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Retrospective Study of Eccentric Evaluation of Biological Age in Rural Population of India Based on its Social-Demographic Parameters

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ABSTRACT

BACKGROUND: The preliminary way people define their age which likely based on the amount of time elapsed from the birth in terms of the number of years, months, days etc., which said to be the 'Chronological Age'. Regardless of the chronological age, the physical condition of the body determines the biological age or physiological age or functional age, which depends on several factors such as, genetics, cellular functions, lifestyle diseases and disorders, nutritional behavior, gut microbiome and other clinical conditions. The social-demographic parameters like population density, poverty in population groups, education, unemployment, poor food habitsand hygiene and occupation-specific physical activities. It has evidenced from objective measures within and outside the body that the biological age is different from the actual chronological age.

AIM: Idiosyncratic evaluation of biological age in rural population of India based on its social-demographic parameters.

MATERIAL AND METHODS: A population-based retrospective study was conducted in a rural area and collected data in the form of a secondary source. Biological age was measured by using a standard instrument. Individuals having age 18 to 50 years old included and any other co-morbid medical or surgical illness and physically handicapped participants were excluded.

RESULTS: We observed that 26% of people are preferred to only veg food in their life. The proportion of non-vegetarian people is larger than vegetarian people. Correlation between biological age, chronological ageandBody Mass index (BMI) was positive as compared to the systolic blood pressure, diastolic blood pressure and blood sugar respectively. The respondents' increasing BMI showed that about 25% were obese or overweight in a rural area.

CONCLUSIONS: The relation between social-demographic parameters and the biological ageing process has been studied for the rural population. The study provided a statistically significant explanation about the complex interaction between different parameters taken into consideration under biological ageing.

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KEYWORDS: Biological Age, Chronological Age, Body Mass index

INTRODUCTION:

The general term age is defined as the number of years something has been alive or in existence. As per medical terminology the age parameter is classified into Actual age (i.e., chronological age) and biological age. Actual age starts from birth whereas, thebiological age refers to how old the person seems to be. It is a measure of how well or poorly the body is functioning relative to the actual chronological age of a person.

The importance of biomarkers has been highlighted for the estimation of biological age (BA) with respect to the body's physiologic function, physical parameters of the body, habitat and habits[1].

The Knowledge of the biological age to be needful for longevity. At a certain level of age to change the lifestyle and also necessary to improve health and increase the vitality of a person. Our study identifying how to disturbing the biological age as compared to the age actual i.e., is chronological age. The Biological age assessment includes an evaluation of health risk factors, nutrition, absolute and dynamic strength testing, flexibility, body composition, cardiorespiratory fitness etc. In 2012Chul-Young Bae, et.al.Model estimated based on the biological age and found a coefficient of determination (R2) was 0.71 in men and 0.76 in women.[2]

In 1994 Uttley M and Crawford M. observed the difference between chronological age and biological age concluded that, predicted age can be considered as an estimate of biological age, and may help to identify how much it differs from chronological age.[3]Johanson C etal. have conducted the study on bone. Observed age-related changes in bone and developed a model for human ageing and pragmatic basic biological changes that take place with increasing age.[4]

Dr A. C. Randag conducted a study at the University of Groningen, Netherlands05 under the department of plastic surgery, based on the biological skin age. They found that the current setting skin autofluorescence did not throw in better to the prediction of biological skin age than chronological age. Biological skin age was predicted on the body mass index, chronological age and hormonal status respectively.

In China retrospective study conducted at Sun Yat-sen University. Along with 3280 Chinese women were included between 10 to 52 years old. Biological age was inversely correlated with chronological age in Characterizing age-wise after providing specific serum Anti-Müllerian Hormone (AMH). Evaluating the fertility potential and ovarian reserve of infertile patients, as well as facilitate clinicians to decide individual treatment options.[6,7]

Kang Y. G. included subjects aged above 20 years who received routine health checkups including Median age at university medical centers and community hospitals in Korea[8] a metabolic syndrome (MS) biological age model, through which overall evaluation and management of the health status and ageing state in MS can be done easily.

World Health Organization (WHO) taken overview in 2015, the global health status has certain health differences trend to accumulate and increase as the population ages. The health status among individuals of age group 18 to 50 years commonly shows more different as compared to the other age groups.[9]

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A variable lifestyle may be to a large extent changed due to the control measures, with the subsequent risk of sedentary behaviors, modification in food consumption, smoking and sleeping habits[10,11,and 12]. A parameter habits largely disturbed terminology chronological age and biological age[13,14]. Here we have taken a review of various studies and observed there was an association between sleep in continuation or sleep instability and obesity due to the increase in the discharge of pro-inflammatory cytokines by the increased visceral adipose that could supply to alter the sleep-wake rhythm[15]. The diet affecting on the features of sleep. On172 middle-aged adults conducted cross-sectional study good sleepers had higher adherence to the Mediterranean diet (MD) and inferior BMI compared to poor sleepers[16].

Dr Leonardo da Vinci suggested the role of biomarkers in the form of trees a ring per annum cut based on growth effect on the thickness and density of considered the ring. The number of annual growth rings of an individual tree measures the tree's chronological age in years. This Tree rings initially called biomarker[17,18.] In general peoples, height, weight, BMI, the strength of muscles, skin features, hair color are familiar phenotypic deviation that is correlated, but poorly, with CA, RLE, and forecast of health or disease.

The Biomedical experts observed some of the parameters that predict morbidity and mortality more accurately as compared to the CA,by considering some biological parameters will measure ageing more precisely than CA18. If we are looking to back last two decades, lots of biomarkers related to ageing have been projected, with inadequate success[19].
In Duke University at Durham, North Carolina conducted the longitudinal study based on the seven methods[20]. To find out the BA with help of repeated-measures physiological and genomic data. They are studied approximate eleven measures telomere-length and erosion, three epigenetic-clocks and their ticking rates, and three biomarker-composites respectively. A very little agreement between different measures of biological ageing. We next compared associations between biological ageing measures and outcomes that neuroprotective therapies for modification such as physical functioning, cognitive decline, and subjective signs of ageing, including an aged facial look. The 71– cytosine-phosphate-guanine epigenetic clock and biomarker combined were related to ageing-related outcomes. However, there are various approaches to enumerate biological age that may not measure the same aspects of the ageing process.

Thestudy was designed to evaluate there was any relation between the BA and CA. Varies studies carried out on the BA which has shown, the some of the factor affecting on the BA. Therefore, present study observed, what are the parameters affected on the BA.

MATERIALS AND METHODS:
A retrospective study was conducted in a rural area at KIMSDU, Karad, and Maharashtra. The study was approved by the ethics committee and informed consent was obtained. Biological age was measured by using a calibrated instrument Karada Scan Body Composition Monitor HBF-358-BW. The whole process was monitored by the expert physician at Krishna Hospital, Karad. Information regarding the personal data was collected with the help of a pre-tested questionnaire from respondents. In this study, we have included individuals having age group between 18 to 50 years. Individuals having any other co-morbid medical/surgical illness and physically handicapped participants were excluded in the study.

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Sample Size: In the present study, convenient sampling method was taken into consideration.

Types of Data
Secondary Data.

Ethical Issue
Institutional Ethics Committee of the Krishna Institute of Medical Science Deemed To be University, Karad had approved the study.

Statistical Methods
Data were analyzed using Microsoft Excel Office 2010. The results were expressed in terms of descriptive Statistics and expressed in terms of the percentage. Significances of differences between models were calculated with help of the r^2 test and the adjusted r^2 test. A correlation coefficient used to find out the correlation between two variables. Durbin-Watson test and F test used to measure variably in the data.

Hypothesis
H_0 −Biological ageissameas Chronological age
H_1 - Biological agediffers significantly from Chronological age

Table 1. Distribution of Scio Demographic Variables

Parameter	Sub -Parameters	Count	Percentage
Gender	Male	45	44.1
	Female	52	50.9
Types of food taken	Mix (Veg /non veg.)	75	73
	Veg	27	26.5
Marital Status	Married	66	64.8
	Unmarried	36	35.2
	Total	102	-

A total of 102 participants reported in the study with the age range of 18 to 50 years. Table 1 presents the socio-demographic characteristics of participants in present study based on parameters such as gender, types of food preferences, marital status with respect to their sub-parameters. None of the participants reported a history of smoking, tobacco chewing or alcohol at present or in the past.The correlation between biological age and chronological age and BMI should be positive. It clearly shows that the chronological age is directly proportional to biological age. Moreover, the correlation between BA and blood pressure have not found statistically significant.

Table 2. Correlation with Clinical Parameters

Sr. No.	Correlation	Correlation	p value
01	Biological age and Chronological age	0.7487	0.0001

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02	BMIand Biological age	0.4823	0.0001
03	Biological age and Bold Sugar	0.1787	0.0724^{nsq}
04	Biological age and Systolic blood pressure	0.04835	0.6294^{ns}
05	Biological age and Diastolic blood pressure	0.0690	0.4903^{ns}

Note: -ns: -not significant, nqs:not quite significant

According to the WHO guideline, the present study revealed the BMI of participants as 16.66%, 43.33%, 14% and 12% for underweight, appropriate weight, class I obesity and Class II obesity as overweight, respectively[8].

Table 3. Classification of Body Mass Index

General Classification	Cut of Levels	Frequency	Percentage
Underweight	< 18.5 kg/m^2	20	16.66
Normal weight	18.5-24.9 kg/m^2	52	43.33
Class I obesity	25.0-29.9 kg/m^2	17	14.16
Class IIobesity overweight	30.0-39.9 kg/m^2	12	10
Class IIIextreme obesity	40 kg/m^2	01	0.83

Statistical Analysis: -

The Fitted Models

$CA = 0.389 + \beta 1BMI + \beta 2RM\_Cal + \beta 3 \text{ Body fat} + \varepsilon$…….. [A]

In equation A we were comparing

$BA = 0.567 + \beta 1BMI + \beta 2RM\_Cal + \beta 3 \text{ Body fat} + \varepsilon$ …… [B]

Table 4. Comparison of Models

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
CA	.389	.151	.125	15.690	.151	5.830	3	98	.001	2.064
BA	.567	.322	.286	13.72195	.322	9.111	3	96	.000	2.189

Table 4. Comparison of Models

We had observed that, there was autocorrelation between the variable in Model B as compare to the Model A. r^2 value of the Model B or BA to be large as compare to the Model A or CA. There was more variation in model B.i.e. It means that BMI, RAM Cal. Body fat was auto correlated with the BA.

DISCUSSIONS:

A total of 102 participates ofdata Analyzed in this study. Collated data in the form of secondary sources. Selected data in the form of record there was no scope of some variables to be including such as physical activity, habits, types of job, income sours etc. or some other antroparamatricparameters[09].We can observe that, more than 73% of participates recommended mixed types for food taken in his rutting life.

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In 2019 Mani G estimated statistics related to adolescents. One-fifth of adolescents were overweight and a similar proportion had elevated blood pressure due to unhealthy dietary practices and sub-optimal physical activity.[10]

Let us seen examples, some of the people at the age of 80 years old are fit mentally and physically condition and on the other hands, 50 years old have wide cognitive health problems and some of the chronic diseases[11, 12]. Finally, we can say the Aging means being able to compute physical inability, mental functional capacity, organs and apparatus deregulation.

The term ageing is changing the performances of most physiological systems and increases vulnerability to diseases and death. Ageing is a cumbersome integration of stochastic, environmental, genetic and epigenetic variables[13]. However, these variables do not create the ageing kind but generate the loss of molecular fidelity and therefore as the random accumulation of damage in the human organism's cells, tissues, or whole organism during life increases, the probability of disease and death this is general calculation.

In forensic sciences, the estimation of the age of an individual's has attained importance.[11] It is legal proceedings and has been a recurrent demand from concerned authorities to find out whether the person in the subject has reached the age of immutability and legal responsibility. The function of age estimation is not just limited to how much younger I am comparing to two others but also what about the required situation of my body.

Chronological age is a tentative measure of age but we can't say the best indicator of the ageing process. Our interest is to estimate suitable and trustworthy biomarkers or parameters affecting the biological age to understand the true effect of ageing[14]. Also, we can say that some clinic pathological bands are affecting the BA. The calculation of age is cumbersome and heterogeneous methods. Some biological and psychological dealings may be or may not improve accuracy in reflecting an individual's actual age.

CONCLUSIONS:

People were not aware of the biological age. Here 25% of peoples already pass out the cut of biological age i.e., biological age equals to the chronological age. Approximate 61% Peoples balancing his or her BA with the CA. Many peoples to be casual approach regarding controlling the biological age in a rural area. Those group of people’s overweight or obese need to involving physical activities program me such as yoga, pranayama, and a ground game in the community.

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