Original Article

# A Study of Asymmetry in Foot Length in Adult Males



Syed Zia Uddin[1], Roman Ashraf[2], Sarba Khalid[3], Pervaiz Zarif[3] and Mazhar Murtaza[3]


## ABSTRACT

**Objective:** Aim of the study was to find any dissimilarity in right and left foot length.
**Study Design:** Cross-sectional study
**Place and Duration of Study:** This study was conducted at the Lahore General Hospital, Lahore and duration of study is Jan, 2020 to Dec, 2020 for period of one year.
**Materials and Methods:** Non-probability Convenience sampling technique was used in this study. Statistical analysis was done by using SPSS 23.
**Results:** Mean RFL was 26.12 cm and mean LFL was 26.10 cm. Mean difference in right and left foot length was 0.013 cm with p value 0.139 indicating statistically insignificant difference
**Conclusion:** This study will be beneficial to orthopedic and forensic departments

**Key Words:** RFL (right foot length), LFL (left foot length), Asymmetry, Lahore General Hospital

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## INTRODUCTION

Dissymmetry is an absence of mirror image of an organ or part of the body on both sides of the body[1]. Human foot is one of the organs and parts of the body which shows dissimilarity in its length and other dimensions on both sides of the body. This variation in size differs not only in different ethnicities but also in different ages[2]. It may be due to combined impact of heredity, cultural, social and climatic factors[3]. Same physical factors affecting on movements of different individuals result in different levels of dissymmetry. Right sided dissymmetry is more noticeable in arms[4]. Dissymmetry of organs or part of body has been studied a lot. Many authors say that right foot length is more than left one[5,6]. Some of the studies show that LFL is more than RFL[7,8,9]. Mean foot length of males was more than that of females. LFL is more than RFL in both sexes[10]. A study has shown that there is a significantly higher mean value of foot length and foot breadth in males than females[5]. Litrature review is silent with respect to work on this topic in Pakistan.

[1.] Al-Aleem Medical College, Lahore.
[2.] Lahore Medical and Dental College, Lahore.
[3.] PGMI, Lahore.

Correspondence: Dr. Muhammad Asif, Assistant Professor, Sialkot Medical College, Sialkot.
Contact No: 0333-4272575
Email: drasif_hameed@hotmail.com

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## MATERIALS AND METHODS

It is cross-sectional study in nature conducted in Lahore General Hospital, Lahore and duration of the study is Jan-Dec 2020. A 200 sample size was taken of men with age between 20-25 years. Non-probability convenience sampling technique was used. Informed consent was taken. Every person was requested to show N.I.D., to confirm stated age. Both feet length was taken. Samples were asked to place their feet turn by turn on wooden board with steel scale fixed on its floor Distance between tip of the maximum projected portion of back of foot to the maximum forward projected portion at first toe was taken by measuring tape. Length was measured from most posterior part of heel to the tip of big toe after cutting the nail where required. Statistical Analysis was done by using SPSS 21.

## RESULTS

Mean RFL was 26.12 cm and mean LFL was 26.10 cm. Mean difference in right and left foot length was 0.013 cm with p value 0.139 indicating statistically insignificant difference.

Data was gathered, arranged and put in to SPSS version 23. After collection of data, it was subjected to statistical analysis using Statistical Package for the Social sciences (SPSS) version 21.

**Descriptive statistics of RFL and LFL:** Minimum RFL and LFL is 23.00 cm. Maximum right foot length is 30.00 cm. Mean right foot length is 26.12 cm. The standard deviation is 1.44. Mean LFL is 26.10 cm. Maximum LFL is 30.00 cm. Minimum LFL is 23.00 cm. The standard deviation of left foot length is 1.44. As shown in table 1.

**Table No.1: Paired difference between RFL and LFL**

| Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | upper | T | Df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| | | | lower | | | | | |
| 0.013 | 0.1404 | 0.0091 | -.0044 | | 0.03157 | 1.48 | 199 | 0.139 |

**Table No 2:** Descriptive Statistics of RFL and LFL.

| | **Minimum** | **Maximum** | **Mean** | **Std. Deviation** |
|---|---|---|---|---|
| RFL | 23.00 | 30.00 | 26.122 | 1.443 |
| LFL | 23.00 | 30.00 | 26.108 | 1.445 |

In this study, there is the difference in mean lengths of right and left foot. Mean right foot length (26.122 cm) is more than mean left foot length(26.108 cm). Difference between mean length of right and left foot was 0.013 cm with an insignificant p-value (> 0.05). 0.139 was value of p which is more than 0.05 not rejecting the null hypothesis that there is no significant difference between right and left foot length. It means that difference between lengths of feet is not statistically significant. This is consistent with the studies which were carried out by different researchers as depicted in table 3. Various researches carried out in different areas of the world has denoted that average length of the right foot was greater than that on opposite side. Contrary to this a few other studies has shown opposite results. The current study also belongs to the second type of studies which are summerized in table no 4.

**Table No. 3: Difference between feet lengths**

| **Sr#** | **Researcher** | **Country** | **Mean RFL** | **Mean LFL** |
|---|---|---|---|---|
| 1 | Bharati et al.[14] | Karnataka India | 23.37 | 23.18 |
| 2 | Agarwal et al.[15] | India | 24.94 | 24.93 |
| 3 | Jakhar et al.[16] | India | 25.445 | 25.442 |
| 4 | This study | Punjab, Pakistan | 26.05 | 26.04 |
| 5 | Ewunonu et al.[5] | Nigeria | 26.40 | 26.28 |

**Table No. 4: Difference between feet lengths**

| **Sr#** | **Researcher** | **Country** | **Mean RFL** | **Mean LFL** |
|---|---|---|---|---|
| 1 | Hemy et al.[13] | Western Australia | 27.34 | 27.42 |
| 2 | Abhilasha1, Ajitpal Singh[17] | India | 26.71 | 26.64 |
| 3 | Zhao X et al.[18] | Japan | 24.24 | 24.18 |

# DISCUSSION

Although the current study shows negligible difference between feet length yet a study carried out in Egypt has denoted large difference between feet length [6]. One of the reasons leading to this difference was due to over utilization of certain foot[11]. Another reason may be when during upbringing a person is repeatedly affected by diseases [12]. When a person goes on over utilizing a certain foot than the other the gap between both feet lengths also enlarges [13].

In a study it was found that mean foot length in Nigerian males was more than the feet length of individuals living in advance countries. As Nigeria is hotter than most of the advanced countries so the people will have to lose additional heat [19].

# CONCLUSION

This study resulted that there is no statistically significant difference between right and left foot length. It will not only give information about normal asymmetry in organs and parts of body but will also help in orthopedic and forensic departments. It will also save the time of future scholars in studying both feet length. Shoe making may also be benefited by this study.

**Author's Contribution:**

| | |
|---|---|
| Concept & Design of Study: | Syed Zia Uddin |
| Drafting: | Roman Ashraf, Sarba Khalid |
| Data Analysis: | Pervaiz Zarif, Mazhar Murtaza |
| Revisiting Critically: | Syed Zia Uddin, Roman Ashraf |
| Final Approval of version: | Syed Zia Uddin |

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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