

# EFFECT OF SOCIO ECONOMIC STATUS (SES) ON FOOT LENGTH, PALM LENGTH, AND MID-FINGER LENGTH OF SCHOOL GOING CHILDREN (8-10 YEARS OLD) IN MUMBAI.

## ABSTRACT

**Aims:** To Study the effect of Socioeconomic status (SES) on foot length, palm length and mid finger length on School going Children (Age:-8-10 years) in Mumbai city.

**Study design:** Foot length was analyzed by Standardized measuring tape, Palm length and mid-finger length was analyzed by Calliper, Height was analyzed by stadiometer. SES was coded according Kuppuswamy scale (2018).

**Place and Duration of Study:** The time span required to carry out study was from November to March 2018-2019. Total 488 subjects (male & female) participated from public to private schools in Mumbai city for study out of which non eligible subjects were removed.

**Methodology:** Total 392 subjects (male & female) participated ranging from public to private schools in Mumbai city, (Maharashtra, India). Kuppuswamy scale (2018) was used to analyse the SES of the subjects. SPSS software version 20 was used for data analysis.

**Results:** A positive striking correlation was observed amongst, different socio economic status and height at  $p < 0.05$  (.001). Maximum height was found among upper class ( $129.58 \pm 6.88$ ), further the lowest mean value of height ( $124.00 \pm 6.34$ ) was noted among the upper lower class. However, foot length and mid-finger length showed highly significant difference statistically at  $p < 0.05$  (.000). Although the maximum foot length was found among upper lower class ( $3.0287 \pm 0.33$ ), further the lowest mean value of foot length ( $1.0599 \pm 0.40$ ), was noted among the lower class and also, higher treatment value ( $6.195 \pm 0.60$ ) for mid-finger length was found amongst the upper middle class and lower treatment value amongst lower class ( $5.700 \pm 0.34$ ). Moreover, a significant correlation was observed between palm length and Socio-economic status at  $p < 0.05$  (.019). Also, the highest statistical association of the palm length to the Socio-economic status of the samples ( $9.412 \pm 3.72$ ) was observed among Upper lower class subjects, Whereas lowest level of palm length was depicted in lower class ( $7.757 \pm 0.82$ ) category.

**Keywords:** SES, Palm length, foot length, mid-finger length, Kuppuswamy scale, stadiometer.

## 1. INTRODUCTION

Growth – the vital process is measured by measuring the height of a person, which itself is a sum of the length of certain bones and appendages of the body represent certain relationship with form of proportions to the total stature. There is always particular interest amongst the anthropologists to assess the height of an individual from measurement of different parts of the body and bones.

As areas of the developing world continue to go through the transition to modernize economies, they commonly experience a growing divide within their societies. This divide is often measured by the inequality in income, material

wealth, and health (Houweling and Kunst, 2009; Karlsson et al., 2010; Stuckler et al., 2010).

Childhood wasting is a global problem and is significantly more pronounced in low and middle income class people among the countries. Socio Economic Status (SES) may be significantly associated with wasting (Mohammad et al 2017). Socioeconomic status (SES) has been linked as both a mediator and fundamental cause of variation in human health outcomes in a variety of settings (Barros et al., 2013; Cameron, 1991; Cameron and Williams, 2009). Malnutrition, especially under-nutrition, is a major health problem affecting the development of children in many low- and middle-income countries (WHO, 2000).

## **2. MATERIAL AND METHODS / EXPERIMENTAL DETAILS / METHODOLOGY (ARIAL, BOLD, 11 FONT, LEFT ALIGNED, CAPS)**

Mumbai city was selected due to its diverse economic and cultural background, it provided ideal setting to study "EFFECT OF FOOT LENGTH, MID-FINGER LENGTH, PALM LENGTH ON SOCIO ECONOMIC STATUS (SES) OF SCHOOL GOING CHILDREN (8-10 YEARS OLD) IN MUMBAI." Total 392 subjects (male & female) participated ranging from public to private schools in Mumbai city, (Maharashtra, India). Children from selected schools, falling under the age 8-10 years (male & female) from grade 3 were selected by random, purposive sampling.

Anthropometric measurements of the children were taken with the help of STADIOMETER, measuring tape, and Socio economic status was recorded from the parents/guardian of the students by means of questionnaire. Kuppuswamy scale was used for scoring socio economic status.

Stadiometer is the standardized rod used for measuring height of the subject. Stadiometer are used in routine medical examination and also for the clinical tests and experiments. Children were guided accordingly to avoid possible error. Palm length and finger length was measured by Vernier Caliper, student were instructed to hold hand straight in comfortable position then, for palm length jaw of caliper was tighten on lower point of middle finger of hand and starting point of wrist and measurements were noted. Similarly, for mid-finger length measurements were calculated through adjusting jaw between lower and higher point of middle finger. However, Foot length was measured manually for each child. The children were guided to stand on a blank sheet of paper and measurements were noted down by marking highest and the lowest point near toe and the fingers of the foot respectively. Then both points were joined using ruler, and measured using standardized tape.

## **3. RESULTS AND DISCUSSION**

As demonstrated in table 3.1 and fig:-3.1, the samples were analysed with socio economic status, it was observed that the highest levels of subjects were found in lower middle class. Whereas the maximum height was found among upper class ( $129.58 \pm 6.88$ ), followed by upper lower class ( $126.56 \pm 8.69$ ) and lower middle class ( $126.35 \pm 3.69$ ) respectively. Further the lowest mean value of height ( $124.00 \pm 6.34$ ) was noted among the upper lower class. Overall it showed positive striking correlation amongst, different socio economic status in correlation to height at  $p < 0.05$  (.001). Thus, socio economic status, in long run might affect the height of an individual.

Table 3.1 Height (cm) BY SES Code Score:-

Socio Economic Status	Number of subjects	X ± σ (cm) Height	Significance P ≤ 0.05
Upper Class = 1	31	129.58 ± 6.88	.001
Upper Middle Class= 2	83	128.24 ± 6.48	
Lower Middle Class= 3	113	126.56 ± 8.69	
Upper Lower class = 4	84	124.00 ± 6.34	
Lower Class = 5	8	126.35 ± 3.69	
Total	319	126.61 ± 7.48	

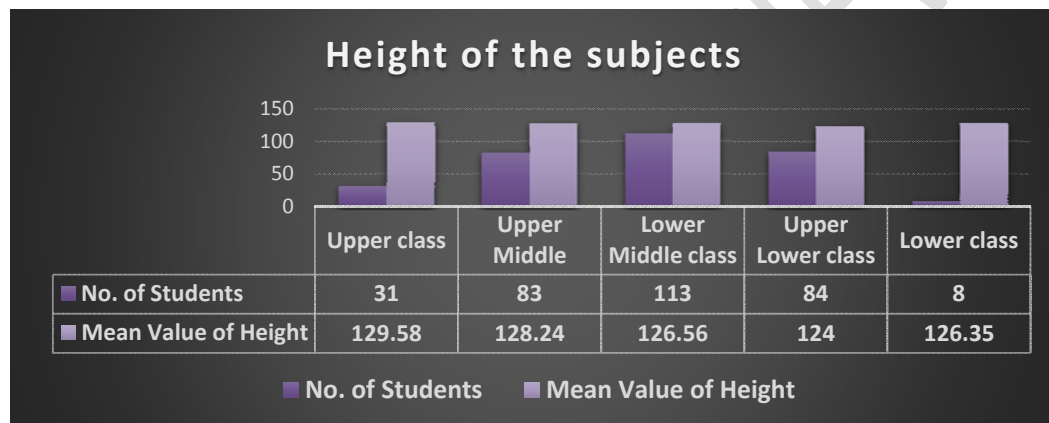


Figure 3.1:- Comparison of Height of Subject with SES.

As illustrated in table 3.2 & fig: 3.2, when foot length was compared with the Socio-economic status, it was observed that maximum subjects were found in lower middle class. Although the maximum foot length was found among upper lower class ( $3.0287 \pm 0.33$ ), followed by lower middle class ( $2.6602 \pm 0.25$ ), upper middle class ( $1.8426 \pm 0.20$ ) and upper class ( $1.3504 \pm 0.24$ ) respectively. Further the lowest mean value of foot length ( $1.0599 \pm 0.40$ ), was noted among the lower class. Alternatively when measurements of foot length was considered, it was observed that upper middle class and upper lower class had similar number of subjects however it was noted that upper lower class had higher mean value for foot length compared to upper middle class subjects. Further, a highly significant difference was observed statistically between foot length and socio economic status at  $p < 0.05$  (.000).

Table 3.2 - Foot Length (cm) BY SES Code Score:-

Socio Economic Status	Number of subjects	X ± σ (cm) Foot length	Significance P ≤ 0.05
Upper Class = 1	31	1.3504 ± .24	.000
Upper Middle Class= 2	83	1.8426 ± .20	
Lower Middle Class= 3	111	2.6602 ± .25	

Upper Lower class = 4	83	3.0287 ± .33	
Lower Class = 5	7	1.0599 ± .40	
Total	315	2.5302 ± .14	

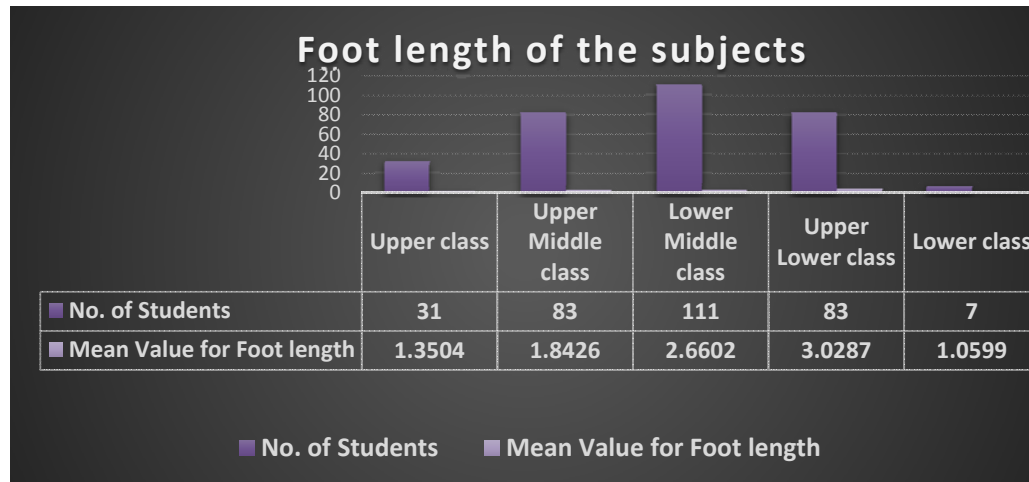
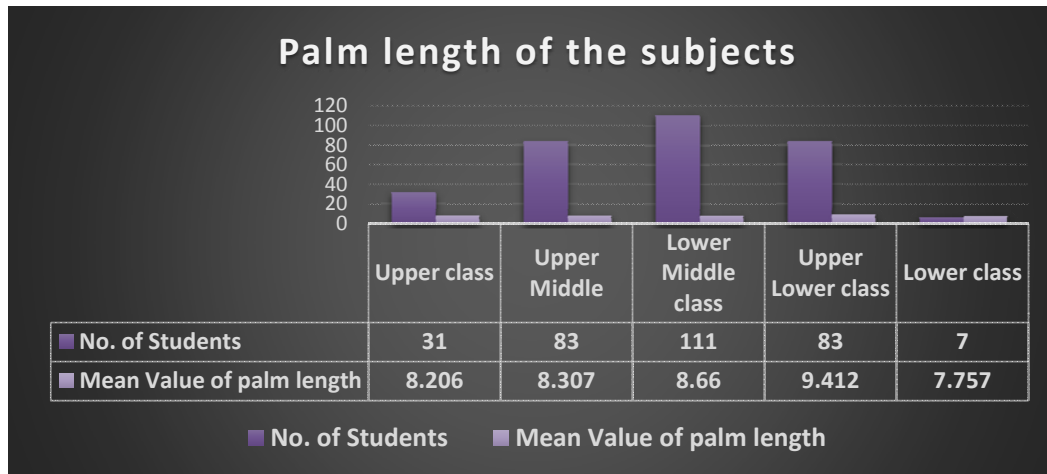


Figure 3.2:- Comparison of Foot length of Subject with SES.

As indicated in table 3.3 and fig 3.3, utmost result for number of subjects was observed in upper lower class, when palm length and socio economic status was compared. Also, the highest statistical association of the palm length to the Socio-economic status of the samples ( $9.412 \pm 3.72$ ) was observed among Upper lower class subjects. Whereas lowest level of palm length was depicted in lower class ( $7.757 \pm 0.82$ ) category. Therefore, a significant correlation was observed between palm length and Socio-economic status at  $p < 0.05$  (.019).

Table 3.3 - Palm Length (cm) BY SES Code Score:-

Socio Economic Status	Number of subjects	X ± σ (cm) Palm length	Significance P ≤ 0.05
Upper Class = 1	31	8.206 ± .44	.019
Upper Middle Class= 2	83	8.307 ± 1.34	
Lower Middle Class= 3	111	8.660 ± 2.12	
Upper Lower class = 4	83	9.412 ± 3.72	
Lower Class = 5	7	7.757 ± .82	
Total	315	8.701 ± 2.43	

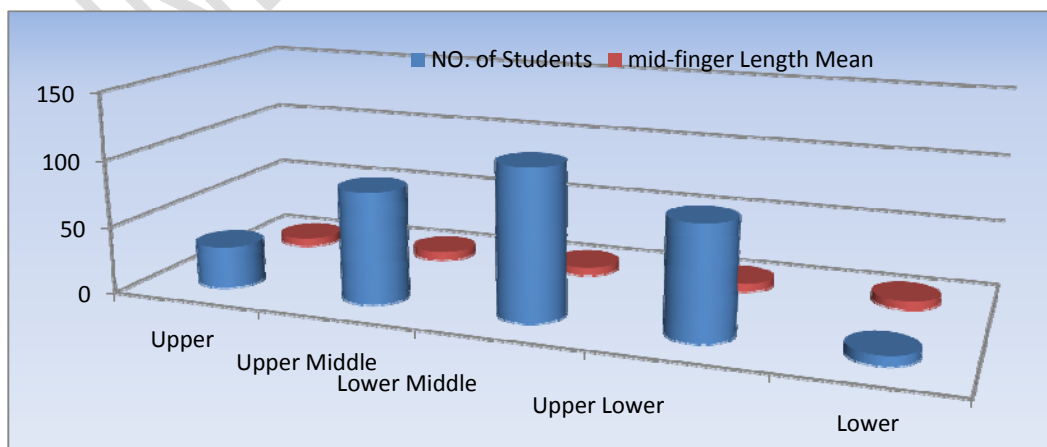


**Figure 3.3:- Comparison of Left Palm length of Subject with SES.**

As indicated in table 3.4 & fig 3.4, impact of SES on mid-finger length was observed to be maximum in lower middle class subjects. Although, higher treatment value ( $6.195 \pm 0.60$ ) of mid-finger length was found amongst the upper middle class. Alternatively, SES showed linear trend in mid-finger length of upper class ( $6.065 \pm 0.47$ ) and upper middle class ( $6.195 \pm 0.60$ ) and also lower class ( $5.700 \pm 0.34$ ) and upper lower class ( $5.873 \pm 0.39$ ). Hence a significant difference was noted between mid-length and SES at  $p < 0.05$  (.000).

**Table 3.4 – Mid-finger length (cm) BY SES Code Score:-**

Socio Economic Status	Number of students	$X \pm \sigma$ (cm) Mid-finger length	Significance $P \leq 0.05$
Upper Class = 1	31	$6.065 \pm .47$	.000
Upper Middle Class= 2	83	$6.195 \pm .60$	
Lower Middle Class= 3	111	$5.975 \pm .47$	
Upper Lower class = 4	83	$5.873 \pm .39$	
Lower Class = 5	7	$5.700 \pm .34$	
Total	315	$6.009 \pm .50$	



**Figure 3.4:- Comparison of mid-finger length of Subject with SES.**

#### 4. CONCLUSION

When measurements were compared with SES of the subjects, it was found that height, and palm length, showed statistically significant co-relation. Also, mid-finger length and foot length showed highly significant difference statistically when compared with SES. However, a positive correlation was observed among, different socio economic status in correlation to height at  $p < 0.05$  (.001). Further highly significant correlation was observed between foot length and socio economic status at  $p < 0.05$  (.000) and also, between mid-finger length and SES. Moreover, a significant correlation was observed between palm length and Socio-economic status at  $p < 0.05$  (0.019). Thus, it was concluded that, SES had great impact on the parameters of stature (Height) of an individual.

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