Egypt. J. Chem. Environ. Health, 2 (2):106–133 (2016)
On line ISSN: 2536-9164.

Biological Age Associated with Socioeconomic &Nutritional Status Across Healthy Population Residing in Jeddah Between Ages 19 to 65

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Abstract

Background: Our understanding of the mechanisms by which aging is produced is still very limited. Nutrition status focus on the areas such as staying fit from 19 ≥ 60; Work-Life Balance; Genetic risk factors and risk calculation of chronic illness; assessing the biological age against the chronological age; weight reduction and minimizing risk for chronic illness. The aim of this study to find the association between socioeconomic &Nutritional Status on measuring the biological age length (telemeter length) for healthy population residents in Jeddah across 19-65 age.

Methods: A cross- sectional descriptive study was carried out by two parts of questioner contain several section to assess nutritional status, and to calculate Biological age for 115 (56.3%) female and 88 (43.7 %) male were conducted. The mean age for female was (27) and for male was (29). Patients with any disease diagnosed were excluded.

Results: The majority of our participants (70%) their ages were ranging from 19 to 30 years old followed by (30%) were from 31 to 50 years and above. More than half (53.7%) of our participants had high income level (from 6000 to >10000SR / month). A positive correlation between Bio age and levels of income as total sample and statistically significant at (P<0.05).But no significant different among male and female and Bio age.

There was highly significant differences between age groups at (p <0.000***) in weight, BMI, mid arm circumference, waist circumference, however significant differences for waist to hip ratio & for triceps skin fold and hand grip (left) was at (P<0.05*). The majority percentage of obesity distribution between overweight, obesity class 1, 2 and 3 was (83.1%) among (31- 50) age group followed by (75.0%) for (51 – 65) age categorized and third position (53.7%) for (19-30) year age group. Likewise as gender prevalence obesity was higher in male than female (59 vs. 40%). Lipid profile: High level LDL &CHOL in male than female with highly significant differences among

(male &female) in LDL at ($P<0.003$**). Low in HDL level (good cholesterol) in male than female with statistically sig ($p<0.000$***).
Blood Constituents: Iron HGB, HCT and RBC blood levels in male participants were higher than in female with highly statistically significant differences at ($p<0.000$***). High mean levels of VB9 & B12 in female than male (22.4 ±8.43 vs. 16.32 ±5.24) & (222.8 vs. 151.31) respectively. Level of iron in the blood was higher in male than female (13.19± 20.99 & 12.69 ± 6.89). Food intake: The mean of total energy intake as % from RDA was (62.02 ± 23.3) for male and (59.2 ± 34.6) for female. The consumption of female was more than male in all food groups but still less than normal as guidelines of 2010 for healthy diet intake. A highly differences between male and female and the total participants in fat intake as percent of RDA (149% vs. 109% vs.127) statistically highly significant differences at ($P<0.000$***). The mean of real age for male population less than bio age (29.5 ±10.2 & 31.0±12.0) respectively may be that the male exposure to life stress and bad behavior life style practices more than female which the average of their biological age was less than real age (Chronological age) (22.7±7.6 & 27.0 ±9.5) respectively.
Conclusion: A healthy balance diet may protect against endothelial cell senescence, generating by decrease in intracellular oxidative stress, telomere shortening and cellular apoptosis. All these mechanisms may be involved in an increased lifespan and a lower incidence of the diseases associated with aging.
Our Results in this study indicate to the need of rising nutritional awareness among adult males to consumption healthy diet, practices physical exercise daily and to reduce fast foods.
Key words: Biological age, telemeter length, Chronological age, Nutritional status, socioeconomic status.

Introduction

From the beginning of human life, people have always tried to understand what is aging, what happening in the cells and tissues, why all those changes happening as we getting older (**NIH, 2011**).

Chronological age is defined as the number of years in life according to calendar. It's an unchangeable number and it doesn’t affected by lifestyle or diet or anything else **(Basaraba 2013).**

Life span is a term that describes the life of an organism, it is also used to describe the maximum years people have lived in certain population. Maximum lifespan in 2010 for human recorded was 122.5 (**NIH, 2011**). In humans and other multicellular organisms that have an extended lifespan, the leading causes of death are atherosclerotic cardiovascular disease and cancer. Experimental and clinical evidence indicates that these age-related disorders are linked through dysregulation of telomere homeostasis (**Sajidah Khan.et al, 2012**).

Biological age; our understanding to how our cell aging is still limited (**Antonia et al. 2013).** Aging is a natural process ongoing in every gene, cell, molecule, organ and every body system. Exact mechanism of aging is still poorly understood but there are some points toward reactive oxygen species (ROS) are one of the basic things of aging. The "oxidative stress theory" sees that the repeated stress and damage caused by ROS has a great impact on cells and can impair physiological functions leading to aging quickly, increase morbidity and decrease lifespan. (**Kevin and Hannah 2007)**.

Biochemical Measurements

Biochemical assessments are used for nutritional status evaluating, nutritional care outcome monitoring and nutritional diagnoses identification. Data which used to help dietitian to complete the nutritional assessments are Complete blood count (CBC); Hematocrit (Hct) and Hemoglobin (Hgb); Hematocrit (Hct) concentration; Serum Iron; Lipid profile; Total Cholesterol; Serum triglyceride (TG); High density lipoprotein (HDL); Low density lipoprotein (LDL); Serum Vitamin Serum Vitamin B12; Serum Float; Serum calcium (Ca): Serum phosphorus (Phos) **(Mahan, K., et al. 2012)**

Diseases and telomere length:

Endothelium is one of the most important biological structure among different structures that are affected by the process of aging, because it is produce nitric oxide (NO) that regulate vascular homeostasis **(Marín. C.E. et al. 2013).**

Studies found that aging causes the development of atherosclerosis in the absence of other risk factors, Cardiovascular risk factors such as hypercholesterolemia, hypertension, diabetes mellitus, cigarette smoking, and genetic factors, aging could be considered as an independent factor associated with endothelial dysfunction even in the absence of these factors**(Marín. C.E. et al. 2013)**

Obesity:

Obesity is strongly associated with cardiovascular disease and increases the exposure to several risk factors such as dyslipidemia, diabetes, hypertension and the metabolic syndrome. A retrospective analysis of the Bogalusa Heart Study examined the association between weight change and the length of telomere in 70 young adults at a period of 10 to 12 years. The study found that weight gain was associated with accelerated telomere shortening and that a rise in insulin resistance accounted for the association between the increase in body mass index (BMI) and telomere shortening (**Khan, S,A. et al. 2012**).

There is a link between telomere shortening and with increasing BMI, waist to hip ratio, and excess fat accumulation in the visceral. Then, many of the metabolic imbalances of obesity (e.g. glycemic, lipidemic, etc.) lead to organ dysfunction in a way that accelerate the aging (**Tzanetakou, I.et al. 2012**). Obesity may increase the processes of aging by which short telomere was found in individuals who have higher total and abdominal adiposity (**Lee, et al. 2011**).

Dietary intake:

The type of food and how much we eat from it can significantly affect our telomeres length, health, and Longevity (**Shammas 2011**).

The dietary intake of specific foods would be related with telomere length in a manner consistent with reported relationship between diet and inflammation, chronic diseases, and mortality rate (**Nettleton, J,A. et al. 2008**).

Socioeconomic

In the last three decades, Saudi Arabia we have seen rapid changes in the field health, education, agriculture, and social services. It was for those changes profound impact on food consumption patterns, health, and nutritional status (**Madani, K., and Kumosani.T 2001**).

This study carried out to assess the association between socioeconomic &Nutritional Status on measuring the biological age length (telemeter length) for healthy population residents in Jeddah across 19-65 age.

Aim of study

The main objective of the study: A cross-sectional study to assess the association between socioeconomic &nutrition statues on measuring the biological age length (telemeter length) for healthy population residing in Jeddah across 19-65 age.

Specific Objectives: To know the socio-demographic features of respondents and environmental conditions which determining the quality of the diet.

1. To observe the impact of different socioeconomic classes in participants on food and nutrient intake of the respondents with relations to biological age.

2. Determine the assessment of Nutritional Status for participants (anthropometric measurements; Biochemistry; clinical information and dietary) (ABCD).
3. Identify the health status for all participations
4. Laboratory analysis for parameters which effect on Bio age for participations.
(Lipid Profiles, Total antioxidants …etc).

Materials and Methods

Sampling: A cross- sectional descriptive study was carried out among 203 male and female healthy populations in a retrospective review of the healthy populations both sexes aged from the age of 19 to 65 year. All racial and ethnic groups as well as both genders resident in Jeddah were included in this study. Of these, 115 (56.3%) female and 88 (43.7 %) male were conducted. The mean age for female was (27) and for male was (29). Patients with any disease diagnosed were excluded. The aim of the study was explained to the subjects.

Location of the study: The present study was conducted in Kingdom of Saudi Arabia (KSA) for staff in King Abdul-Aziz university hospital (KAAUH); King Fahd Center for Researches; Faculty of Applied Medical Sciences male and female and Engineering Projects Management in Jeddah city.

Methods: This study carried out to identify the association between socioeconomic & nutritional status (anthropometric measurements; Biochemistry; clinical information and dietary) (ABCD), on measuring the biological age length (telemeter length) in healthy population across 19 - 65 age Residing in Jeddah from the data which was collected by two questionnaires.

First questionnaire design: Questionnaire was developed for the purpose of data collection, which was pilot, tested and modified accordingly to become validity. A face-to- face interview with each participating. The interview was of 20 to 30 minutes duration (**Karlsson et al, 2009**).

This questionnaire contains several sections:

Socio-demographic data (Socioeconomic status; SES) which include questions on basic socio-economic characteristics of the households. It also collects data on individual characteristics as the: name, age, nationality, marital status, educational status and the wife/husband (if married), occupational and employment status, working hours, income source, average of household income, place of residence, type of dwelling, number of rooms, number of family members.

Nutritional Status determine: Nutritional status (anthropometric measurements; Biochemistry; clinical information and dietary) (ABCD),

Anthropometric data: It includes weight, height and BMI, arm-circumference, triceps skin fold, waist circumference, waist to hip ratio, hand grip. (**Kuczmarski et al, 2000**).

Weight (wt): The plate from scale was used to measure weight for participating. The scale should be placed on a flat, hard surface. We should make sure that the scale is at zero before measuring participant weight. The participant should stand in the middle of the scale's platform without touching anything and with the body weight equally distributed on both feet. The weight should be read to the nearest 100g (0.1 kg) and should be recorded. The subject asked to be wearing light clothes as possible **(Robert, D et al, 2003).**

Height (Ht): Height was measured using vertical measuring board for adults. The participant stood bare footed on a flat platform, with feet parallel and with heels, buttocks, shoulders and back of head touching the upright surface. The head was held comfortable erect, with the over border of the orbit in the same horizontal plane with the external auditory meat us "Frankfort plane". The arms were hanging at the sides in natural manner. The head piece was gently lowered, crushing the hair and making contact with the top of the head. Height was recorded to the nearest ½ centimeter **(Chumlea WC, et al, 1985; Moore and Roche, 1983; Gordon CC, et al, 1988).**

Body Mass Index (BMI): This index was obtained by calculating weight by kg / square height by meter (kg/m^2), and BMI was then categorized as underweight(< 18.5 kg/m^2), healthy weight (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2), obesity (30-34.9 kg/m^2), over obesity (35-39.9 kg/m^2) and morbid obese ($\geq$40 kg/m^2) **(Jimmam, et al, 1998).**

Waist Circumference: Fat distribution correlates with health risks and mentioned that the waist circumference is a valuable indicator of fat distribution. To measure waist circumference, the assessor places a non-stretchable tape around the person's body, crossing just above the upper hip bones and making sure that the tape remains on a level horizontal plane on all sides. The tape is tightened slightly, but without compressing the skin **(Whitney and Rolfes, 2008).** A measurement of greater than 40 inches (102 cm) for men and greater than 35 inches (88 cm) for women is an independent risk factor for disease. These measurements may not be as useful for those less than 60 inches tall or with a BMI of 35 or above **(CDC and Prevention, 2002)**.

Waist-to-Hip Ratio: The waist-to-hip ratio also assesses abdominal obesity, but provides no more information than using the waist circumference alone. In general, female with a waist-to-hip ratio of 0.80 or greater and male with a waist-to-hip ratio of 0.90 or greater have a high risk of health problems. To calculate the waist-to-hip ratio, we divided the waistline measurement by the hip measurement **(Whitney and Rolfes; 2008).**

Triceps Skin fold Thickness (TSF): Measure the amount of body fat in an individual. This method is helpful because the most complete standard and method of evolution are available for these sites **(Mahan, K., et al. 2012).**

Handgrip: Measure the strength of the handle is either kilograms or by pressing the Newton reinforced the power of single handle with maximum strength. It is a measure of the strength of several muscles in the hand and forearm. That poor nutritional status with poor functional status as assessed by handgrip strength in both older men and women had both lower handgrip strength and lower arm muscle area(LAMA) **(Chilima and Ismail 2000)**.

Biochemical measurements:

Blood tests by collected blood samples from all participants in the laboratories of king Fahed center for researches and King Abdul-Aziz university hospital to analyzed the following parameters:

A. Complete blood count (CBC) (**Derrick W Spell et al, 2004**).

B. Lipid Profile.

C. Serum total antioxidants in the blood.

D. Serum Vitamins D, B12 and B9 levels.

E. Serum Calcium, Phosphorus and Iron.

Daily intake of nutrients:

The 24-hour recall method was used to assess the usual intake of energy and nutrients for three consecutive days. In the same day of interview, the participant asked to recall type and quantity of all foods and beverages or snakes that consumed during the previous 24 hours, and they were also asked to record the food intake during the another two days in their homes and the amount in units or parts then collect the questioners from them or by telephone (day by day). Then the student (investigators) conformed these units or parts into grams to calculate the daily intake from different nutrients and by using food composition tables **(Robert, D et al, 2003).**Data of the 24-hour food intake were coded and entered into the computer program of food analysis. The food intake data were analysis by this program is based on food composition tables of the

(National Nutrition Research Institute2006). The adequacy of diets estimated by using dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein and amino acid (**national academies press, 2005).** After 3 days of giving the students the questionnaires we went back to review the dietary food recalls for the previous three days, or takes the food recall by calling the subjects on their mobile numbers.

Second Questionnaire design for Biological age and vitality:

Assessing the biological age against the chronological age:

To determine the biological age and vitality markers of participants' organs such as heart, lung, brain, kidney, intestinal tract, skin, nerves, senses, muscles and tendons. This is done by physical and laboratory tests that are validated and standardized using a programmed called Bio Aging Software Package computer (**Mike Roizenand Mehmet Oz.2014).** This could be relevant in finding participate specific weaknesses and developing strategies to improve them. The critical period for the human race is usually between 50 and 60. If person can avoid major problems such as major operations and illness before this age he has the chance to stay very fit and healthy way into 80-90 years.

Ethical Considerations:

Permission was attained from Ethics and Research Committee. Information letters form to be provided to all participants residents in Jeddah province Kingdom of Saudi Arabia before the interview.

The statistical analysis included:

The results were analyzed by SPSS statistical package version 15 **(Statistical Package for Social Science, (1994)** and the results were tabulated and used the Harvard graphics packages version 4 for representing the results graphically **(Harvard 1998).**

Result and Discussion

The dietary intake of specific foods would be related with telomere length and there is a relationship between diet and inflammation, chronic diseases, and mortality rate. There was a study showed an inverse relationship between consumption of processed meat and telomere length, but other food groups were not associated with telomere length (**Nettleton, et al. 2008**).

Longer telomeres are correlated with a healthy lifestyle like eating diet rich in fruits and vegetables, doing exercise, and no cigarette smoking (**Paul 2011**).

A cross- sectional descriptive study was carried out by two parts of questioner contain several section to assess nutritional status, lifestyle and to calculate Biological age for 115 (56.7%) female and 88 (43.3%) male were participants178 of them were Saudis 25 were non-Saudis. The mean age for both female (27) and male was (29).

Socioeconomic status (SES) Characteristics

Table (1): represent the number and Percent of distribution of social data of population Residents in Jeddah included in the study. We can see that female participant were 115 (56.7%) while male were 88 (43.3%) of total participants. For nationality 178 (87.7%) of them were Saudis 25 (23.3%) were non Saudis. The major percent of participants (70%) were around (19- 30) years old followed by (26.0% for 31-50 year old and 4.0% for (51-65year).

Socioeconomic state measured in terms of income, education and occupation has been found to be negatively associated with mortality and morbidity from almost every diseases, this relationship have been found in almost every country people have access to health care (**Sheldon cohen et. al. 2006)**. Moreover researchers have found that highly stressed individual have low SES low income and low education those individual have to cope with the stressful life **(Laura D. and David 1999).**

Saudi Arabia is of the richest and highest per caption income countries of the world. This high income along with food galore and shortage awareness of food has led to a state of excessive-nutrition of macronutrients and malnutrition of micronutrients among the population. The over-nutrition of macronutrients is one of the main reasons of the prevalence of overweight and obesity among adult population (**Madani et al., 2000).**

The present study results revealed that more than half (53.7%) of our participants had high socio economic level (HSEL) from (6000, >10,000SR). However (16%) had 3000 SR considered in moderate socioeconomic status, (18.2%) were had (1000 SR) and only (11.3%) were had income less than (1000 SR) per month as seen in table (1). Our study agreement with the previous study by **Madani et al., 2000.**

Table (2) and Figure (1) a positive correlation between Bio age and levels of income as total sample and statistically significant at ($P<0.05$).But no significant different among male and female and Bio age.

Anthropometric measurements

Table (3): presented the descriptive statistics of anthropometric data according to age groups. These result show a significant differences between age groups at ($p <0.000$***) in weight, BMI, mid arm circumference, waist circumference. These results due to variation in age categorized. Also there are significant differences between age groups

at ($p < 0.001$***) in waist to hip ratio between age groups. However the differences among age groups in triceps skin fold was significant at ($P<0.04$*).
A positive correlation between bio age and waist circumstance in male participates &body weight; hip and Waist to Hip ratio in total sample of total population as shown in figures (2; 3; 4and 5) respectively and statistical significant at ($p<0.01$). Also in table (3)there was significant differences between age groups in hand grip (left) at ($p<0.03$*). On other hand there is no significant differences between age groups in height, systolic and diastolic blood pressure, hand grip (right) and lower arm muscle area(LAMA) in the same table and figures (6&7).

Table (4) represent a cross tabulation between BMI and age group categories and we see that there are highly significant between three groups. Also demonstrate that the percent distribution of overweight among age groups was (23.9%, 39.6 % and 12.5% for 19-30, 31-50 and 51-65) respectively. Statistically was highly significant at ($P<0.000$***). We notice that the prevalence obesity among our participants in the age group (19 -<31), (31- <51) and (51 – 65) by (33.7%; 83.1%; and 75, 0%) distribution among overweight, obesity class (1, 2 and 3), respectively. These results show that prevalence obesity higher among (31-<50 year) categories than other age groups.

The percent distribution of obesity in our results considered higher than another study in Saudi subjects by **Al- Nuaim et. al. 1996** subject: 13,177 for male and female subjects (15-95 years, 33 years) which demonstrated that the mean BMI for female subjects was significantly higher than for male subjects, (24% vs. 16%). Whether in the same study for all subjects or subjects of any given age group: The prevalence of overweight among male subjects was significantly higher than for female subjects (29% vs. 27%) these result agreement with our result. But still our results have the highest percent of prevalence obesity among male than in female (59% vs. 40%) as showed in table (5) which show a cross tabulation of BMI of male and female group and χ^2 value**.** Our study agreement with another study by **AL Qauhiz, N., 2010** from a sectional wasfi study about obesity among Saudi aged (18 -74) reported that among the study participants, overweight and obesity reached (47.9%). However our percent of obesity considered much higher than the observed in Brazilian adolescents from a random nationally representative sample developed in 1996-1997 (12.6%) (**Wang Y, 2002**).

Unfortunately our present study had evidence which demonstrated that the prevalence obesity among male participants was higher than female. This evidence presented in table (8) shows that the mean of real age for male population less than bio age (29.5 ±10.2 & 31.0±12.0) respectively may be the male exposure to life stress more than female which the average of their biological age was less than real age (22.7±7.6 & 27.0 ±9.5) respectively as we know all most female preferably this. There was highly significant differences between male and female and the total participants at (P<0.000***)

Tzanetakou, Katsilambros et al. 2012 revealed that there is a relationship between short telomere length and with increasing body mass index, waist to hip ratio, and visceral excess fat accumulation. Furthermore, many of the metabolic imbalances of obesity (e.g. glycemic, lipidemic, etc.) lead to organ dysfunction in a way that increases the aging process.

Another study show that short telomere length was observed in individuals with higher total and abdominal adiposity, suggesting obesity may accelerate the aging (**Lee, Martin et al. 2011**).

Hand grip strength (HGS)

Chilima, M. and Ismail, S 2000 indicate that poor nutritional status is associated with poor handgrip strength. The results of their study tests of handgrip strength agree with those reported in the literature: men are generally stronger than women and function declines with age.

The present study in table (3) & figures (6& 7) Confirm positive correlation between bio age and hand grip left in total sample of population Residents in Jeddah included in the study. Also there is a statistical significant between total sample at (p<0.01**) in hand grip left. A study by **Nathalie de Almeide Silva, et al, 2013**. A total of 420 elderly individuals were evaluated. Correlations of hand grip strength (HGS) with age, lower arm muscle circumference (LAMC) in both genders, were observed. BMI correlated with HGS only in females. Their results indicated that a probable influence of age and anthropometric variables in muscular strength, as well as that of excess weight in flexibility limitation. Our study revealed that a significant differences between age groups in hand grip (left) at (p<0.03*) and the mean ± SD (19.95± 9.29) & (21.83±9.04) for left and right handgrip respectively were highest in (51 - 65 year) than other age groups categorizes.

In the present study among 203 subjects as in table (3) demonstrate in total sample a significant difference according age group at (P < 0.001**) in Waist to hip ratio and had a positive correlation with bio age as in figure (5). But there was no significant difference between age group and lower arm muscle area (LAMA). Moreover the mid arm circumference in total sample in table (3) as age group had statistically significant difference at (P < 0.000***). There was a positive correlation among bio age and waist with high significant difference in male subjects at (P < 0.01**) as in Figure (2).

Our study as presented in table (4) revealed that prevalence obesity among two genders was (59 %) for male participants and (40%) for female participants which distribution among all categorized of obesity (overweight, obesity class1, 2 and 3).

Biochmical Parameter

For lipid profile: A pilot study by (**Paul 2011**) for a 3 months period in men found that changes in lifestyle especially increase the consumption of low-fat diet, unrefined plant-based food with omega-3 fatty acids supplement (from fish oil), soy and vitamins E and C increased the activity of telomerase enzyme of peripheral blood mononuclear cells which lead to low-density lipoprotein reduction in the plasma and decrease in psychological distress. Also they found that increased intake of whole grains improve inflammation and positively correlated with telomere length

Our descriptive statistics of laboratory data of population Residents in Jeddah included in the study according to gender in table (6) clear that there was highly significant differences among our participants (male &female) in HDL and Iron level in the blood at ($p<0.000^{***}$). But there was statistical significant differences among our participants (male &female) for LDL at ($P<0.003^{*}$).

Regard to HDL and LDL level among our participants their result was logical as we can see (mean ±SD) for HDL (good cholesterol level) in male was less than in female (0.41± 0.98&0.621.35±) respectively; but LDL level (bad cholesterol) in female was less than in male (±2.39 0.99&2.76 ± 1.18) respectively. These results indicate that as we know that risk of incidence hyperlipidemia in male more than in female and the prevalence obesity among male participants was higher than in female. These results logically because male subjects life style in this study trend to unhealthy habits.

Mean ± SD of iron in the blood for male population is higher than in female (±18.53 14.1 &±10.61 7.87) respectively. This result is logic because female had higher risk for iron deficiency than male. However Mean ±SD for VITB12 in Female population was higher than in Male. (222.78±111.58 & 151.31±94.91) respectively. But the different between them non-significant. Likewise, mean for VITD and VITB9 in Female population was higher than in Male (35.18 & 30.84) and (22.4 &16.32) respectively and the difference between male and female was highly significant at ($P<0.000^{***}$) for VIT B9 these results may be due to that female always take supplements.

According to biochemical parameters in table (6) as we can see in the result of measure the level of total antioxidants by (TBARS) test, the mean of total antioxidants was (11.83 &11.19& 11.5) for male, female and total subjects respectively these results proven that our participants were healthy population. However when compare TBAES results with lipid profiles for males and females and total sample as in table (7) we found that the male participants whom having increasing in mean of CHOL& LDL and TG (slightly increased above maximum of normal range in CHOL (5.20 mmol / L) were having also high level in TBARS (10-20 µmol/L).

Dietary intake:

The dietary intake of specific foods would be related with telomere length and there is a relationship between diet and inflammation, chronic diseases, and mortality rate. There was a study showed an inverse relationship between consumption of processed meat and telomere length, but other food groups were not associated with telomere length (**Nettleton, J. et al. 2008**).

In the last three decades, Saudi Arabia we have seen rapid changes in the field health, education, agriculture, and social services. It was for those changes profound impact on food consumption patterns, health, and nutritional status **(Madani and Kumosani. 2001).**

Longer telomeres are correlated with a healthy lifestyle like eating diet rich in fruits and vegetables, doing exercise, and no cigarette smoking (**Paul 2011).**

Our results in table (10) show that the mean± SD intake from Kcal and was (1889±716 &1434±830) for male and female respectively and statically highly significant differences at (p<0.000***). Regard to mean intake from fat for male and female was (52.09± 36.29&38.24±34.25) respectively and statically highly significant differences at (p<0.006**).While protein mean intake was (60.3±45.6&65.37±48.83) for male and female respectively and there was no statistically significant. However there's no statistically significant between two genders in carbohydrate there close together.

Our study revealed that the mean of total energy intake as % from RDA± SD was (62.02 ± 23.3) for male and (59.2 ± 34.6) for female. The consumption of male was more than female but still less than normal as guidelines of 2010 for healthy diet intake these evidences by the results in table (8) which clear that the Mean intake of total K. calories as % from RDA by male and female of our participants were (62 % &59%) respectively. A highly differences between male and female and the total participants in fat intake as percent of RDA (149% vs. 109% vs.127) respectively & statistically highly significant differences at (P<0.000***). The mean of real age for male population less than bio age (29.5 ±10.2 & 31.0±12.0) respectively may be that the male exposure to life stress and bad behavior life style practices more than female which the average of their biological age was less than real age (Chronological age) (22.7±7.6 & 27.0 ±9.5) respectively as shows in table(8).

Saudi Arabia is of the richest and highest per caption income countries of the world. This high income along with food galore and shortage awareness of food has led to a state of excessive-nutrition of macronutrients and malnutrition of micronutrients among the population. The over-nutrition of macronutrients is one of the main reasons of the prevalence of overweight and obesity among adult population (**Madani et al., 2005).**

The present study agreement this fact as clear in table **(8)** that the Mean intake as % from RDA of fat was (148.8% &109.2%) for male and female respectively and statistically there was highly significant differences at (p<0.000***) as shown in table(10).

Micronutrients intake:

Table (11) presented the Mean ± SD of Minerals Intakes of population Residents in Jeddah included in the study according to gender. It's clear that statistically there was highly significant differences among our participants (male &female) in potassium, phosphorus, Zinc and selenium at (p<0.000***). Also there was statistically significant at (P<0.04*, <0.02* &<0.01*) between male and female participants in iron, sodium and magnesium respectively. However there's no significant difference among population in the Mean ± SD of calcium and cupper as seen in the same table. Regard to iron intake as % from RDA there is also a positive correlation with bio age for male and females included in the study. P value < (0.05, 0.01) respectively, Moreover there is a positive correlation between Bio age and vitamin D, A and C in total participant and statistically significant at (p<0.05).

Table (12) shows that Mean ± SD and mean intake as % from RDA from Vitamin for population Residents in Jeddah included in the study according to gender. There was significant differences between male and female groups at p (<0.04* and <0.01*) in vitamin A Intake and vitamin D Intake respectively .However there's no significant difference among population in the Mean ± SD of vitamin C, vitamin B1 and vitamin B2 as seen in the same table. It's clear that statistically there was significant differences among our participants (male &female) in vitamin A, C and vitamin D intake at (P<0.04 , p<0.02* and p<0.01*) respectively. However there's no significant difference among population in the Mean intake as % from RDA ± SD for vitamins B1 and B2 as seen in the same table. As we can see in table (12) female has higher level of vitamin C more than male. Regard to the mean intake as % RDA of vitamin D for male participants was (392.0 %) higher than in female population (228.0 %). However for vitamin C intake as% from RDA for female participants was (59.9 %) higher than in male population (41.1 %). These results indicate that as we know female intake of vitamin C (vegetables and fruit) higher and male intake of vitamin D (Fish and dairy product) higher than female.

Bio age: It is the first research in this subjects and there is no previous studies to compare our results with the other results and here we are presenting our study as start and focus on the main points related to nutritional status and lifestyle for healthy populations residents in Jeddah and the correlations for all variables with bio age.

From a cross tabulation for all parameters with bio age in our study revealed that there was a positive correlation between Bio age and socioeconomic status, anthropometric measurements, biochemical analysis, some items for life styles (chronological age).

The Correlation between real age and bio age in male and female and total sample of population Residents in Jeddah included in the study. It is obvious that a positive correlation between two variables (real age and bio age) in male group with highly significant at ($p< 0.001$**) as shows in figure (8). Likewise there was Correlation between real age and bio age in total sample with significant at ($P < 0.01$**) as shows in figure (9).

Table (1): Number and percent Distribution of socioeconomic data of population Residents in Jeddah included in the study (no=203)

Characteristics	No	%	Characteristics	No	%
Gender			**Education**		
			Elementary	2	1.0
Male	88	43.3	Intermediate	27	13.2
Female	115	56.7	High school	150	73.9
			Bachelor`s degree	18	8.9
			Master degree	6	3.0
			Education wife/husband		
Age(years)			unmaried	115	56.7
			Elementary	1	0.5
19-	142	70.0	Intermediate	5	2.5
31-	53	26.0	High school	18	8.9
51-65	8	4.0	Bachelor`s degree	55	27.1
			Master degree	8	3.9
			PHD degree	1	0.4
			main source		
			job	106	52.2
			husband/wife	8	3.8
			parents	72	35.5
Nationality			job-husband/wife	2	1.0
Saudi	178	87.7	job-parents	4	2.0
Non Saudi	25	12.3	husband/wife-other	1	0.5
			parents-other relatives	1	0.5
			parents-other	1	0.5
			other relatives	2	1.0
			other	6	3.0
Marital Status			**Income**		
single	114	56.2	1000<	23	11.3
married	82	40.4	-1000	37	18.2
Divorced	7		-3000	34	16.7
			-6000	63	31.1
			10000>	46	22.7

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Table (2): Correlation between bio age and income of population Residents in Jeddah included in the study according to gender

Correlation of Bio age with	Male		Female		Total Sample	
	R	p-value	R	p-value	r	p-value
INCOME	**0.17**	**NS**	**0.22**	**NS**	**0.197**	**P < 0.05***

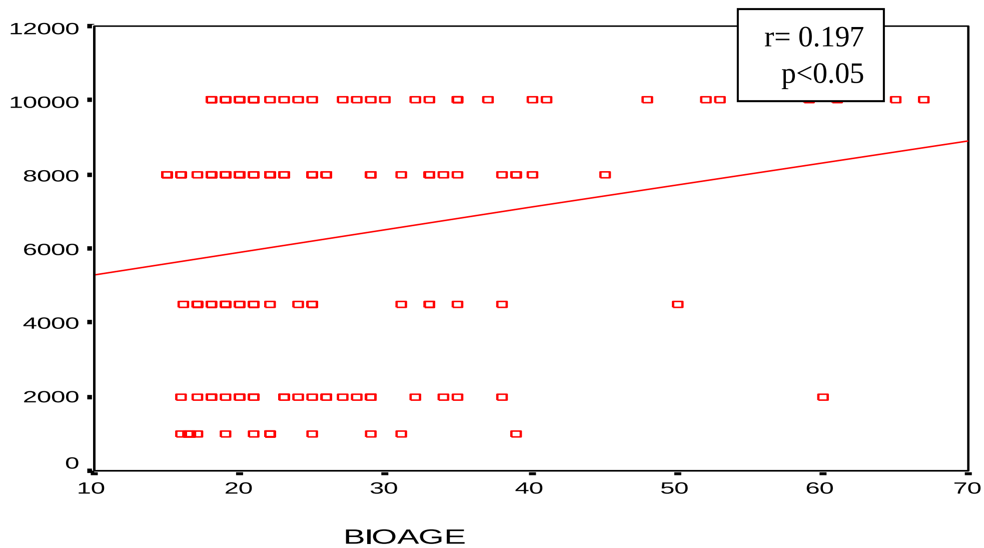

Figure (1) shows a positive correlation among the levels of income for total sample and Bio age and statistical significant at (P<0.05).

Table (3): Mean ±SD statistics of Anthropometric data of population Residents in Jeddah included in the study according to age groups (n=203)

Variables	Age Groups					
	19- (n=142)	31- (n=53)	51- 65 (n=8)	Total (n=203)	F-value	p-value
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD		
Weight	64.2±17.05	83.28±18.28	85.5±18.79	70.02±19.51	26.63	0.000**
Height	163.16±10.96	165.79±9.97	167.25±7.17	164.01±10.63	1.58	0.21(NS)
BMI	24.12±6.99	30.22±5.94	30.4±5.47	25.92±7.25	17.85	0.000***
Mid Arm Circumference	29.0±6.43	33.07±4.76	32.63±4.17	30.22±6.22	9.54	0.000***
Waist Circumference	79.62±15.5	96.29±14.86	96.75±25.95	84.65±17.52	23.86	0.000***
Hip Circumference	99.44±13.69	112.25±15.71	124.13±34.6	103.76±16.79	20.78	0.000***
Waist to Hip ratio	0.79±0.09	0.86±0.07	0.82±0.25	0.82±0.10	7.31	0.001**
Triceps skin fold	19.12±5.73	21.65±7.05	20.63 ±5.93	19.84±6.18	3.38	0.04*
Hand grip(right)	16.56±9.78	19.86±10.94	21.83 ±9.04	17.93±10.16	2.81	0.06(NS)
Hand grip(left)	14.17±9.61	17.69±9.96	19.95±9.29	15.31±9.81	3.5	0.03*
Systolic Blood Pressure	130.57±18.86	128.32±21.93	132.63±29.59	130.06±20.09	0.31	0.74(NS)
Diastolic Blood Pressure	85.68±11.74	84.72±13.76	86.13±18.66	85.45±12.54	0.13	0.88(NS)
lower arm muscle area(LAMA)	99.84±94.66	±118.70 134.25	103.42±83.81	±101.75 108.97	2.25	0.11(NS)

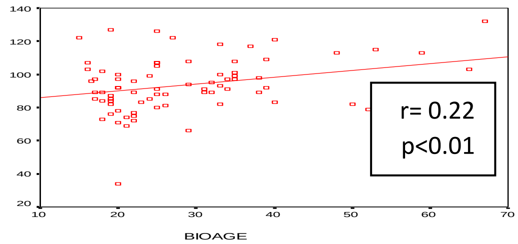

Fig (2): Correlation between bio age and waist in male group of population Residents in Jeddah included in the study

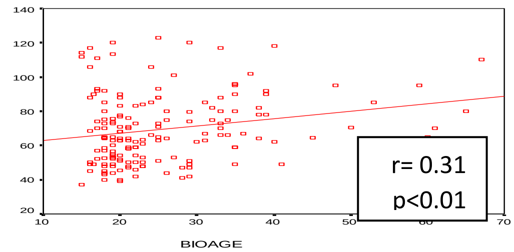

Fig (3): Correlation between bio age and weight in total sample of population Residents in Jeddah included in the study

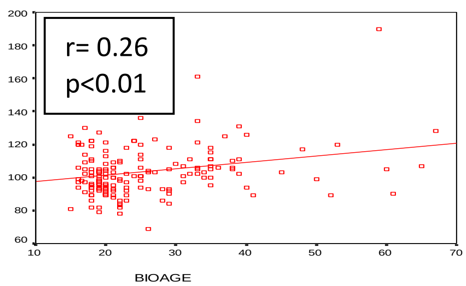

Fig (4): Correlation between bio age and Hip in total sample of population Residents in Jeddah included in the study

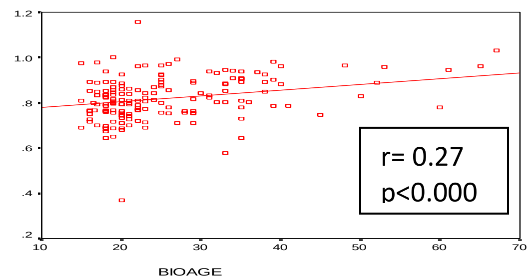

Fig (5): Correlation between bio age and waist to hip ratio in total sample of population Residents in Jeddah included in the study

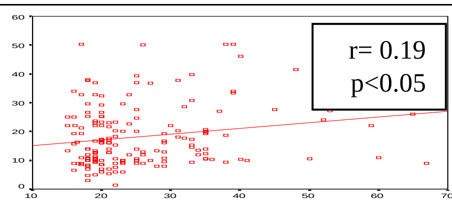

Fig (6): Correlation between bio age and handgrip Right in total sample of population Residents in Jeddah included in the study.

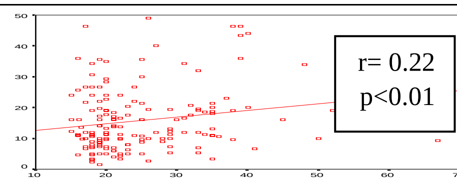

Fig (7): Correlation between bio age and hand grip left in total sample of population Residents in Jeddah included in the study

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Table (4): Cross tabulation of BMI of population Residents in Jeddah included in the study according to age group (n=203)

BMI	19- < 31		31- <51		51-65 years		χ^2	
	No.	%	No.	%	No.	%	χ^2 value	P
<18.5	13	9.2	0	0.0	0	0.0	57.7	0.000***
18.5-	81	57.0	9	17.0	2	25.0		
25-	34	23.9	21	39.6	1	12.5		
30-	6	4.2	10	18.9	3	37.5		
35-	5	3.5	11	20.8	2	25.0		
>40	3	2.1	2	3.8	0	0.0		

Table (5): Cross tabulation of BMI of population Residents in Jeddah included in the study according to gender (n=203)

BMI	Male		Female		χ^2	
	No.	%	No.	%	χ^2 value	**p**
<18.5	**2**	**2.3**	**11**	**9.6**	**10.1**	**NS**
18.5-	**34**	**38.6**	**58**	**50.4**		
25-	**29**	**33.0**	**27**	**23.5**		
30-	**10**	**11.4**	**9**	**7.8**		
35-	**10**	**11.4**	**8**	**7.0**		
>40	**3**	**3.3**	**2**	**1.7**		

Table (6): Mean ±SD statistics of laboratory data of population Residents in Jeddah included in the study according to gender (n= 181)

Variables	Male(n=77)	Female(n=104)	Total (n=181)	t-value	p-value
	Mean ±SD	Mean ±SD	Mean ±SD		
HGB	14.3 ±1.36	12.03 ±1.83	12.91 ±1.98	68.45	0.000***
HCT	44.29 ±2.78	36.44 ±5.79	3 9.57±6.16	100.03	0.000***
RBC	5.22 ±0.47	4.58±0.72	4.83±0.71	39.03	0.000***
CHOL	4.86 ±1.18	4.63 ±0.89	4.72 ±1.03	2.15	NS
TRIG	1.42±1.37	1.46 ±7.7	1.44 ±5.45	0.01	NS
HDL	1.07 ±0.30	1.52 ±0.43	1.32 ±0.44	56.8	0.000***
LDL	2.99 ±0.89	2.62 ±0.69	2.78 ±0.81	8.98	0.003**
VITD	30.84±11.06	35.18±30.9	34.24±27.74	0.15	NS
VITB12	151.31 ±94.91	222.78 ±111.58	209.78 ±110.28	1.4	NS
VITB9	16.32 ±5.24	22.4 ±8.43	19.57 ±7.73	26.92	0.000***
CA	2.24 ±0.11	2.26±0.12	2.25±0.12	1.17	NS
IRON	13.19± 20.99	12.69±6.89	10.92± 16.33	25.55	0.000***
PHOS	1.013±0.17	1.07±0.15	1.04 ±0.16	6.3	0.013*
Antioxidant TBAS(µmol/L)	11.83±7.42	11.19±7.44	11.52±7.41	0.22	NS

Table (7): Mean ± SD) of TBARS, LDL, CHOL, and TRIG of Population Residents in Jeddah included in the study According to gender

GENDER	TBARS (µmol/L)		LDL(mmol/L)	CHOL(mmol/L)	TRIG(mmol/L)
Male	<10	Mean± SD	2.9± 0.84	4.8± 1.07	1.25±0.91
	10-20	Mean ± SD	3.08±1.01	5.15±1.26	1.791.97
	Total	Mean± SD	2.99±0.92	4.95±1.167	1.505±1.512
Female	<10	Mean± SD	2.47±0.64	4.46±0.87	0.73±0.34
	10-20	Mean± SD	2.71±0.81	4.79±0.99	0.74±0.36
	Total	Mean± SD	2.57±0.72	4.59±0.93	0.74±0.34
Total	<10	Mean± SD	2.68±0.77	4.60±0.97	0.98±0.72
	10-20	Mean± SD	2.91±0.93	4.99±1.15	1.3±1.54
	Total	Mean± SD	2.78±0.84	4.77±1.06	1.12±1.16
F-values			6.61	2.72	13.65
P			0.01*	NS	0.000***

Table (8): Mean ± SD of real and bio age of population Residents in Jeddah included in the study according to gender

Variable	Male Mean ± SD	Female Mean ± SD	Total Mean ± SD	t.value	P
Real age	29.5 ±10.2	27.0 ±9.5	28.1 ±9.8	2.4	NS
Bio age (Chronological age)	31.0±12.0	22.7±7.6	26.3±10.6	26.1	0.000***

Table (9): Correlation between real age and bio age of population Residents in Jeddah included in the study according to gender

Correlation of **Bio age with**	Male		Female		Total Sample	
	R	p-value	r	p-value	R	p-value
Real age (Chronological age)	0.35	P < 0.01**	0.16	P > 0.05	0.28	P < 0.01**

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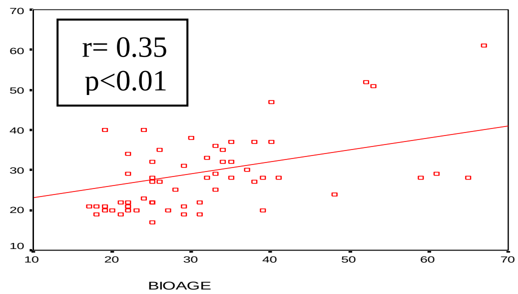

Fig (8): Correlation between real age and bio age in male group of population Residents in Jeddah included in the study

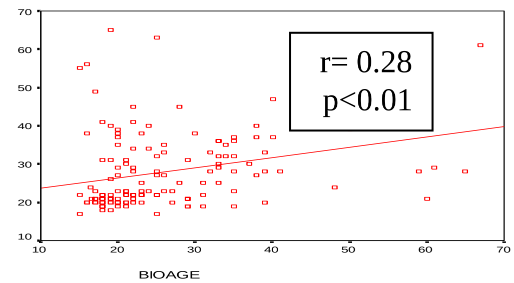

Fig (9): Correlation between real age and bio age in total sample of population Residents in Jeddah included in the study

Table (10): Mean and Mean % RDA ± SD of Macronutrients Intakes of population Residents in Jeddah included in the study according to gender (n= 205)

Variables / Macronutrients Intakes	Male Mean ± SD	Female Mean ± SD	Total Mean ± SD	t. - value	P
Energy Mean	1889 ±716	1434 ±830	1636 ±812	17.13	0.000***
Mean %RDA	62.02 ± 23.3	59.2 ± 34.6	60.5 ± 30.1	0.43	NS
Protein Mean	60.3±45.6	65.37±48.83	63.12±47.37	0.58	NS
Mean %RDA	107.67± 81.38	142.11±106.17	126.8± 97.26	1.46	NS
Fat Mean	52.09± 36.29	38.24±34.25	44.39±35.76	7.8	0.006**
Mean %RDA	148.84± 103.7	109.28 ± 97.86	126.84 ± 102	16.1	0.000***
Carbohydrate Mean	119.99±87.87	120.37 ± 71.9	120.2 ± 79.18	010.	NS
Mean %RDA	92.3±67.59	92.59±55.30	92.46±60.9	0.46	NS

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Table (11): Mean and Mean % RDA ± SD of Minerals Intakes of population Residents in Jeddah included in the study according to gender

Variables / Minerals	Male Mean ± SD	Female Mean ± SD	Total Mean ± SD	t. value	P
Sodium(mg/d) Mean	1874±834	1541 ±1126	1689 ±1019	5.549	0.02*
Mean %RDA	124.9±55.6	102.7±75.1	112.6±67.9	5.55	0.02*
Potassium(mg/d) Mean	2026±816	1556±840	1765 ±860	16.289	0.000***
Mean %RDA	43.11±17.4	33.1±17.9	37.6±18.3	16.3	0.000***
Calcium(mg/d) Mean	554± 301	557±289	555 ±293	.004	NS
Mean %RDA	54.9± 30.3	55.3± 28.9	55.1± 29.5	0.01	NS
Phosphorus(mg/d) Mean	1019.8±416.4	743.7± 452.5	866.2±456.9	20.228	0.000***
Mean %RDA	145.7±59.5	105.7±64.7	123.5±65.4	20.7	0.000***
Magnesium(mg/d) Mean	152.3±76.5	122.8 ± 80.4	135.9±79.9	7.085	0.01*
Mean %RDA	37.4±18.7	38.6±25.6	38.1±22.8	0.14	NS
Iron(mg/d) Mean	12.2±5.3	9.16±13.2	10.5 ±10.6	4.129	0.04*
Mean %RDA	149.9±67.9	54.1±74.8	96.6±86.1	90.0	0.000***
Zinc(mg/d) Mean	11.3±5.23	7.26±5.6	9.05 ±5.8	28.002	0.000***
Mean %RDA	103.6±47.2	89.8±70.2	95.9±61.3	2.5	NS
Cupper(μg /d) Mean	0.93±0.55	0.79±0.77	0.85 ±0.68	2.302	NS
Mean %RDA	103.8±61.2	87.7±85.6	94.8±75.9	2.3	NS
Selenium(μg /d) Mean	126.9±61.6	90.45±42.5	106.6 ±54.8	25.067	0.000***
Mean %RDA	230.8±111.9	164.4±77.3	193.9±99.6	25.1	0.000***

**Differences are highly significant at P<0.01 ***Differences are highly significant at P<0.001
NS: Not Significant

Table (12): Mean and Mean % RDA ± SD of Vitamin Intakes of population Residents in Jeddah included in the study according to gender

Vitamins	Male	Female	Total	t. value	p
	Mean± SD	Mean ±SD	Mean±SD		
Vitamin A(µg/d)					
Mean	374.3 ±430.5	283.4±197.3	323.7±324.6	4.03	0.04*
Mean %RDA	37.4 ±43.0	28.3±19.7	32.4±32.5	4.03	0.04*
Vitamin C(mg/d)					
Mean	37.0±36.1	44.9±52.6	41.4±46.1	1.51	NS
Mean %RDA	41.1±40.2	59.9±70.2	51.6±59.4	5.2	0.02*
Vitamin B1(mg/d)					
Mean	0.64±0.32	1.17±5.63	0.93±4.2	0.79	NS
Mean %RDA	64.0±32	117±56.3	93±42	0.79	NS
Vitamin B2(mg/d)					
Mean	0.96±0.62	0.83±0.48	0.89±0.55	3.15	NS
Mean %RDA	96.0±62.0	83.0±48.0	89.0±55.0	3.15	NS
Vitamin D(µg/d)	39.2 ±55.9	22.8 ±32.9	30.1±45.2	6.78	0.01*

**Differences are highly significant at $P<0.01$ ***Differences are highly significant at $P<0.001$
NS: Not Significant

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