

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) of foot length, palm length and mid finger length on School going Children (Age:-8-10 years) in Mumbai city.

Study design: A survey research design was adopted for measurement and data collection. Foot length was analysed by Standardized measuring tape, Palm length and mid-finger length was analyzed by Calliper, Height (cm) was analysed by stadiometer. The unit of measurement used was centimetre (cm). SES was coded according to Kuppuswamy scale (2018).

Place and Duration of Study: The time span required to carry out study was from November to March 2018-2019 in Mumbai city.

Methodology: Total 319 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 between height and different socio economic status at $p < 0.05$ (.001). Maximum height was found among upper class (129.58 ± 6.88), further the lowest mean value of height (124.00 ± 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 ± 0.33), further the lowest mean value of foot length (1.0599 ± 0.40), was noted among the lower class and also, higher treatment value (6.195 ± 0.60) for mid-finger length was found amongst the upper middle class and lower treatment value amongst lower class (5.700 ± 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 ± 3.72) was observed among Upper lower class subjects, Whereas lowest level of palm length was depicted in lower class (7.757 ± 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 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). It 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).

The present study was an attempt to determine the effect of socio economic status on foot length, palm length and mid finger length in developing area of Mumbai, India. The foot length, palm length and mid finger length are major indicators for measuring height and even actually growth of an individual.

SES of an individual subjects were assessed by questionnaire, although data was individually extracted by the researcher so, chances of wrong data are less. The five classes of SES mentioned in study were upper class, upper middle class, lower middle class, upper lower class, lower class. Ethical committee approved this study and also consent of individual subject was taken in consideration.

2. METHODOLOGY:

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 319 subjects (male & female) participated from 5 different schools ranging from public to private category in Mumbai city, (Maharashtra, India). Children from selected schools, falling under the age 8-10 years (male & female) from grade 3 were selected by 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. Criteria for the scoring the question mentioned in questionnaire were Parents/Guardians Education, Profession and Family Income.

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. An inclusion criterion for study was the subjects between age group of 8-10 years and also both the genders have participated in study. Exclusion criteria for study was subjects less than 8 years and more than 10 years, also subjects with some kind of physical disability. Out of 392 individuals 319 agreed with questionnaire and shared the data so other subjects were excluded from the study.

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 number of subjects were found in lower middle class. Whereas the maximum height was found among upper class (129.58±6.88) cm, followed by upper lower class (126.56 ± 8.69) cm and lower middle class (126.35 ± 3.69) cm respectively. Further the lowest mean value of height (124.00 ± 6.34) cm 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	

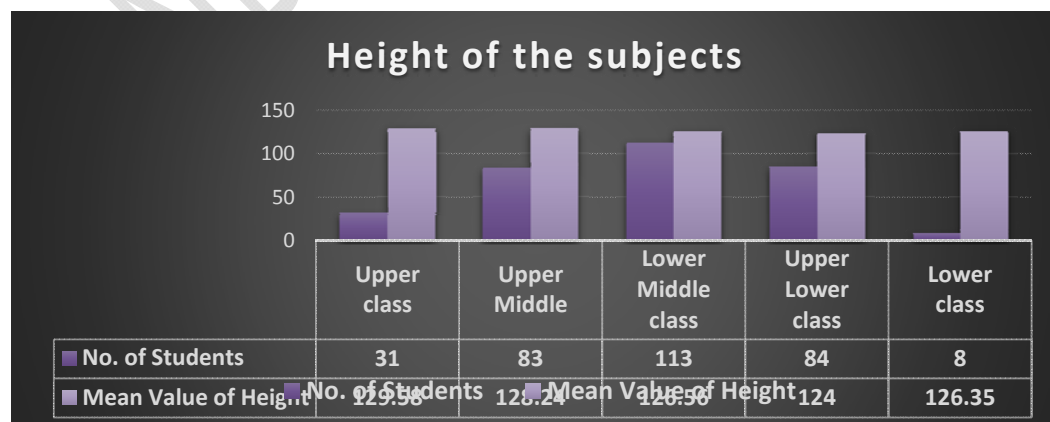


Figure 3.1:- Comparison of Height of Subject with SES.

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 ± 0.33), followed by lower middle class (2.6602 ± 0.25), upper middle class (1.8426 ± 0.20) and upper class (1.3504 ± 0.24) respectively. Further the lowest mean value of foot length (1.0599 ± 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 \pm σ (cm) Foot length	Significance P \leq 0.05
Upper Class = 1	31	1.3504 \pm .24	.000
Upper Middle Class= 2	83	1.8426 \pm .20	
Lower Middle Class= 3	113	2.6602 \pm .25	
Upper Lower class = 4	83	3.0287 \pm .33	
Lower Class = 5	9	1.0599 \pm .40	
Total	319	2.5302 \pm .14	

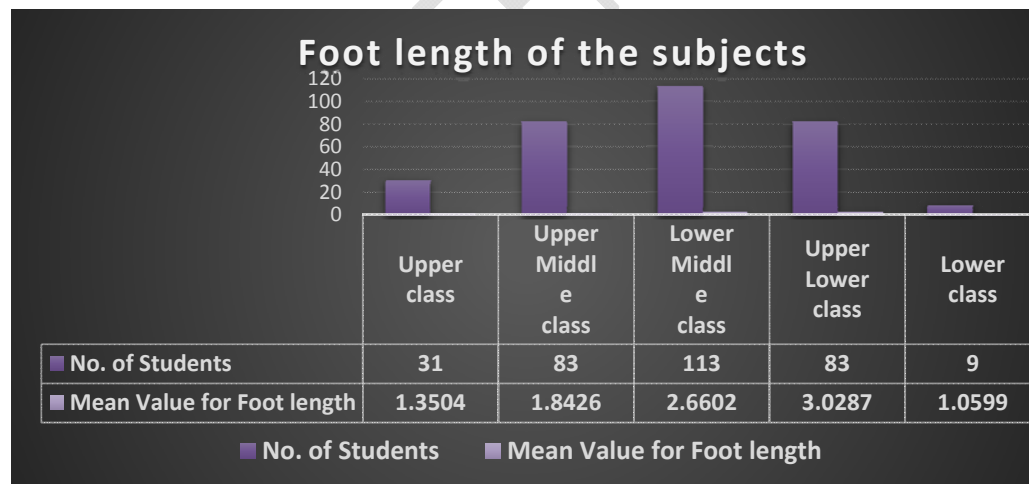


Figure 3.2:- Comparison of Foot length of Subject with SES.

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 level of the palm length to the Socio-economic status of the samples (9.412 ± 3.72) was observed among Upper lower class subjects. Whereas lowest level of palm length was depicted in lower class (7.757 ± 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	113	8.660 ± 2.12	
Upper Lower class = 4	83	9.412 ± 3.72	
Lower Class = 5	9	7.757 ± .82	
Total	319	8.701 ± 2.43	

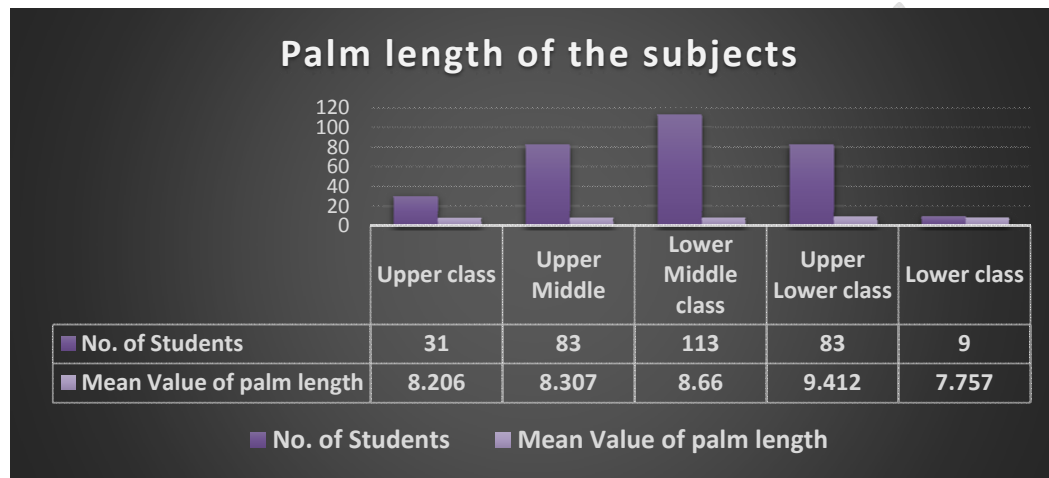


Figure 3.3:- Comparison of Left Palm length of Subject with SES.

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 ± 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 ± 0.47) and upper middle class (6.195 ± 0.60) and also lower class (5.700 ± 0.34) and upper lower class (5.873 ± 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 ± σ (cm) Mid-finger length	Significance P ≤ 0.05
Upper Class = 1	31	6.065 ± .47	.000
Upper Middle Class= 2	83	6.195 ± .60	
Lower Middle Class= 3	113	5.975 ± .47	
Upper Lower class = 4	83	5.873 ± .39	
Lower Class = 5	9	5.700 ± .34	
Total	319	6.009 ± .50	

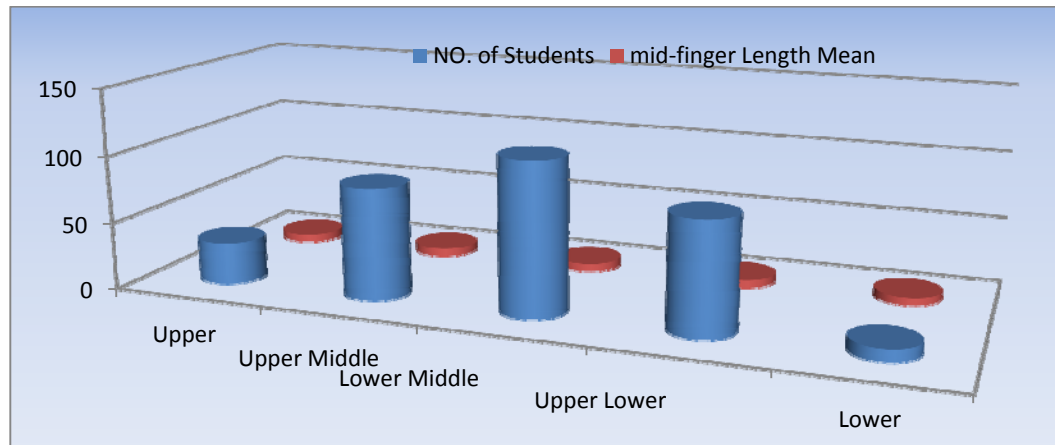


Figure 3.4:- Comparison of mid-finger length of Subject with SES.

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 **significant** impact on the parameters of stature (Height) of an individual.

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