mg/dl). Total blood cholesterol levels should less than 200 mg/dl is desirable (lower risk), 200 to 239 mg/dl is borderline high (higher risk) and 240 mg/dl and above is high blood cholesterol (more than twice the risk as desirable level).

Nakamura , (1994) reported that total cholesterol concentration increases until about 50 to 70 years of age , then decreases with age. Lowering serum cholesterol concentration was an effective way to reduce cardiovascular morbidity and mortality. However, low serum cholesterol concentration was associated with high incidence of stroke, because the blood vessel of hypercholesterolemia patient is weak and easily fissured by high blood pressure. .

Results table (6) also shows the serum triglycerides values for elderly males and females which were 216.94 ±25.78 and 212.66 ±28.38, mg/dl respectively. Serum triglycerides values were higher than that of the normal level (less than 150 mg/dl). The serum LDL-c content for elderly males and females were 147.00 ±9.39 mg/dl and 130.15± 12.42 mg/dl respectively. The lower value for LDL –c results the lower risk of heart attack and stroke. Elderly males had significant higher LDL- c levels than females. LDL- c value was borderline high compared with normal value (less than 100 mg/dl). Table (5) also presented the serum HDL-c content for elderly males which was 46.92 ± 3.37 and this was within the normal level (40 to 59 mg/dl) but higher is the better, while in females was 42.69± 6.99 mg/dl, it was less than 50 mg/dl for females (higher risk). The reduction of HDL-c may accelerate the development of atherosclerosis by impairing the clearance of cholesterol from the arterial wall (Miller, 1996).

The atherogenic index (AI) and VLDL-c proposed as a marker of atherogenicety, which increased higher risk for coronary heart disease. Table (5) shows that 3.87of male and 4.31 of female were had AI ratio >2 which indicated high risk for coronary heart disease (Lee and Niemann, 1996). In connection VLDL-c observed values of 43.39±4.44 mg/dl for male and 42.53±8.40 for female which were more than the normal value.

The alteration observed in the present studies regarding lipid metabolism and indicate that they can be important marker of hepatocyte structure and thus of liver function which agrees with the results obtained by Malaguarnera *et al.,* (1996).

Serum lipids were found to be roughly proportionate to the clinical severity of the renal complication of diseases (Keiding *et al.,* 1952 and Chatterjeat and Shinde, 2002). Therefore, although these may be some relation between the level of lipid functions and the presence of diseases, the estimation of serum lipids is of no real value in the diagnosis of the renal disorders. So it was of great important to estimate renal function by the classical methods which induces the determination of serum urea and creatinine as well as a result of aging and malnutrition in elderly males and females.

The results in table (5) observed that serum urea (mgldl) for elderly males and females were 29.07±7.7 and 30.46±7.89 mg/dl respectively. These values of blood urea were insignificant among males and females. These amounts of urea were in the range of the normal lab values (15-50 mg/dl). In addition blood creatinine contents of the both studies males and females were 0.87±0.19 and 0.83±0.17 mg/dl respectively and there was insignificant difference between these values. The present values of blood creatinine for the both genders in normal lab values are (0.6-1.1 mg/dl for males and 0.5-0.9 mg/dl for females).

As reported previously in the present results, mammalian cells are equipped with both enzymatic and nonenzymatic defense system to minimize cellular damage from action of reactive oxygen species (ROS). The overproduction of ROS leads to cellular and tissue damage (Harris, 1992). Free oxygen unstable radical species that have at least one unpaired electron in an outer orbital, are by-products of normal mitochondrial and endoplasmic reticulum metabolism. The primary product of oxygen reduction is superoxide anion, which is a precursor of hydrogen peroxide and highly reactive hydroxyl radicals (Ruthkowski *et al.,* 2000). Mitochondria are continually exposed to ROS, which cause peroxidation of membrane lipid (Apai *et al.,* 1999). An increase in the oxidative stress may be due to a decrease in the antioxidant defenses or due to an increase in the processes that produce oxidants (Zhang and Wang 2000).

The results reported here clearly show that acute intoxication with aging caused disturbance in the body metabolism as well as oxidative/antioxidative balance in the brogans tissue and serum of elderly. These data suggest that the aging and malnutrition probably caused hypoxia at an early aging (Lukasiewicz – Hassain and Moniuszko – Jakoniuk, 2003). Also, nutritional status has a major impact on disease disability and offers great promise for minimizing this oncoming burden. However, the current trend in developing countries is toward higher fat, more refined diets that contribute to increase risk of chronic disease, and the prevalence of chronic disease is already increasing rabidly. At the same time, social and demographic changes are placing elderly at even greater risk of food insecurity and malnutrition. This double burden of under nutrition and obesity in an aging population posses tremendous challenges for developing countries, whose policies and institutions are currently unprepared to handle the demand these changes will bring (Tucker and Buranapin, 2001).

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التقييم الكيميائى الحيوى للحالة الغذائية لكبار السن فى دار المسنين

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يهد ف هذا البحث الى تقييم الحالة الغذائية لكبار السن فى دور المسنين فى مصر (القاهرة- المهندسين) وذلك عن طريق تقييم تناول الطعام المأكول لمدة 24ساعة خلال 3 ايام مستمرة اشتملت الطاقة والبروتين والكربوهيدرت والالياف و المعادن والفيتامينات وكذلك عن طريق اخذ القياسات الانثروبومترية للجسم وايضا عن طريق عمل التحاليل الطبية للدم التى اشتملت على الهيموجلوبين وصورة الدم كاملة و جلوكوز الدم وتقدير الليبيدات الليبوبروتين منخفض الكثافة (LDL-c) TC,TG , ,HDL-c,) الليبوبروتين شديد انخفاض الكثافة (VLDL-c) الليبوبروتين عالية الكثافة (HDL-c) الكوليستيرول(TC) والجلسريدات الثلاثية(TG) ووظائف الكبد(انزيمات نقل الامينAST,ALT) ووظائف الكلية (يوريا وكرياتنين) ومقارنتهم بالمعدلات الطبيعية

اوضحت النتائج ان الطاقة المأخوذة اقل من التوصيات الغذائية العالمية اما المأخوذ من البروتين و الكربوهيدرات فكان اعلى من التوصيات الغذائية وذلك بالنسبة للذكور و الاناث وايضا المأكول من فيتامين A 63% للذكور اما الاناث 74% ومن فيتامين E 35% وفيتامين C للذكور 55% والاناث 40% مقارنة بالتوصيات العالمية. وكل من الكالسيوم و الحديد و الزنك الكمية المأخوذة كانت اقل من التوصيات العالمية. ووجد ارتفاع نسبة الانيميا بين كبار السن الذكور فى دار المسنين عن الاناث وايضا ارتفاع قيم الكوليستيرول(TC) والجلسريدات الثلاثية(TG) والليبوبروتينات المنخفضة الكثافة (LDL-c) فى سيرم الدم .وارتفاع نشاط ايضا قيم انزيمات نقل الامين (AST,ALT) لكل من الذكور و الاناث التى تدل على ان كبار السن عرضة لامراض تصلب الشرايين و القلب.