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ANALYSIS OF SELECTED PHYSICAL FITNESS VARIABLES BETWEEN MONGOLOID AND DRAVIDIAN FEMALE COLLEGE STUDENTS

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Abstract: *The objective of this study is to analyse selected physical fitness variables among Mongoloid and Dravidian female college students aged 18 to 23 years. The specific aims include assessing the differences in physical fitness between Mongoloid and Dravidian female college students and examining the effects of race and age on selected physical fitness variables, namely muscular endurance, flexibility, and agility. A total of 600 participants, consisting of 300 Mongoloid and 300 Dravidian female college students, were selected using a random sampling method. The subjects were categorized into three age groups: 18-19 years, 20-21 years, and 22-23 years, with all individuals engaging in a minimum of 30 minutes of daily physical activity or exercise. To evaluate the variations in physical fitness variables concerning race and age groups, a two-way analysis of variance (2x3 ANOVA) was employed. When a statistically significant F-value was obtained, simple effect and least significant difference (LSD) post hoc tests were utilized to determine the effects and pairwise mean differences. The results indicated a significant difference in muscular endurance, flexibility, and agility between Mongoloid and Dravidian college students, irrespective of age. Additionally, significant differences in flexibility were observed among the three age groups, while muscular endurance and agility did not display significant differences. Furthermore, a significant interaction was found concerning agility relative to race and age, whereas no interactions were evident for muscular endurance and flexibility. The variations in physical fitness levels between Mongoloid and Dravidian female college students can be attributed to numerous factors, including heredity, environment, nutrition, disease, socioeconomic status, urbanization, physical activity, and climatic conditions.*

Keywords: *Physical Fitness, Muscular Endurance, Flexibility, Agility, Mongoloid, Dravidian,*

Introduction:

Race is the classification of humanity into groups based on shared physical traits and appearances that are inherited across generations. The 19th-century rise of evolutionary theories fuelled efforts to categorize human racial types, often represented through maps. Anthropologists and geographers developed unique classification systems, leading to various racial groupings. Over time, different traits were used, resulting in multiple racial classifications. One such system identified six major racial stocks: Negroid, Mongoloid, White, Australoid, American Indian, and Polynesian, each defined by distinct physical characteristics *(Anemone, 2018). Vidal de la Blache, 1926* described race as a broad division of humankind based on inherited physical traits. However, race should not be confused with classifications based on nationality, religion, community, or language, which are shaped by personal beliefs and choices rather than genetic inheritance.

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According to *UNESCO, 1969* race remains a complex and debated concept, with no universally accepted definition. Scientifically, all humans share a common origin and belong to the species *Homo sapiens*. Race should not be conflated with nationality, religion, geography, culture, or language, as these are independent of racial classification. While races are distinguished by physical traits, cultural differences do not define them. Variations in physical characteristics arise from both heredity and environmental factors, with genetic diversity playing a key role in evolution and other biological fields *(Ewens, 2001).* Claims of racial purity are unfounded, as racial mixing has occurred throughout history. The extent of racial diversity varies by nation, but the idea that racial mixing is biologically harmful is scientifically incorrect. In essence, a race is a group of intermarrying individuals, descended from common ancestors, who share similar physical traits and a collective identity.

The Mongoloid race, originating from Central Asia, is divided into four subgroups based on geography and is characterized by yellowish skin, straight hair, scant facial hair, a broad face with prominent cheekbones, a low nasal bridge, and obliquely set eyes with an epicanthic fold. This racial group includes populations from East Asia, Southeast Asia, the Arctic, the Americas, the Pacific Islands, and Finland, with significant presence in the Himalayan regions, including Northeast India, Nepal, and Burma *(Ali & Ali, 2019).*

Dravidian people are native speakers of Dravidian languages, a linguistic family distinct from Indo-European languages. Primarily found in southern India, major Dravidian ethnic groups include Tamil, Kannada, Malayalam, Telugu, and Tulu, with speakers also present in central India, Sri Lanka, Bangladesh, Pakistan, southern Iran, and Afghanistan. There are approximately 245 million Dravidian language speakers worldwide. The Indo-Dravidian race is characterized by light to dark brown skin, black wavy hair, dark brown eyes, a dolichocephalic (long) head, a medium to narrow face, minimal prognathism, and a high nasal bridge with a depressed root. Their stature is generally medium, and they predominantly speak Dravidian languages, except for certain groups in Karnataka and the Todas of the Nilgiri Hills, who have distinct languages.

Physical fitness is the ability to carry out daily tasks with vigour and alertness without undue fatigue and ample energy to enjoy leisure time pursuits and meet unforeseen emergencies (President's Council on Physical Fitness and Sports). Physical fitness refers to the organic capacity of the individual to perform the normal task of daily living without undue tiredness or fatigue having reserves of strength and energy available to meet satisfactory efficiency and emergency demands that are required suddenly arising *(Nixon and Jewett, 1980).*

Muscular endurance is the ability of an individual to do higher amounts of effort than their original capabilities. The act of gaining muscle endurance through physical activity has been shown to decrease anxiety, depression, and stress. Muscular endurance is the ability to keep going through a tough situation involving hardship and stress *(Holloszy, 2015).* Flexibility is the range of motion around a joint. Good flexibility in the joint can help to prevent injuries through all stages of life *(Johnson & Nelson, 1984).* Agility is defined as one's ability to change body position and direction rapidly and accurately *(Kansal, 1996).* The present study focuses on the Analysis of Selected Physical Fitness Variables Between Mongoloid and Dravidian Female College Students.

The objective of the Study:

1. To assess selected physical fitness (muscular endurance, flexibility, and agility) differences between Mongoloid and Dravidian female college students.
2. To analyse the interaction between race and age on selected physical fitness variables such as muscular endurance, flexibility, and agility.

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Materials and Methods:

The present study aimed to analyse selected physical fitness variables among Mongoloid and Dravidian female college students from the northeastern (Manipur) and southern (Tamil Nadu) regions of India. The participants, aged 18 to 23 years, were categorized into three age groups: 18–19 years, 20–21 years, and 22–23 years, all of whom were registered college students engaging in at least 30 minutes of daily physical activity or exercise. A total of 600 female college students were selected using a random sampling method, with 300 participants from the Mongoloid group and 300 from the Dravidian group, ensuring equal representation from both regions. The study assessed three physical fitness variables: muscular endurance (measured using knee bend sit-ups), flexibility (sit-and-reach test), and agility (SEMO agility test). The collected data were analysed to compare the physical fitness levels between the two groups.

Research design and statistical techniques

For the present study, the Statistical Package of Social Sciences (SPSS) software version 22.0 was used for the purpose of analysing the data on selected physical fitness variables. A two-way analysis of variance (ANOVA) (2x3) was used for estimating the variations in physical fitness variables in relation to respective race and age groups. Whenever the obtained f-value was found to be statistically significant, the Simples Effect Test (SET) and then the Least Significant Difference (LSD) post hoc test was applied to find out the pair mean difference. In all cases, the criteria for statistical significance were set at the 0.05 level of significance, which was considered appropriate.

Findings and Discussions:

Table 1 reflects the descriptive values of mean and standard deviations of Mongoloid and Dravidian female college students of age groups 18-19 years, 20-21 years, and 22-23 years in muscular endurance.

Table -1
Descriptive Statistics on Muscular Endurance between Mongoloid and Dravidian Female College Students with Age Groups

Age group		Mongoloid	Dravidian	Total
18-19yrs	**Mean**	31.34	30.45	30.89
	S.D.	5.74	6.76	6.27
20-21yrs	**Mean**	31.77	30.58	31.17
	S.D.	6.43	7.12	6.79
22- 23yrs	**Mean**	32.53	30.43	31.40
	S.D.	6.43	7.08	6.46
Total	**Mean**	**31.88**	**30.43**	**31.16**
	S.D.	**5.93**	**6.97**	**6.51**

The statistical analysis between Mongoloid and Dravidian female college students of muscular endurance is presented in Table 2.

Table-2
Summary of ANOVA (2X3) Factorial Design on Muscular Endurance

Tests of between-subject effects					
Dependent Variable: Muscular Endurance					
Source of variation	**Sum of square (ss)**	**df**	**MS**	**F**	**Sig.**

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Factor A (Race)	313.927	1	313.927	7.468*	0.006
Factor B (Age)	25.603	2	12.802	0.305	0.738
Interaction (Race x Age)	51.863	2	25.932	0.617	0.540
Error	24969.880	594	42.037		

**** Significance at 0.05 level of confidence***
(Table values of 1 to 694 & 2 to 594 are 3.86 & 3.02 respectively)

It is clear from the above table that the muscular endurance between Mongoloid and Dravidian female college students from Manipur and Tamil Nadu reveals a significant difference irrespective of age, as the obtained F ratio of 7.468 is greater than the table value of 3.86 at $\alpha = 0.05$ for the df of 1 and 594. Further, the finding shows that there is an insignificant difference in muscular endurance among age groups irrespective of race, as the obtained f ratio of 0.305 is less than the table value of 3.02 for the df of 2 and 594. Moreover, the finding disclosed that an insignificant difference is found in muscular endurance between the interaction of race and age, as the obtained f ratio of 0.617 is less than the required table value of 3.02 at $\alpha = 0.05$ for the df of 2 and 594.

Table 3 reflects the descriptive values of mean and standard deviations of Mongoloid and Dravidian female college students of age groups 18-19 years, 20-21 years, and 22-23 years in flexibility.

Table-3
Descriptive Statistics on Flexibility between Mongoloid and Dravidian Female College Students with Age Groups

Age Group		Mongoloid	Dravidian	Total
18-19yrs	**Mean**	29.70	24.12	26.91
	S.D.	4.07	2.48	4.37
20-21yrs	**Mean**	28.95	22.94	25.95
	S.D.	3.97	2.55	4.49
22-23yrs	**Mean**	27.83	22.79	25.31
	S.D.	3.99	3.17	4.39
Total	**Mean**	**28.83**	**23.28**	**26.05**
	S.D.	**4.07**	**2.81**	**4.46**

The statistical analysis between Mongoloid and Dravidian female college students of flexibility is presented in Table 4.

Table-4
Summary of ANOVA (2X3) Factorial Design on Flexibility

Tests of between-subject effects					
Dependent Variable: Flexibility					
Source of variation	**Sum of square (ss)**	**df**	**MS**	**F**	**Sig.**
Factor A (Race)	4609.282	1	4609.282	389.980*	0.000
Factor B (Age)	268.750	2	134.375	11.369*	0.000
Interaction (Race x Age)	24.503	2	12.252	1.037	0.355
Error	7020.650	594	11.819		

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**** Significance at 0.05 level of confidence***
(Table values of 1 to 694 & 2 to 594 are 3.86 & 3.02 respectively)

It is clear from the above table that the flexibility between Mongoloid and Dravidian female college students from Manipur and Tamil Nadu reveals a significant difference irrespective of age, as the obtained F ratio of 389.980 is greater than the table value of 3.86 at α =0.05 for the df of 1 and 594. Further, the finding shows that there is a significant difference in flexibility among age groups irrespective of race, as the obtained f ratio of 11.369 is greater than the table value of 3.02 for the df of 2 and 594. Moreover, the finding discloses that no significant difference is found in flexibility between the interaction of race and age, as the obtained f ratio of 1.037 is less than the required table value of 3.02 at α = 0.05 for the df of 2 and 594.

Table-5
Pairwise Comparisons (Post Hoc Test LSD) of Age on Flexibility

18-19yrs	20-21yrs	22-23yrs	M.D.	95% CI.
26.91	25.95		1.000*	1.35
26.91		25.31	1.625*	
	25.95	25.31	0.625	

From the above table, a statistically significant difference is found in flexibility between 18-19 years and 20-21 years, 18-19 years and 22-23 years, but a statistically insignificant was found between 20-21 years and 22-23 years respectively, as the obtained value ($p < 0.05$).

Table 6 reflects the descriptive values of mean and standard deviations of Mongoloid and Dravidian female college students of age group 18-19 years, 20-21 years, and 22-23 years in agility.

Table -6
Descriptive Statistics on Agility between Mongoloid and Dravidian Female College Students with Age Groups

Age group		Mongoloid	Dravidian	Total
18-19yrs	Mean	14.73	14.35	14.54
	S.D.	0.87	0.81	0.86
20-21yrs	Mean	14.66	14.44	14.55
	S.D.	0.81	0.87	0.84
22-23yrs	Mean	14.68	14.75	14.72
	S.D.	0.85	1.12	0.99
Total	Mean	**14.69**	**14.52**	**14.61**
	S.D.	**0.84**	**0.96**	**0.91**

The statistical analysis between Mongoloid and Dravidian female college students of agility is presented in table 6.

Table-7
Summary of ANOVA (2X3) Factorial Design on Agility

Tests of between-subject effects					
Dependent Variable: Agility					
Source of variation	Sum of square (ss)	df	MS	F	Sig.
Factor A	4.980	1	4.980	6.252*	0.013

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(Race)					
Factor B (Age)	3.731	2	1.865	2.342	0.097
Interaction (Race x Age)	5.560	2	2.780	3.490*	0.031
Error	472.369	593	.797		

**** Significance at 0.05 level of confidence***
(Table values of 1 to 694 & 2 to 594 are 3.86 & 3.02 respectively)

It is clear from the above table that the agility between Mongoloid and Dravidian female college students from Manipur and Tamil Nadu reveals a significant difference irrespective of age, as the obtained F ratio of 6.252 is greater than the table value of 3.86 at α =0.05 for the df of 1 and 594. Further, the finding shows that there is an insignificant difference in agility among age groups, irrespective of race, as the obtained f ratio of 2.342 is less than the table value of 3.02 for the df of 2 and 594. Moreover, the finding discloses that a significant difference is found in agility between the interaction of race and age, as the obtained f ratio of 3.490 is more than the required table value of 3.02 at α = 0.05 for the df of 2 and 594. Since a significant difference in interaction is found between race and age, simple effect and pairwise comparison are applied to agility.

Table-8
Simple Effect of Race and Age on Agility

Source of variation		**SS**	**df**	**MS**	**F**	**Sig.**
18-19yrs	**Mongoloid Women**	7.738	1	7.738	9.714*	0.002
	Dravidian Women					
20-21yrs	**Mongoloid Women**	2.563	1	2.563	3.217	0.073
	Dravidian Women					
22- 23yrs	**Mongoloid Women**	0.263	1	0.263	0.330	0.566
	Dravidian Women					
Mongoloid Women	**18-19yrs**	0.321	2	0.160	0.201	0.818
	20-21yrs					
	22-23yrs					
Dravidian Women	**18-19yrs**	8.999	2	4.500	5.649*	0.004
	20-21yrs					
	22-23yrs					

From the above table, it is clearly shown that there is a significant difference in agility between 18-19 years of Mongoloid and Dravidian women college students since the obtained F ratio of 9.714 is greater than the table value of 3.86 at α = 0.05 for the df of 1 and 594. And also, there is no significant difference in agility between 20-21 years of Mongoloid and Dravidian women college students, since the obtained F ratio of 3.217 is less than the table value of 3.86 at α = 0.05 for the df of 1 and 594. Moreover, there is no significant difference in agility between 22-23 years of Mongoloid and Dravidian

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women college students since the obtained F ratio of 0.330 is less than the table value of 3.86 at $\alpha = 0.05$ for the df of 1 and 594.

Further, there was no significant difference in agility among the different age groups of Mongoloid women college students since the F ratio of 0.201 is less than the table value of 3.02 at $\alpha = 0.05$ for the df of 2 and 594. Whereas, there is a significant difference in agility among the different age groups of Dravidian women college students since the F ratio of 5.649 is greater than the table value of 3.02 at $\alpha = 0.05$ for the df of 2 and 594.

Table-9
Pairwise Comparison of Dravidian Female College Students in Agility

18-19yrs	20-21yrs	22-23yrs	M.D.	95% CI.
14.35	14.44		0.092	0.089
14.35		14.75	0.405*	
	14.44	14.75	0.313*	

From the above table, a statistically insignificant difference is found in agility between 18-19 years and 20-21 years, but a significant difference is found between 18-19 years and 22- 23 years, 20- 21 years and 22-23 years respectively, as the obtained value ($p < 0.05$).

DISCUSSIONS AND FINDINGS

The result shows that there is a significant difference in muscular endurance, flexibility, and agility between Mongoloid and Dravidian female college students, irrespective of age. Further, there was a significant difference in flexibility among three different age groups, irrespective of race but there is no significant difference in muscular endurance and agility among three different age groups. Also, there was an interaction between race and age in agility but no interaction between race and age in muscular endurance and flexibility.

CONCLUSIONS

1. Mongoloid female college students exhibit superior muscular endurance and flexibility compared to their Dravidian counterparts. Conversely, Dravidian female college students demonstrate greater agility than Mongoloid female college students, regardless of age.
2. Age-specific analyses reveal that female college students aged 18–19 years possess significantly greater flexibility than those aged 20–21 years and 22–23 years. However, no significant differences in muscular endurance or agility were observed across these age groups.
3. A significant interaction effect between race and age was observed in agility. Specifically, 18–19-year-old Dravidian female college students outperformed their Mongoloid counterparts in agility. However, no significant differences in agility were found between Mongoloid and Dravidian female college students in the 20–21 years and 22–23-years age groups. Additionally, within the Mongoloid group, agility varied significantly across age groups. In contrast, among Dravidian female college students, 18–19-year-olds demonstrated superior agility compared to those aged 20–21 and 22–23 years, though no significant difference was found between the 18–19 and 20–21 years age groups.
4. The observed differences in physical fitness parameters between Mongoloid and Dravidian female college students may be attributed to multiple factors, including genetic predisposition, environmental influences, nutritional status, prevalence of diseases, socioeconomic conditions, urbanization, physical activity levels, and climatic variations. Further research is recommended

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to explore the underlying physiological and environmental determinants contributing to these differences.

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