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Annals of Biological Research, 2011, 2 (3) :150-161
(http://scholarsresearchlibrary.com/archive.html)

ISSN 0976-1233
CODEN (USA): ABRNBW

Causes and Rate of Adiposity in Faculty Members and the Personnel of the University

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ABSTRACT

Obesity is a pressing health concern, the etiology for which is difficult to pinpoint given the numerous factors that can be attributed to it. On a global scale, there are currently more than 1 billion overweight adults, with at least 300 million clinically obese, and an estimated 17.6 million children under five are overweight or obese. The first aim of this study was to examine and compare the causes and rate of adiposity in faculty members and the personnel of the Islamic Azad University (IAU), maragheh branch. The second aim was to investigate the way adiposity should be controlled in these populations.In a sectional study, 155 samples were chosen randomly from among 256 faculty members and personnel of Islamic Azad University (IAU), maragheh branch. Samples went under a test to measure their subcutaneous fat and then they were asked to fill out a questionnaire designed by the researcher. Based on the data collected from the tests and questionnaires, and after an analysis done by SPSS10 software, the following hypotheses were derived: There was not meaningful relationship between age and adiposity rate and also there was not any meaningful relationship between faculty members and personnel's age and their adiposity rate. In contrast to the above mentioned findings, there was a meaningful relationship between adiposity rate and genetic factor, and between adiposity and triple factors (physical activity, nutrition and genetics) in the faculty members of the university and its personnel.

Keywords: adiposity, physical activity, nutrition, heredity, age.

INTRODUCTION

Overweight and obesity can be classified by various means, with the body mass index (BMI) as the most ubiquitous method employed. BMI is a calculation of mass over height squared (kg/m2) and is used to predict adiposity stored generally throughout both the periphery and centre of the body. Obesity can also be established using methods that predict central adiposity, such as waist

circumference and skinfold thickness (SFTs). Central adiposity is excess storage of fat in the trunk and abdominal areas preferentially over storage of fat in the peripheral limbs, and it includes abdominal adiposity. The term 'adiposity' is used here synonymously with the word 'fatness' as a means to include all methods that assess body fatness. Adiposity, and centralised storage of adiposity in particular, is a key indicator of risk for metabolic syndrome, defined by a clustering symptoms, which include insulin resistance, hyperlipidemia (excess fatty acids in bloodstream), and hypertension [64]**.**Elevated mortality has been described at both high and low body mass index (BMI) and high waist-to-hip ratio (WHR), a frequently used marker for central adiposity [55,56]. Although BMI is recognized as a crude surrogate for general adiposity [57], data on the association between body fatness and mortality are limited. It has been further suggested that the impact of age on the BMI-mortality association is strongly dependent on the statistical approach used, i.e., choice of relative risk or risk difference can lead to profoundly different conclusions [58]. Additionally, methodological problems in studies of BMI and mortality may arise from lack of adequate control for early death or existing disease, as debated previously [56,59,60]. For instance, despite the intuitive appeal of analyses that exclude early deaths to mitigate influences of existing disease, it has been proposed that the effect of this type of adjustment is very small and of questionable clinical significance [61].Only a few studies have investigated the association between fat mass, a measure of total adipose mass, or percentage fat, and risk of all-cause mortality [62]. Allison et al. [62] used body composition data from several small studies and concluded that prospective cohort studies that take actual measurements of body composition are required to achieve meaningful inferences about the relationship between adiposity and mortality.

Adiposity is caused by health and nutrition disorders. People get tired sooner and look wearier than others, which may cause mental and physical problems. Internal organs like heart, lungs, and kidneys' size does not increase by gaining weight which reduces blood stream to to these parts, so they get to do more than their capacity in order to keep the extra body weight, the productivity falls and sudden death comes [1]. A study conducted in France revealed that the main causes of death (60%) among the overweight people are heart attacks, blood pressure, and cardiovascular disease. 20% of the apoplexies were caused by the blood vessels'damages and the rest died of muscular pains, diabetes and hepatic diseases.

The severity of diseases in overweight people is higher, and diabetics, hepatic, bilious and enteric problems are more common like apoplexy and Coronary artery disease. Adiposity shortens the lifespan [44]; each one kilogram extra weight reduces two months from life. A study showed that 10% extra weight resulted in 13% higher death in men and 9% in women [39]. Berenson and et al [4] found adiposity as the risk factor for cardiovascular disease and other chronic diseases like hyper lipid, hyper insulin, high blood pressure and early atherosclerosis. Not only gluttony, physical inactivity or stress [24] but also eating habits and cultural factors [18] cause adiposity. A research done on the relationship between the amount of lipid and sugar in food and adiposity on 1078 men and 1110 women between 16- 64 in England demonstrated that overuse of food containing fat and sugar give 12% of extra energy for men and 14.9% to women on average, which had a negative effect on BMI however getting 40% of energy by adults with high BMI had a positive effect [42].

Changing the lifetyles with technology advances and mechanization, tendency toward good-looking high calorie foods and decrease in peoples' activities have caused growing adiposity in different countries including Iran.

One way to test adiposity rate is to compare the body's lipid amount with the overall body weight. Normal amount of lipid should be 12- 15% in men 15- 25% in women; [43] and BMI (height and weight are converted into inches and pounds and the weight is divided by the square height) is announced as the best way to measure adiposity rate by British Nutrition Foundation [51] and The National Women's Health Information Center [51]. There are three main types of adiposity: first type with BMI= 30- 34.9, second type with BMI= 35- 39.9 and the third type with BMI= 40 and higher.

Going on different diets, taking some medicine to limit the energy absorbed from the food, going under surgeries to remove subcutaneous fat, using corsets and belts often fail to help losing weight, sometimes causes overweight or illnesses. The best way is to have a healthy diet with descent exercises based on light aerobic ones. Keeping on exercising and focusing on quality and quantity rather than amount of weight loss are much more important than the severity [12].

A study conducted by Dublin and Lutka [41] revealed that death rate among overweight people is 75 to 25% higher than people with normal weight. People with 5- 14% extra weight have a 22% higher rate; people with 15- 24% extra weight have 44% higher death rate and people who are 25% heavier and higher than that, rises death rate up to 74%. The condition becomes more severe by aging. People between the ages 45- 50 with about 4.5 kilograms extra weight has an 8% higher death rate than people with normal weight. If these people are 9 kg heavier they will have 18%, with 13.5 kg they will have 28% and finally with 23kg extra weight, they will have 56% of higher death rate. Center for Control and Prevention's study shows that the numbers of Americans who are 30% higher than normal weight has increased form 1 in 18 people in the year 1991 to 1 in 5 people in the year 1998. Some scholars have doubted about the genetic reasons for adiposity. Hypothalamuses directly affects cells metabolism; that is, not only extra calorie but also all metabolisms in the body are partners in this crime [48]. Charlotte Vlaar [9] believes that the reasons of adiposity in kids, adolescents and adults are similar and claims that misbalance of energy level, heredity, laziness, watching too much TV, lack of sport facilities, going to school, working with computer and having unhealthy food in schools and supermarkets are some of them. A study on 3000 people between the ages 18- 30 showed that since they regularly have fast food, they are in danger of becoming overweight and having type 2 diabetes. Those who had fast food twice a week were on average 10lbs heavier than those who had just once [14].The body weight is decided based on the amount of energy it takes. Most of weight loss programs focus not on the exercise but on the amount of food they eat. Mayer and et al (2004)[38] cited Mann and concluded that the most believable cause and reason for adiposity is rather simple i.e. being physically inactive. Also, the heavier the parents go the more adiposity children have.In general, 11.8% of children have normal weight parents, 19% have heavier fathers, and 35.4% have overweight mothers and in 40.8% both mother and father are overweight [39]. Bowman & Vinyard [7] claim that being overweight is a result of nutrition disorders and since there has not been a genetic change, natural causes (nutrition and exercising) have raised adiposity rate. Besides, Gibson [21] showed that activity level may be genetic. He also believed that extra lipid

is absorbed when the foods are high in fat and when the level of fat is higher than carbohydrates adiposity occurs.

Yang's [55] showed that adiposity 65% of American adults believe poor diet and lack of exercise have relationship with their adiposity. 85% thought lack of physical inactivity and 84% poor diet as the cause of adiposity. 58% were willing to lose weight and 26% do exercises three times a week. Later in his study he showed that 59% of Americans think of watching too much television and 50% family profile and genetic reasons are the causes of adiposity. Hyper lipid is another common reason for adiposity. A study demonstrated that 4.35% of a group of kids over 10, had parents with Coronary artery disease or high triglyceride over the normal level. HDL on average was 7901.41 comparing to 3571.45. Moreover the kids under experiment had a higher BMI rather than the sample group [3].Since physical activity affects the blood's lipid rate, sport exercises have a good effect on the body's lipid rate, plasma's lipoprotein, and other troublesome cardiovascular risks. Also, adding sport exercises to a diet with low calorie intake rather than having a low calorie diet by itself, will improve anthropometric condition, blood's lipids, adiposity therapy and reducing risk of heart diseases [53] He believed that as the weight loss happens, the body loses its isometric muscular power and that a single diet affects the tissues and weight of the body.

Applying other techniques to lose weight will inevitably be dangerous. Armaturda et al.[2] did an experiment on those who took a liquid with amino acid and experienced heart rate disorders. 17 people having lost nearly 30% of body weight showed that the heart size was affected and muscular strings atrophy occured. Therefore there is no doubt that weight loss in long run influences the free fat masses and decreases aerobic stamina. Weight loss in short run affects skeletal muscles and decreases the power to have activities. Davey and stanton [14] showed that loss of stamina and 17% of loss in muscles' glycogen happens in marathon runners after 28 hours of fasting.

Flynn et al.[19] gave a daily amount of 500- 700 kilocalorie diet for a week to a group of samples and aerobic stamina fell about 60- 80% of oxygen intake, muscles' glycogen for about 43% during (vo2 max) the period. Both of the studies of Schmitz et al. [45] and Wing and Hill [54] revealed that jogging affects weight loss greatly. Along side with these Hill [28] observed that in a group of overweight women with physical activity and diet, 67% of weight loss was due to the reduction of fat and for the ones only having a low calorie diet 57% of the lost weight was fat. Ekblom [17] tested his samples by having heavy exercises and limited energy intake tended to lose more fat than a diet with 1200 kilocalorie. The ones' with light exercises lost more weight than with limited energy intake [28]. However Slattery et al. [48] emphasize that activities are needed for overweight women and their view toward life should be changed. If programmed well, dieting strategies and appropriate sport exercises are good ways of losing weight, physical inactivity, or genetic, have numerous harmful results. So it is of great importance to study the methods and find new strategies to lose weight.

MATERIALS AND METHODS

Participants

Participants of the present study included fulltime and part time personnel and also full time and part time faculty members of Islamic Azad University (IAU), maragheh branch .All of whom

were working and teaching in the current school year. Overall number was 254 from which 155 were faculty members and 104 were the personnel.

Sampling was a simple random one and according to Morgan table, 155 were chosen and tested out of 254. In order to do this, first a list of the statistical society was made, after numbering them; samples were chosen randomly based on the numbers. Since the researcher assumed some of the participants may relinquish, he chose 170 samples and as it was predicted just 155 participants remained to the end and helped sincerely to finish this study.

Procedures

After selecting the participants from the personnel and the faculty members of the university, they were tested and measured one by one and solely. First of all they were asked to answer a questionnaire made by the researcher honestly. They were also asked to fill in their personal information, like their full names, birth years, and gender and … in the ideal weight form. Then they were asked to be weighed without any single piece of clothing except underpants. They were all bare feet and the angle of their view was straight ahead and made parallel lines between their chin and the ground. All of the data were recorded carefully. Then the fat was measured by a caliper for three times and again, the results were recorded according to table no.1.

Different formulas are used to calculate the amount of fat in people's body but the formula used in the present study is a rather simple one and is special for ordinary people. The method and position of testing was also different in men and women which are described here:

1. The women's skin fold: skin fold' depth on triceps, superiliacus and thigh on the right side of the body is measured to estimate the body's fat. The skin fold is measured on the triceps muscle and exactly in the middle of the elbow and shoulder joint. By measuring the depth of the diagonal wrinkle of the skin on the superiliacus, exactly hip joint, was measured by the same method. And finally the thigh's skin fold was measured by transferring the body's weight on the left foot and relaxation of quadriceps thigh muscle, the vertical wrinkle on the thigh was measured.

2. The men's skin fold: The skin fold on chest, belly and thigh are the sites used to measure the men's fat percentage. The chest's skin fold is on the outer edge of the pectoralis major muscle that is measured by a diagonal wrinkle toward the chest sternum. The skin fold on the body is located 1- 2 cm away on the right side of the umbilicus and is measured by a slightly diagonal wrinkle. The way we measure the thigh's wrinkle's depth is just like the one mentioned above about the women.

After these measurements in men and women, in the three sites mentioned, for three times, the average amount was calculated and the results were entered in the form for the ideal weight to get the average for three sites altogether. Then the average wrinkle depth was put on the line for the "overall three skin fold" on the right side of the anemogram and considering age of the samples, the fat percentage was calculated.

Considering the fact that the body weight is consisted of the fat weight and the fat free weight, the FFW (Fat Free Weight) was calculated. Following, comes the formula used for the ideal

weight recording form and FFW. At last, the ideal weight of the sample checked by a scale was compared to get the amount of gain or loss in the body weight.

body weight fat percentage= fat weight
body weight - fat weight = fat free weight
The related formula is as follows:
the ideal body weight= the ideal fat percentage – 100%

Authenticity and stability of the measuring devices

In this study, authenticity and stability of caliper and the questionnaire is of very special importance. It should be noted that the calipers' authenticity and stability had been tested, proven and derived by domestic and foreign researchers. To test the questionnaire's authenticity and stability, it was asked from five experts to investigate it and give their comments and correction. At the end they proved its authenticity and stability and finally using Greenback method they were calculated to be 86%.

Statistical analysis

In order to study the hypotheses and get to the study results, all of the data collected form the questionnaires were studied considering the subcutaneous fat measurements in men and women and they were processed by SPSS 10 software. This study has practiced the Pierson integrated impetus method to test the hypothesis no. 1 to 5. To present the results, and the relationship between them, statistical diagrams and tables are used.

RESULTS

Table 2. The relationship between adiposity rate and physical activity of personnel and faculty members

	adiposity	physical activity
Pierson coordination	1.000	0.079
meaningful level adiposity	0	0.381
degree of freedom	125	125
Pierson coordination	0.079	1.000
meaningful level physical activity	0.381	0
degree of freedom	125	125

Based on the results driven from, which was studied by Pierson coordination in r=0.079, it can be seen that there is not a meaningful relationship between the faculty members and personnel of the universities' adiposity and their physical activity.

Table 3 .The relationship between adiposity and diet in personnel and faculty members

	adiposity	nutrition
Pierson coordination	1.000	0.033
meaningful level adiposity	0	0.711
degree of freedom	125	125
Pierson coordination	0.033	1.000
meaningful level nutrition	0.711	0
degree of freedom	125	125

The results driven from the questionnaire presented in table 3, which was calculated based on Pierson coordination in r=0.033, showed that there is not a meaningful relationship between the faculty members and personnel of the universities' adiposity and their nutrition (dp= 125, p=0.711, r= 0.033).

Table 4:The relationship between adiposity and heredity in personnel and faculty members

	adiposity	heredity
Pierson coordination	1.000	0.325**
Meaningful level adiposity	0	0.000
degree of freedom	125	125
Pierson coordination	0.375	1.000
Meaningful level heredity	0.000	0
degree of freedom	125	125

***: coordination in the 0.01 level is meaningful.*

Based on the findings of table no.4, which were calculated by the use of Pierson coordination in r= 0.325, it was seen that there is a meaningful relationship between the faculty members and personnel of the universities' adiposity and their heredity (df = 125, p= 1%, r= 0. 325).

Table 5: The relationship between adiposity and triple factors (heredity, diet and physical activity)

	adiposity	(heredity ,nutrition ,physical activity)
Pierson coordination	1.000	0.256**
meaningful level adiposity	0	0.004
degree of freedom	125	125
Pierson coordination	0.256	1.000
meaningful level (heredity, nutrition, physical activity)	0.004	0
degree of freedom	125	125

***: coordination in the 0.01 level is meaningful.*

Based on the results gotten from table no. 5 which was based on Pierson coordination, it's inferred that there is a meaningful relationship between the faculty members and personnel of the universities' adiposity and the triple factors (heredity, nutrition and physical activity) (dp= 125, p=0.01, r= 0.256).

Table 6 . The relationship between the personnel and faculty members' aging and adiposity

	Adiposity	Aging
Pierson coordination	1.000	0.060
meaningful level adiposity		0.508
degree of freedom	125	125
Pierson coordination	0.060	1.000
meaningful level Aging	0.508	
degree of freedom	125	125

Based on the findings in table no. 6, about the relationship between aging and adiposity, analyzed by Pierson coordination, it was seen that there is not a meaningful relationship between the faculty members and personnel of the universities' adiposity and their aging.

DISCUSSION

The first aim of this study was to examine and compare the causes and rate of adiposity in faculty members and the personnel of the Islamic Azad University (IAU), maragheh branch. The second aim was to investigate the way adiposity should be controlled in these populations. The findings showed that physical activity rate plays a very important role on the weight gain or loss in people. When moving activities by the people raises, their weight decreases and in contrast, when the moving activities comes down and the energy level stays the same, weight increases [7, 15, 17, 26, 28,55]. Slottery et al. [48] believed that if we have a plan and beside that we do a lot of exercises with fewer limitations on food, losing weight will be easy. Also findings of the present study revealed that doing exercises does not help the body to lose weight which is not in accordance with the findings of above mentioned successes. An age-modifying effect on the relationship between BMI and total and cause-specific mortality has been reported in previous cohort studies with longer follow-up periods. In both men and women (age groups 30 to 44 years and 45 to 54 years) participating in the Cancer Prevention Study I, the RR associated with greater BMI was higher than in older adults up to 74 years of age [62]. Among Seventh Day Adventists, the RR of death associated with elevated BMI was higher for women 30 to 54 years old than for those 54 to 74 years old [62].The discipline of evolutionary medicine presupposes that humans in general are adapted to a Paleolithic existence, which involved the energy-intensive hunting and gathering means of procuring food [65]. Research into early origins of human health and disease uses the framework that our human adaptations are carried over from our evolutionary past into our modern world [65].

On the other hand other researchers approve that the lesser energy they get and diet have a more important role than basic sport exercises. They believe that there was not a great difference in the weight loss between those who had a hard exercise program and those who stayed at home [5, 6, 34, 46]. This finding is in complete accordance with the results of the present study and shows that there is not a meaningful relationship between the faculty members and personnel of the universities' adiposity and their physical activity.diyor, However there may be doubt about the correctness of the answers provided by samples for the question of the exercising times to lose weight. Although many of the above mentioned researchers [48] believe that when the samples are under heavy exercises is the tendency toward the release of free fat of the body than those who just had to have a diet. Different studies on adiposity and its relationship with dieting shows that, nutritional reasons play a very important role in controlling this factor. Different researchers have talked about nutrition as one of the most important factors in weight control. Azizi [3, 15, 23, 28] think the fat mass reduction happens in the people who have a poor nutrition and three times exercise in a week. also those who did not exercise reduction of fat mass is a part of weight loss program and believe that type of eaten food including carbohydrates and lipids have an important role on adiposity and omission or limitation of each one will cause weight loss. in spite of the above mentioned findings in the present study, the researcher have studied the relationship between adiposity and the personnel and faculty members of the universities and has found that the results were in accordance with the above findings considering the point that samples were under low calorie diet.

However other researchers' ideas against these findings are noticeable but they all believe that changes and reduction in the fatless mass of the body (muscles) beside a weight losing diet,

causes blood systole or diastole in the tested samples and a meaningful relationship exists between BMI and blood pressure [7, 13, 21, 24] Considered the diet type, samples of the present study which were using low fat diets and the results driven from the data gathered from them shows that their adiposity does not have anything to do with their diet and may have other causes. Having the natural factors in mind, and their effect in adiposity, heredity will have an important role in it. Different scholars believe that one of the important factors causing young teens to be fat is their parents' adiposity. They all believe that beside nurture, nature has a great role in the children's adiposity [7, 9, 15,28] . The reason is that, children usually are under the parents' control about the taste of foods, the times, meals and amount of food. Considering the above mentioned points, in the present study, with a high rate of authenticity, it can be seen that there is a meaningful relationship between adiposity in the personnel and faculty members of the university and their heredity**.** This finding is in complete accordance with other studies' findings. It can be seen that although most of the samples in this study were men and claimed to be affected by heredity, but women in this study are affected more by the heredity factor. In addition it should be mentioned that mother as the teacher in food matters have an undeniable role in the food and today's fat children are tomorrow's fat parents. As it is seen in the statistical sample of the study, majority of the members are just like their parents and overweight and parents' adiposity is the children's risk factor. It linear increase also increases adiposity in children. Also it has been shown that the fat parents' children are in a greater danger of adiposity in people with normal weight [3, 13, 48].The results of the studies about adiposity factors are different. A group has worked on genetics and others have studied physical activity, job, nutrition, excitements and announced different views. In accordance to this, findings show that there is a meaningful relationship between the faculty members and personnel of the universities' adiposity and the triple factors**.** (Heredity, nutrition and physical activity) [3, 7, 15, 17, 26, 28,46,29]. These findings may be in accordance with our study's findings and approve them. Although the finding of the studies on the hypotheses no. 1 and 2 are different with hypothesis no.4, it can be said that physical activity and nutrition are insufficiently effective in increase and decrease in the adiposity in no. 1 and 2 but they were completely effective in the no.4. The reason for this is that, each of these factors, individually, had a minor effect on the whole and the most effective factor has been heredity. These three however have made an important factor. These three have shown a high authenticity in the effective factors in the adiposity of the samples. Beside the researchers' findings about the four hypotheses, it is necessary to investigate the samples' age and the adiposity rate. If this is done there will be seen that there is not a meaningful relationship between the personnel and faculty members' adiposity. This findings show that if the physical activity and nutrition factors were meaningful, younger samples should have been very healthy but, because heredity was important and meaningful, it is clear that people of all ages can be fat because of heredity. This finding is in accordance with findings of other studies [13, 15, 17, 46]. There are some suggestions which are appliable in daily activities and taking different types of food in order to supply the body with necessary energy, proteins, vitamins, minerals and the fiber is the first one. Accordingly, you should keep your body weight in a standard and normal level through choosing your diet with little fat and cholesterol. But, it is also important to keep fruits, vegetables and grains in your diet to supply the needed vitamins and help reduce the calorie produced by the fat. Simple sugars should be used in a normal manner, and the amount of Salt and sodium should be limited. The meat must be eaten with little fat, in other words; fat-full meat shoul be limited. Accordingly, eating fish very often is an alternative. Beside the food, you should be careful about what king of food you eat, for example, do not eat out very often and

avoid having snacks, nuts, ice cream, tea or other stuff between meals. Also, you shoul be aware of how much energy intake you have with different foods and drinks. In order to do this, drink water instead of alcoholic, non-alcoholic drinks or alcohol. While trying to count the daily energy intake, do not reduce it more than 500 to 1000 kilo calories, whose 25% or less should be fat. Beside the fat, be careful of protein. For example, eat as little protein as possible (about 0.5 grams for each kilogram of the body weight). Moreover, it is highly recommended that you should stop eating before you are stuffed up, cut the amount of food you eat and drink as much water as possible. Not only the food, daily energy intake or drinks, but also the manner you eat is important. Firts of all, you should eat slowly and chew fully, eat more meals with little food in each and drink sufficient beverages. Afterwards, you had better to take a 30 minute walk everyday which should have 20 minutes of sweating. Moreover, joging for 30 minutes everyday, doing power lifting 3 times a week, doing the housework yourself, trying to use as little electrical appliances as possible, walking on your way to work at least once a week, doing the daily tasks yourselves and not asking other people for help, using bicycle daily, hiking, swimming, walking, biking and mountain climbing to pass your time are good exercises. Also, you can do abdomen and waist; arms, shoulder and chest exercises. If you do not have the time to exercise, you can try to have a treadmill at home, or if you do not have the money or the time for treadmill, you can jump rope for 20 to 30 minutes every day. Moreover, you can pedal the air while sleeping on your back everyday nearly 100 times counting on the right foot. While sleeping on your back, you can raise your feet for fifty times everyday in the morning and afternoon or raise your hips while at the same time raise both your feet 25 to 35 times a day. During the day, you can also do sit-ups everyday in the morning and afternoon and bend your knees fully, do Sweden swimming (Press) everyday in the morning and afternoon for 15 to 25 times. You had better not to use remote controls of the TV, radio, CD player etc. but to stand up and adjust them yourself, emphasize on good breakfast without fat of course beside geting off your table as often as possible. Last, but not the least, consider heredity when marrying someone, and try to have physical activity in everything you do. Besides, have little food with abundant fats and sugars.

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