A study of factors associated with biological aging in women of Department of Food Science and Nutrition, SNDT College of Home Science, Pune

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***Abstract*- The difference between biological aging and chronological aging is studied to a great length in many research papers. Also, there are many factors that could lead to the internal aging of the body's cells and tissues. These factors need to be studied in depth so that the rate at which aging takes place can be controlled. In this particular study, 221 samples were studied, which were basically college-going students and teachers. We found that there are many factors that have a positive association with biological aging. Some of these factors include BMI, total fat mass, total muscle mass, visceral fat mass, stress and sleep. Particularly under stress, it was seen that academics and increased responsibilities were the prime factors that caused accelerated aging. 71.9% of the participants reported their biological age to be greater than chronological age. This proves that this topic needs to be studied with a larger population so that the burden of aging can be reduced.**

Keywords: **Biological aging, BMI, stress, sleep**

INTRODUCTION

Aging is often defined as "the gradual functional and structural decline of an organism, resulting in an increased risk of disease, impairment and mortality over the life span" (5). Chronological age is the age in terms of years, months, days etc from the time of birth to the given date. Similarly, biological aging can be defined as the gradual aging of body cells and tissues.

The lifestyle causes such as daily routine, personal, families, social, professional environment, relationship with others and negative things happening around affect the overall quality of life of an individual. This negatively influences growth and nutrition of the cells leading to premature exhaustion. Stress effects due to increased responsibilities in turn leads to premature aging. Comparatively, urban life is less eco-friendly, more stressful and highly polluted which has an impact on aging. Physical, mental growth and development of the individual is influenced by the family environment. This is seen to affect well-being, quality of life of a person. If the psychological status of an individual is disturbed then also premature aging could be observed (1).

It has been speculated that delaying aging by 2.2 years could save a lot of money in the health sector. Cumulative stress over a long period of time is positively associated with accelerated aging. In a study of female college going students it was seen that poor quality or few hours of sleep was associated with aging (2). DNA damage has been observed to be one of the responsible factors for aging. Researchers suggest that academic stress is associated with elevated DNA damage (3). Aging is also associated with an increase in abdominal obesity. Also it has been seen that high BMI leads to loss of longevity. In this particular study it was noted that biological age can represent a person's aging status more appropriately as compared to chronological age (7). Another study was conducted in adolescents over a period of time and it was found that unhealthy lifestyle habits during pubertal years was associated with accelerated biological aging in young adulthood (6).

METHODOLOGY

A stratified random sampling method was used to select the participants. An offline survey was conducted using a questionnaire which contained questions about different factors that could affect aging. Information regarding stress, exercise, sleep and body composition was collected. Total 221 subjects were included in the survey.

Anthropometric measurements were taken by measuring their height, weight and calculating their BMI. Body composition analysis was done using Karada scan. The data was analyzed statistically using the SPSS software, version 16.

RESULTS AND DISCUSSION

Total 221 participants were included in the study. Different parameters like BMI, body composition, physical activity, stress, diet pattern and sleep schedule were analyzed. In this paper, we will discuss only those parameters which have a positive correlation with body aging and factors that are associated with internal aging of the body.

95.02% of the participants were students (n= 210), 4.52% were teachers (n= 10) and 0.45% were non-teaching staff (n= 1). The general age group of the participants was from 18-43 years.

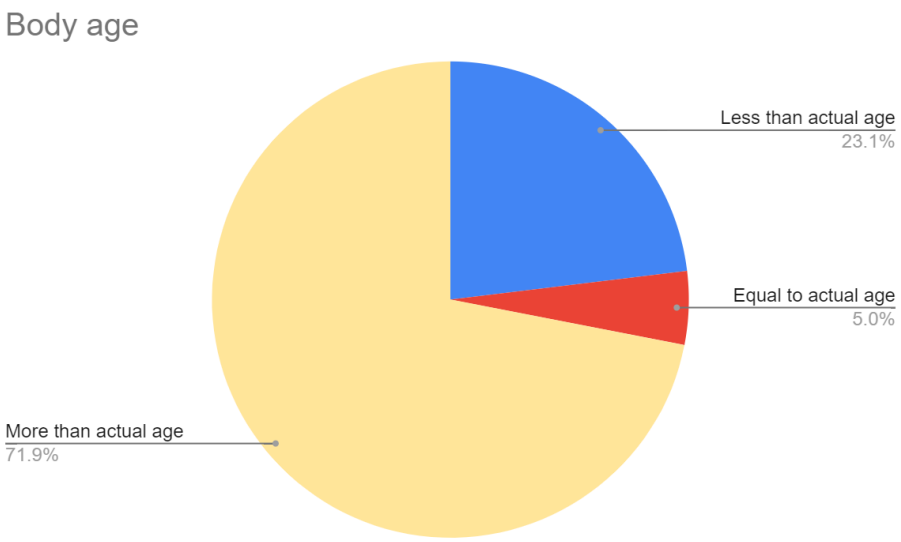

Figure 1: Percentage wise distribution of participants according to body age

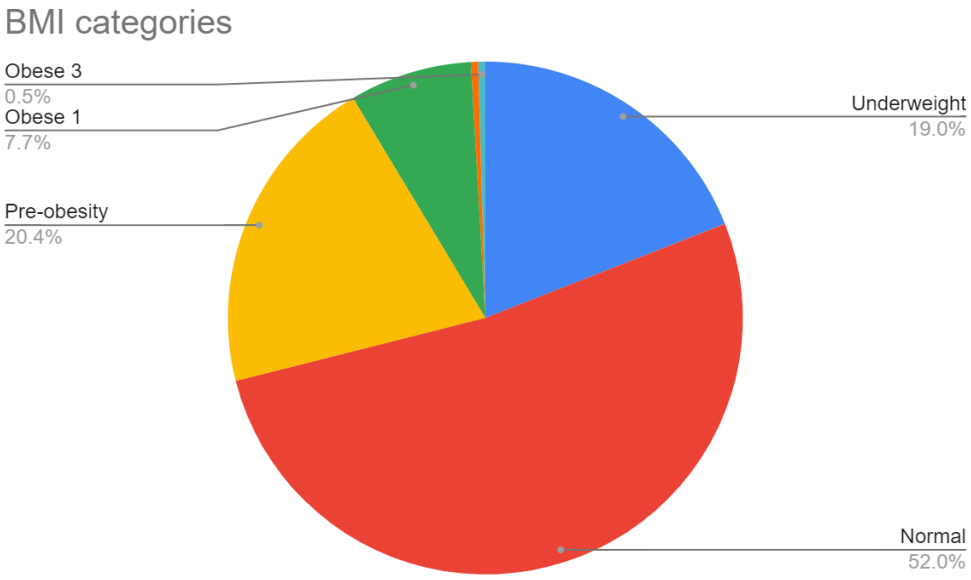

Figure 2: Percentage wise distribution of participants according to BMI categories

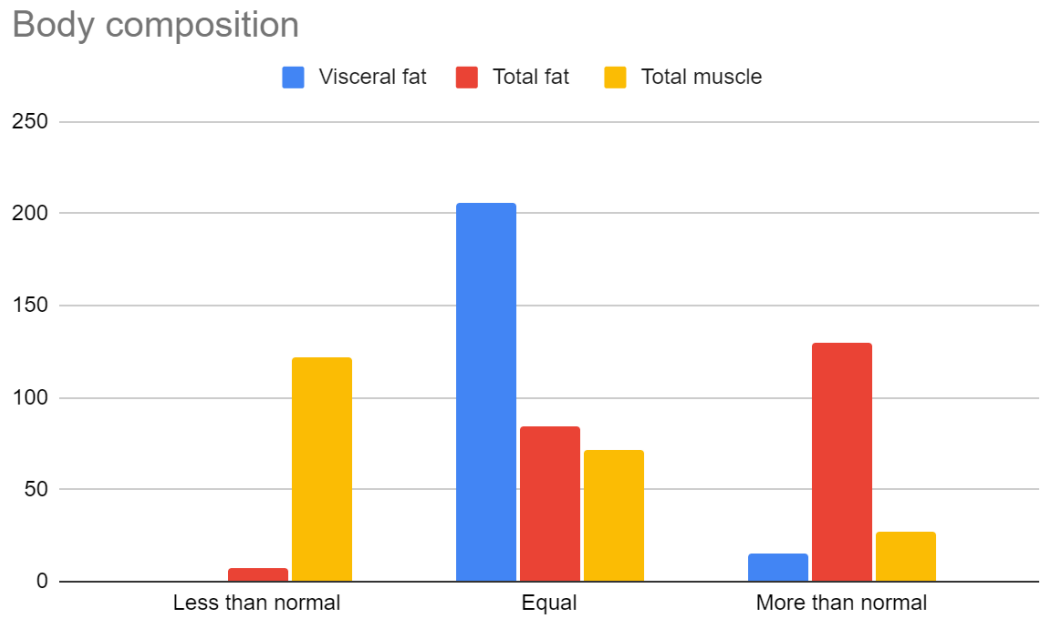

Figure 3: Percentage wise distribution of participants according to Body composition analysis

	0	1	2	3	4	5
Exam	7	11	21	56	64	62
Studies	6	22	39	69	49	36
Deadlines	27	27	32	48	53	34
Increased responsibilities and expectations	15	29	29	49	55	42

Table 1: Reasons for stress

The above table indicates the stress level of the participants for the given reasons. Out of the 10 reasons included in the questionnaire, the above 4 showed a prominent effect. The intensity of stress was measured by using Likert scale.

ANOVA

bmi					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	67.524	2	33.762	70.964	**.000**
Within Groups	103.716	218	.476		
Total	171.240	220			

Table 2: ANOVA for body age and BMI

The above table shows that there is a very significant correlation between BMI as a factor that affects aging of the body (p value<0.01).

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
totalfat	Between Groups	25.960	2	12.980	69.925	.000
	Within Groups	40.466	218	.186		
	Total	66.425	220			
visceralfat	Between Groups	.510	2	.255	3.661	.027
	Within Groups	15.182	218	.070		
	Total	15.692	220			
muscle	Between Groups	44.294	2	22.147	73.460	.000
	Within Groups	65.724	218	.301		
	Total	110.018	220			

Table 3: ANOVA for body composition and BMI

The above table shows that there is a very significant correlation between total fat percentage, total muscle percentage and visceral fat as factors that affect aging of the body (p value<0.01).

Correlations

		bodyage	stress	exercise	sleep	consequences
bodyage	Pearson Correlation	1	.076	.092	-.053	-.049
	Sig. (2-tailed)		.262	.172	.433	.467
	N	221	221	221	221	221
stress	Pearson Correlation	.076	1	.080	.146*	.654**
	Sig. (2-tailed)	.262		.236	.030	.000
	N	221	221	221	221	221
exercise	Pearson Correlation	.092	.080	1	.009	.032
	Sig. (2-tailed)	.172	.236		.890	.637
	N	221	221	221	221	221
sleep	Pearson Correlation	-.053	.146*	.009	1	.148*

	Sig. (2-tailed)	.433	.030	.890		.027
	N	221	221	221	221	221
consequences	Pearson Correlation	-.049	.654**	.032	.148*	1
	Sig. (2-tailed)	.467	.000	.637	.027	
	N	221	221	221	221	221

Table 4: Correlations between lifestyle factors and body age

The above table shows that there is a very significant correlation between stress and consequences of stress with aging of the body. Sleep has also proven to be a very significant factor that affects the aging of body cells (p value<0.01).

SUMMARY AND CONCLUSION

Looking at the above statistics it can be noted that there is a high need for intensive research to take place regarding factors that cause biological aging especially in college-going students. Also if the sample size is increased then many other factors like physical activity, quality of sleep, eco-friendly lifestyle and nutrition could also play a role in aging. This study definitely proves that BMI, total fat mass, total muscle mass, visceral fat mass, stress and sleep have a positive association with biological aging.

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