



## EFFECT OF AGING ON PSYCHO-MOTOR COMPONENTS IN RELATION TO PERCEIVED STRESS AMONG HEALTHY CITIZENS

(Received on: 24 Dec 2017, Reviewed on: 23 Jan 2018 and Accepted on: 22 Feb 2018)

**Miss. Diti Roy**, M P Ed Scholar,  
State Institute of Physical Education for Women, West Bengal  
**Mr. Anup De**, Ph. D Scholar,  
Visva Bharati University, West Bengal



### Abstract

Purpose of the study was to investigate the effect of aging on psycho motor components and its relationship with perceived stress among healthy citizens. Subjects were selected from North 24 Paraganas district under the state of West Bengal with 120 male sample sizes on three equal groups. Groups were divided according to age i.e. adolescent ( $G_1=13-19$  year), adult ( $G_2=20-30$  year) and old age group ( $G_3=31-60$  year). Variables were considered under psycho motor components i.e. kinesthetics perception, coordinating ability and reaction ability and other side perceived stress was considered as another parameter. Criteria of kinesthetics perception, coordinating ability, reaction ability and perceived Stress were measured as "Distance perception jump", "Eye hand coordination test (Ball transfer)", "Nelson hand reaction test" and "Perceived Stress Scale" respectively. Statistics were done on mean, Standard deviation, standard error of mean, correlation of coefficient and ANOVA for investigating the effect of aging on healthy citizens in which level of significance was set at 0.05 level of significance. Result of the present study shows that significant differences have been observed in case of all psycho motor components and perceived stress among adolescent, adult and old age group of healthy citizens. Insignificant positive

relationship is found in respect of adolescent and adult citizens. Insignificant negative relationship is observed in case of old age citizens between perceived stress and all psycho motor components.

**Keywords:** Aging, Kinesthetic Perception, Coordinating ability, Reaction ability, Psycho motor, Perceived stress.

### Introduction

Ageing rats show decrements in performance of behavioral tasks requiring coordinated control of motor and reflexive responses, such as suspension time on a horizontal wire or inclined wire mesh screen and the length of time it takes for the animal to traverse a wooden rod or plank (Dean et al. 1981; Ingram et al. 1994; Joseph et al. 1983; Joseph & Lippa 1986).

Psychomotor variables act as the medium for the realization of cognitive and affective domains of learning and motor behavior. All these domains of learning are inseparable identities and work in perfect harmony and unison with one another. Performance of motor skills involves neural, physiological and psychological aspects and is a continuum that runs the gamut from physical to cognitive and there is always integration between these aspects of human behavior. Psychomotor fitness of an individual is a perfect blending of



physical as well as motor fitness and goes a long way in fielding the excellent outcomes.

In everyday life, we use our kinesthetic senses all the time. It is how we decide to duck when we are in a place where the ceilings are low, and it helps us determine whether or not we will fit into a car without adjusting the seat either forward or back. Kinesthetic sense occurs by activating a receptor of proprioception in the periphery. Motor coordination is a part of an action regulation system and closely linked with the process and regulation of psychic abilities movements and an execution aspect of an action.(Hirtz, Menal and Schobel 1987)

Various studies have shown that exercise helps relieve stress for people young and old; however, stress can be both helpful and harmful in terms of adolescent sports. "Sports can have both positive and negative influences on adolescent development. Many sports can improve adolescents' physical well-being and health, self-confidence, motivation to excel, and ability to work with others (Cornick, Bowker, & Gadbois, 2001). In some cases, adolescents who spend considerable time in sports are less likely to engage in drugs and delinquency" (Santrock, 1992). Sports are beneficial and can lead to a well-balanced healthy lifestyle because they teach teamwork, dedication, responsibility, and many other qualities you will rely on later in life.

### **Method and materials**

Subjects were randomly selected from large numbers of population of North 24 paraganas district under the state of West Bengal. Total 120 male samples were selected on three equal groups. Groups were divided according to age i.e. adolescent ( $G_1=13\text{-}19$  year), adult ( $G_2=20\text{-}30$  year) and old age group ( $G_3=31\text{-}60$

year). Variables were regarded under psycho motor components i.e. kinesthetics perception, coordinating ability and reaction ability and other side perceived stress was considered as another parameter. Kinesthetics Perception was assessed by "Distance perception jump" test. It measures the ability to perceive distance by concentrating on the effort involved in a jumping. The jumping distance to the nearest 1/4 inch from the target line to the farthest heel is measured and recorded in inches. Coordinating ability was measured through the "Eye hand coordination test (Ball transfer)". This test, as evident from its name, is used to test the coordination between eyes and hands. This test measures simultaneously agility and speed. The subjects were given two trials after a slow practice trial. Best ball transferring time was recorded from left box to right box (up to 10 balls) and time was recorded in nearest seconds. Reaction ability was measured by "Nelson hand reaction test". The tester held the stick timer near the top, letting it hang between the subjects' thumb and index finger. The subjects were directed to look at the concentration zone and were told to react by catching the stick when it was releasing. When the subject caught the timer, the score was read just above the upper edge of the thumb. The five slowest and five fastest trials were discarded from 20 trials and an average of the middle ten was recorded as the score. Numbers of the timer represent thousands of a second. Score may be recorded to the nearest 5/1000 of seconds. Psychological Stress was measured by "Perceived Stress Scale" and developed by Sheldon Cohen (1988). It is a measure of the degree to which situation in one's life is appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and



overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress. The questions in the PSS ask about feelings and thoughts during the last month. In each case, respondents are asked how often they felt a certain way. PSS scores are obtained by reversing responses (e.g. 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. A short 4 item scale can be made from questions 2, 4, 5 and 10 of the PSS 10 item scale. Total scores ranged from 0 to 40, with higher scores indicating greater psychological stress. Prior studies of the internal reliabilities (Cronbach's alpha) for the PSS-10 were 0.84 to 0.86. Studies in Hong Kong found internal reliability scores of the PSS-10 in between 0.70 to 0.76 among Chinese subgroups.

Statistical techniques of mean, standard deviation, standard error, correlation of coefficient and further one way analysis of variance (ANOVA) were done on the four variables among the three different age groups and the LSD (equivalent to no adjustment) post-hoc test was done on those dimensions in which "F" ratios were found to be significant, in order to verify whether the difference really exist or not for which the level of significance was set at 0.05 level of significance.

### Finding and Results

The result of the study has been presented in tabular and numerical form as given here under.

TABLE -1  
ONE WAY ANALYSIS OF VARIANCE (ANOVA) DONE ON  
PSYCHO MOTOR COMPONENTS AMONG  
HEALTHY CITIZENS

Variables	Source of Variance	df	SS	MSS	"F" value
Kinesthetic Perception	Between Groups	2	132.6	66.32	15.17*
	Within Groups	117	511.5	4.372	
Coordinating Ability	Between Groups	2	305.5	152.8	12.57*
	Within Groups	117	1422	12.15	
Reaction Ability	Between Groups	2	101	50.48	9.508*
	Within Groups	117	621.1	5.309	

\*Significant at 0.05 level of significance  $F_{0.05(2, 117)} = 3.07$

In Table -1 it is clearly revealed that the highly significant differences associated are found in respect of all psycho motor components among different age groups of healthy citizen. Since the calculated "F" value of kinesthetics perception (15.17), coordinating ability (12.57) and reaction ability (9.508) are higher than that of required "F" value (3.07) as significant at 0.05 level of significance.

TABLE -2  
ANALYSIS OF CRITICAL DIFFERENCES ON PSYCHO  
MOTOR COMPONENTS AMONG HEALTHY CITIZENS

Variables	Adolescent	Adult	Old Age	MD	CD at 5% level
Kinesthetics Perception	2.657	1.798		0.859	0.926
	2.657		4.33	1.673*	
	1.798	4.33		2.532*	
Coordinating Ability	32.85	31.11		1.74*	1.544
	32.85		35.01	2.161*	
		31.11	35.01	3.901*	
Reaction Ability	4.601	3.617		0.985	1.02
	4.601		5.858	1.256*	
		3.617	5.858	2.241*	

\*Significant at 0.05 level

The above Table 2 reveals that significant differences exist between the means scores of adolescent and old age ( $MD=1.673, 2.161, 1.256$ ), adult and old age ( $MD=2.532, 3.901, 2.241$ ), in respect of all psycho motor



components. Insignificant differences are found between the means scores of adolescent and adult in case of kinesthetic perception ( $MD= 0.859$ ) and reaction ability ( $MD=0.985$ ) where the critical differences of kinesthetic perception (0.926), coordinating ability (1.544) and reaction ability (1.02) are set at 0.05 level of significance.

TABLE -3  
ONE WAY ANALYSIS OF VARIANCE (ANOVA) DONE ON PERCEIVED STRESS AMONG HEALTHY CITIZENS

Variables	Source of Variance	df	SS	MSS	"F" value
Perceived Stress	Between Groups	2	216.6	108.3	3.772*
	Within Groups	117	3360	28.72	

\*Significant at 0.05 level of significance, " $F$ "<sub>0.05</sub> (2, 117) =3.07  
From the above Table 3 indicate that Significant differences is found among adolescent, adult and old age group in respect of perceived stress. Calculated F value (3.772) is higher than that of required tabulated value (3.07).

TABLE -4  
ANALYSIS OF CRITICAL DIFFERENCES ON PERCEIVED STRESS AMONG HEALTHY CITIZENS

Adolescent	Adult	Old Age	MD	CD at 5% level
13.63	15.7		2.07	2.373
13.63		16.88	3.25*	
	15.7	16.88	1.18	

\*Significant at 0.05 level

Table 4 shows that insignificant differences are found between the mean differences of adolescent & adult group ( $MD=2.07$ ), adult & old age group ( $MD=1.18$ ) and significant difference is found between the mean value of adolescent and old age group ( $MD=3.25$ ) in respect of perceived stress. Critical value is set at 0.05 level of significance.

TABLE -5  
RELATIONSHIP OF PERCEIVED STRESS WITH PSYCHO MOTOR COMPONENTS AMONG HEALTHY CITIZENS

Dependent Variables	Groups	Mean	SD	S E M	"r" Value
Kinesthetic Perception	Adolescent	2.657	1.587	0.251	0.296
	Adult	1.798	2.099	0.332	0.130
	Old Age	4.33	2.488	0.393	0.001
Coordinating Ability	Adolescent	32.85	3.395	0.537	0.082
	Adult	31.11	3.185	0.504	0.029
	Old Age	35.01	3.846	0.608	0.139
Reaction Ability	Adolescent	4.601	2.037	0.322	0.094
	Adult	3.617	2.167	0.343	0.146
	Old Age	5.858	2.661	0.421	0.080

\*Significant at 0.05 level of significance, " $r$ "<sub>0.05</sub> (38) =0.304

This Table 5 reflects that insignificant positive relationship is associated in respect of adolescent and adult citizen and insignificant negative relationship is seen in case of old age citizens between perceived stress and all psycho motor components. All 'r' values are bellowing the table value (0.304) and set at 0.05 level of significance.

### Discussion of Findings

The result of the present study reflects that significant differences are observed in respect of all psycho motor components and perceived stress among adolescent, adult and old age healthy citizens. It may be because of the maturity in respect of age, their involvement in physical and sociological activities as it is a way to anticipate the happenings for this every citizen is eager to participate in physical and sporting activities if it is offered by a given facilities to participate whole heartedly in different activities. Jevas and Yan (2005) who studied that possible reason for the delay in response differences may be due to actual degeneration and Axonal Shrinkage which prolonged loss of coordination with advancing age due to inability to maintain fine balance between agonist and antagonist muscles especially during rapid movements.



Result shows that adult citizens have good psycho motor ability and old age citizens have lower level of psycho motor ability. Because the age gradually acquires higher physical fitness and their neuro-physiological demands are more. Psycho motor ability depends upon the neuro physiological and psychological factors. Patrick J. Smith, et al. found in his studies those people who have completed adolescent age their exhibited improvements are ongoing in psycho motor function. In the age of adult the neuro physiological factors develop and continue up to still 30 years. In old age neuro physiological demands are very less in respect of their aging. Result from present study is partially reliable with the results reached by Hascelik et al (2012) who found decreases in the neuro physiological function in maturity of age.

Result of the perceived stress is increased according to chronological growth of Indian citizens. Adolescent age people have lower levels of stress because some possible contributing factors are included like healthy educative programmes, being more likely to engage in cognitive stimulating activities, having better enjoyment circumstances, eating healthier, and spending more time participating in physical activities. Young people are stressed by the demands of job and career while for older people it is more "health issues" that creates stress. At first glance it may be seemed that older people are more prone to stress associated with increased risk of losing significant others, life partners, close friends, as well as intensified feelings of loneliness, abandonment, and insecurity, more likely to live alone and thus less likely to receive help from family member to deal with stressful situations in their lives especially if their physical conditions become limited. So far, the

evidence that exposure to stressors or level of perceived stress is the primary source of physiological dysregulation is modest. Perhaps it is time to reconsider the underlying premise of the allostatic load framework. A variety of factors, some of which are unrelated to psychological stress, may contribute to multi-system dysregulation. Our finding highlights that aging accompanied deterioration in health might explain a greater proportion of the "age effect"—the presentation of higher perceived stress among older age groups. Devan et al. (1996) Perceived stress is thought to be a contributing factor to the decrements in cognitive and motor performance is seen in aging.

Insignificant positive relationship is associated between perceived stress and all psychomotor components in case of adolescent, adult healthy citizens and insignificant negative relationship is found in respect of old age healthy citizens. Bakhit (2010) reported that age is significantly inversely correlated with perceived stress level, suggesting that perceptions of stress tend to decline as age increases. In a recent study in which people are evaluated and their stress levels are measured, the results show that "there is no significant relationship between stress levels and chronological age". Ames et al. (1993) found that endogenous protection against free-radicals may also be decreased with age, which may be a contributing factor to the motor fitness, seen in aging. Akram Esfahankalati C Venkatesh (2003) suggested that person participating in the physical healthy activities can increase their neurotic activity in the brain and maintain his stress less life.



## Conclusions

Conclusions are made that Perceived stress is an influencing source which brings aging on Indian citizens quickly. Stress is increasing with the increasing of age and psycho motor ability is decreased in the old age. It appears that perceived stress is a contributing factor to the psycho motor movement decrements, seen in aging. Age-validated psychomotor and psychological stress is sensitive to different age group of Indian citizens, which also shows motor behavioral deficits. Therefore, age-related changes in neuro physiological behavior may be resulted from an inability to cope with perceived stress that occurs throughout the life-span.

## References

- Barbara Shukitt-Hale "The Effects of Aging and Oxidative Stress on Psychomotor and Cognitive Behavior" Human Nutrition Research Center on Aging at Tufts Univ.: USDA, Vol. 22, 9-17, 1999
- Chang SJ, et al. "Developing an occupational stress scale for Korean employees" Korean J Occup Environmental Medicine, (2005), 17, 297–317.
- Cohen, S. and Williamson, G. "Perceived Stress in a Probability Sample of the United States". The Social Psychology of Health, Newbury Park, CA: Sage, 1988.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). "A global measure of perceived stress", Journal of Health & Social Behavior, 24(4), pp: 385-396.
- Dana A. Gleit, et al. "Perceived stress and biological risk: is the link stronger in Russians than in Taiwanese and Americans?", The International Journal on the Biology of Stress, ISSN: 1025-3890, Stress, 2013; 16(4): 411–420
- Eun-Hyun Lee "Review of the Psychometric Evidence of the Perceived Stress Scale" Asian Nursing Research, 6 (2012) 121e127
- Ingram, DK. "Toward the behavioral assessment of biological aging in the laboratory mouse: Concepts", terminology, and objectives. Exp. Aging Res., 9:225-238, 1983
- Jayesh Solanki et al, "A Study of Correlation between Auditory and Visual Reaction Time in Healthy Adults", International Journal of Medicine and Public health, 2012; Vol. 2 , Issue 2
- Johnson Barry L. and Nelson Jack K, "Practical Measurements for Evaluation in Physical Education", New Delhi: Surjeet Publication, Third Edition, Third Reprint-2012.
- Jonathan E. Fielding, et al. "A Perspective on the Development of the Healthy People 2020 Framework for Improving U.S. Population Health", Public Health Reviews, Vol. 35, No 1
- Kobayashi Y et al, "Effects of a worker participatory program for improving work environments on job stressors and mental health among workers: a controlled trial". J Occup Health (2008), 50, 455–70.
- P.A. Ramesh Kumar, "Cross Sectional Analysis of coordinative Abilities of Students from Ten to Sixteen Years of Age", Unpublished M.P.E. Thesis, L.N.I.P.E., Gwalior, 1993.
- Saugata sarkar "A Study on Relationship Between Creative Motor Response and Kinesthetic Perception of Student" International journal of innovative research& development, vol 2, issue 9, September 2013
- Shukitt Hale et al. "Psychomotor and spatial memory performance in aging male Fischer", 344 rats, Exp Gerontology, 33: 615-624, 1998
- Srinath S, Girimaji CS, Seshadri S, Subbakrishna DK, Bhola P, Kumar N. "Epidemiological study of child & adolescent psychiatric disorders in urban & rural areas of Bangalore", India. Indian J Med Res. 2005; 122: 67–79. [PubMed]
- Verma J. Prakash. "A Text Book on Sports Statistics", Sports publication 1986.
- Wallace J E et al. "Motor and reflexive behavior in the aging rat", J. Gerontol, 35:364- 370, 1980
- Zhang Manru et al. "The Prevalence of Perceived Stress among U.S. Chinese Older Adults", AIMS Medical Science, Volume 1, Issue 1, 40-56. Published date 1 September 2014