

## Interphalangeal Hair Distribution on the Hands and Feet in Relation to Age, Job Type and Gender amongst the Effiks and Ibibios of South Nigeria

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**Abstract:** The aim of this study was to ascertain the influence of differences in age, job type and gender on distribution of interphalangeal hair of the Effiks in comparison to the Ibibios using 500 subjects comprising 250 Effiks and 250 Ibibios aged 18-40 years. With the aid of a hand lens, the pattern and frequency of hair distribution on the proximal, middle and distal phalanges were examined. Proximal phalangeal hair on the hand was absent in 40 (16%) Effiks and 35 (14%) Ibibios while, hair on the toes was absent in 35 (14%) Effiks and 55 (22%) Ibibios. The highest frequency hair distribution on the hands of the Effiks was 28% on finger pattern 2-3-4 of proximal phalanges while the least was found in finger patterns 1-2, 1-2-3-4, 2-3-5, 2-4-5 and 4-5, having 2% each. For the toes, the highest frequency hair distribution was 26% on toe pattern 1-2-3-4 while the least was 2% on toe patterns 1-3-4 and 1-4. The highest frequency hair distribution on the hands of the Ibibios was 30% on finger pattern 2-3-4 on proximal phalanges while the least was 2% in finger patterns 2-3, 3, 3-4-5 and 4-5. For their toes, the highest frequency hair distribution was 22% in toe pattern 1-2-3-4-5 and least frequent in toe patterns 1-2, 2, 2-3 and 3 with 2% each. Middle phalangeal hair was present in only one subject (a male Ibibio) of the entire population. Hair was absent on the distal phalanges. Age was not a factor in the distribution but individual's sex and job type had effect on hair distribution on the phalanges.

**Keywords:** Effik, foot, hand, ibibio, interphalangeal hair

### INTRODUCTION

Most primates especially mammals have hairs. In some of the mammals it covers almost entire body surface (Jungueira and Carneiro, 2005) while in some it is concentrated in particular parts of the body. Each hair grows from hair follicle as a soft substance that hardens as it arises up and out into the hair shaft. The hair shaft is mainly composed of a protein called keratin (about 88%). The hair consists of epithelial cells arranged in three layers; Medulla, Cortex and Cuticle (Moore and Dalley, 2006; Woloch, 2007). In man the distribution and form varies from one part of the body to another. It is densely concentrated in the scalp, sparse in the limbs and absent in the sole of foot, palm of hand and buccal surface of the lips. Hairs can be straight, helical or wavy with different colors depending on the degree and type of pigmentation.

Hair is a derivative of the epidermis and assists in thermoregulation; it provides some protection against injury (Harrison and Davies, 1999). It transmits sensory information and is a huge part of our general appearance. It provides coloration because it is pigmented. It is used for diagnostic purposes (Szalai *et al.*, 1999).

Phalanges, which are the bones of the fingers and toes (digits) are 14 in number; 3 for each digit and 2 for the thumb and big toe. Each phalanx has a base proximally, a shaft (body) and a head distally. The

proximal phalanges are the largest, the middle ones are intermediate in size and the distal ones are the smallest. The shafts of the phalanges taper distally. The distal phalanges are flattened and expanded at their tail ends, which underlie the nail bed. The phalanges of the first digit are stouter, short and broad than those in other fingers (Moore and Dalley, 2006)

Interphalangeal hairs are concentrated on particular areas of the phalanx and may be influenced by certain factors such as gene and environment (Williams *et al.*, 2005). Hairs show wide variations with apparent familial and racial tendencies in their distribution on the dorsal surfaces of proximal, middle and distal phalanges (Nasir *et al.*, 1995).

"Ibio-ibio" means short or brief but does not have anything to do with the height of the Ibibios. The name was given due to their brief way of doing things (Noah, 1988) is also known as Moco or Moko during salvery. Ibibio is the largest ethnic group in Akwa Ibom state (with the other two being Annang and Oron), lies between latitudes 4°32' and 5°33' North and longitudes 7°25' and 8°25' East. Located just north of the equator and within the humid tropics and generally humid due to its proximity to the sea. Geographically, the climate of Ibibio (Akwa Ibom State) is a tropical rain forest which experiences abundant rainfall with very high temperatures. It is marked by two distinct seasons, the rainy and dry seasons. The climate of the state allows for favorable cultivation and extraction of agricultural

and forest products such as cassava, palm produce, yam, plantain, maize, banana, rubber, timber, cocoa and rice. The soil is also a host to a number of mineral resources such as salt, limestone, clay, coal, sliver nitrate and glass sand found in commercial quantity (Akwa Ibom State Government Online, 2008).

On the other hand Efik is one of the three major ethnic groups found in Cross Rivers State (with the other two being Bekwarra and Ejagham). It lies between latitudes 5°32' and 4°27' North, 7°50' and 9°28' East, situated in the tropical rainforest belt. The climate of Efik (Cross River State) is tropical-humid with wet and dry seasons, average temperatures ranging between 15-30°C and the annual rainfall between 1300-3000 mm. The main crops are cassava, maize, yam, palm produce, plantain, banana, cocoa, cocoyam, rubber, groundnut and timber. Due to the coastal mangroves, the people are also engaged in fishing (About Cross River State, 2010). Forty percent of the population constitutes the active population that is engaged in various economic activities; ranging from subsistence agriculture to urban commerce and transport business (Cross River State Government, 2004).

In this study the variations in hair distribution pattern is examined to determine whether the variations due to sex, age and job types is significant and observe the difference in both ethnic groups.

## **MATERIALS AND METHODS**

The distribution of interphalangeal hair on the upper and lower limbs was studied in June 2011 among the Ibibio and Efik ethnic groups in Akwa Ibom and Cross River States respectively, Southern Nigeria. Five hundred subjects comprising two hundred and fifty Ibibios and two hundred and fifty Efiks between the ages of 18-40 years were selected randomly with both parents and the four grandparents coming from the same ethnic group. Those with any kind of skin diseases were excluded from this study. A hand lens, digital camera and writing pad were used.

The subjects placed their palms on a flat surface and then, stood upright with their feet together, in order to view the hairs on the dorsum of the hands and feet and pictures were taken with the digital camera. With the use hand lens, hairs were viewed directly on the different phalanges and being magnified; counting of hairs was made easy. Observations were made with good lighting for avoidance of mistakes and inaccuracy of data collection. The presence or absence of hair over each phalanx of the hands and feet, sex, job type and tribe (whether Ibibio or Efik) of each subject studied was recorded.

Interphalangeal hair distribution for the upper limb was divided into different groups for the proximal, middle and distal phalanges as below for easy analysis:

- Proximal phalangeal hair:
  - Those with hair on the 1<sup>st</sup> and 2<sup>nd</sup> fingers
  - Those with hair on the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> fingers
  - Those with hair on the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> fingers
  - Those with hair on the 2<sup>nd</sup> and 3<sup>rd</sup> fingers
  - Those with hair on the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> fingers
  - Those with hair on the 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> fingers
  - Those with hair on the 2<sup>nd</sup>, 4<sup>th</sup> and 5<sup>th</sup> fingers
  - Those with hair on the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> fingers
  - Those with hair on only the 3<sup>rd</sup> finger
  - Those with hair on the 3<sup>rd</sup> and 4<sup>th</sup> fingers
  - Those with hair on the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> fingers
  - Those with hair on the 4<sup>th</sup> and 5<sup>th</sup> fingers
  - Those without hair
- Middle phalangeal hair:
  - Those with hair on the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> fingers
- Distal phalangeal hair:
  - None

For the lower limb, hair distribution on the phalanges was divided into fourteen groups:

- Those with hair on the 1<sup>st</sup> toe only
- Those with hair on the 1<sup>st</sup> and 2<sup>nd</sup> toes
- Those with hair on the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> toes
- Those with hair on the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> toes
- Those with hair on the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> toes
- Those with hair on the 1<sup>st</sup> and 3<sup>rd</sup> toes
- Those with hair on the 1<sup>st</sup>, 3<sup>rd</sup> and 4<sup>th</sup> toes
- Those with hair on the 1<sup>st</sup> and 4<sup>th</sup> toes
- Those with hair on the 2<sup>nd</sup> toes only
- Those with hair on the 2<sup>nd</sup> and 3<sup>rd</sup> toes
- Those with hair on the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> toes
- Those with hair on the 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> toes
- Those with hair on the 3<sup>rd</sup> toes only
- Those without hair

Each digit is assigned a number:

- Thumb-1
- Index finger-2
- Middle finger-3
- Ring finger-4
- Little finger-5

Same is applied to the toes beginning from the big toe.

## **RESULTS**

There were observable variations in the distribution of hair on the phalanges of the Efiks and Ibibios. The Table 1 shows the result.

Result from Table 1 shows that groups 1 (1-2), 2 (1-2-3-4), 6 (2-3-5), 11 (3-4-5) and 12 (4-5) had the smallest percentages, 2% each. Group 5 (2-3-4) had the

Table 1: Hair distribution pattern on the fingers in efiks according to job type and sex

S/N	Finger pattern	Total	(%)	Males	Females	Students	Office worker	Field worker
Proximal phalangeal hair								
1	1-2	05	2	05	-	02	02	01
2	1-2-3-4	05	2	03	02	03	01	01
3	1-2-3-4-5	15	6	10	05	10	02	03
4	2-3	10	4	06	04	05	03	02
5	2-3-4	70	28	45	25	50	10	10
6	2-3-5	05	2	03	02	05	-	-
7	2-4-5	10	4	05	05	06	02	02
8	2-3-4-5	60	24	40	20	40	15	05
9	3	10	4	02	08	-	03	07
10	3-4	10	4	04	06	04	04	02
11	3-4-5	05	2	02	03	01	01	03
12	4-5	05	2	03	02	02	02	01
13	Without hair	40	16	15	25	03	07	30
Middle phalangeal hair								
14	3-4-5	01	0.4	01	-	01	-	-
Distal phalangeal hair								
15	-	-	-	-	-	-	-	-
Total		250	100	143	107	131	52	67

Table 2: Hair distribution pattern on the fingers in ibibios according to job type and sex

S/N	Finger pattern	Total	(%)	Males	Females	Students	Office worker	Field worker
Proximal phalangeal hair								
1	1-2	-	-	-	-	-	-	-
2	1-2-3-4	10	4	05	05	05	03	02
3	1-2-3-4-5	25	10	15	10	15	05	05
4	2-3	05	2	03	02	03	01	01
5	2-3-4	75	30	50	25	60	06	09
6	2-3-5	15	6	10	05	06	04	05
7	2-4-5	15	6	08	07	04	04	07
8	2-3-4-5	55	22	40	15	45	02	08
9	3	05	2	-	05	05	-	-
10	3-4	-	-	-	-	-	-	-
11	3-4-5	05	2	01	04	02	02	01
12	4-5	05	2	02	03	01	02	02
13	Without hair	35	14	20	15	05	05	25
Middle phalangeal hair								
14	-	-	-	-	-	-	-	-
Distal phalangeal hair								
15	-	-	-	-	-	-	-	-
Total		250	100	154	96	151	34	65

Table 3: Hair distribution pattern on the toes in efiks according to job type and sex

S/N	Toe pattern	Total	(%)	Males	Females	Students	Office worker	Field worker
1	1	35	14	20	15	15	5	15
2	1-2	10	4	5	5	5	-	5
3	1-2-3	30	12	20	10	20	10	-
4	1-2-3-4	65	26	35	30	35	5	25
5	1-2-3-4-5	45	18	30	15	10	15	20
6	1-3	10	4	10	-	1	4	5
7	1-3-4	5	2	5	-	2	1	2
8	1-4	5	2	-	5	-	3	2
9	2	-	-	-	-	-	-	-
10	2-3	-	-	-	-	-	-	-
11	2-3-4	10	4	10	-	2	4	4
12	2-3-4-5	-	-	-	-	-	-	-
13	3	-	-	-	-	-	-	-
14	Without hair	35	14	20	15	5	10	20
Total		250	100	155	95	95	57	98

highest percentage, 28%. Sixteen percent of the Ibibio population had no hair on the proximal phalanges while 0.4% had hair on the middle phalanges.

Result in Table 2 shows that groups 4 (2-3), 9 (3), 11 (3-4-5) and 12 (4-5) had the smallest percentages of hair distribution, 2% each. Group 5 with hairs on 2-3-4

Table 4: Hair distribution pattern on the toes in ibibios according to job type and sex

S/N	Toe pattern	Total	(%)	Males	Females	Students	Office worker	Field worker
1	1	15	6	5	10	5	5	5
2	1-2	5	2	-	5	1	2	2
3	1-2-3	40	16	15	25	6	16	18
4	1-2-3-4	45	18	30	15	12	8	25
5	1-2-3-4-5	55	22	40	15	20	25	10
6	1-3	-	-	-	-	-	-	-
7	1-3-4	-	-	-	-	-	-	-
8	1-4	-	-	-	-	-	-	-
9	2	5	2	5	-	2	-	3
10	2-3	5	2	-	5	3	1	1
11	2-3-4	10	4	5	5	4	2	4
12	2-3-4-5	10	4	10	-	5	4	1
13	3	5	2	-	5	1	3	1
14	Without hair	55	22	30	25	7	12	36
Total		250	100	140	110	66	78	106

Table 5: Variation in density of interphalangeal hair distribution on the upper and lower limbs in both ethnic groups

Density	Total (%)	Efiks (%)	Ibibios (%)
Full	85 (17)	35 (14)	45 (18)
Moderate	150 (30)	80 (32)	70 (28)
Scanty	175 (35)	85 (34)	95 (38)
No hair	90 (18)	50 (20)	40 (16)
Total	500 (100)	250 (100)	250 (100)

Table 6: Variation of hair distribution on the right and left hands in both ethnic groups

Group	Total (%)	Efiks (%)	Ibibios (%)
Right>left	125 (25)	55 (22)	65 (26)
Left>right	225 (45)	115 (46)	110 (44)
Right = left	150 (30)	80 (32)	75 (30)
Total	500 (100)	250 (100)	250 (100)

fingers had the highest percentage, 30%. Fourteen percent of the Ibibio population had no hair on the proximal phalanges and no hair on the middle phalanges. Hair was absent on the distal phalanges of all subjects in both ethnic groups.

Result in Table 3 shows that those with hair on 1-2-3-4 toes had the highest percentage, 26%. Those with toe hair pattern 1-3-4 and 1-4 had the least percentage, 2% each.

Result in Table 4 shows that hairs on toe pattern 1-2-3-4-5 and those without hair had the highest percentage, 22%. The least percentage is seen in those with toe hair patterns 1-2, 2, 2-3 and 3.

Result in Table 5 shows that those with scanty hair had the highest percentage and those with full hair had the lowest percentage.

Result in Table 6 shows that a greater percentage of the subjects had more hairs on their left hand than the right hand.

Result in Table 7 and 8 shows that those with hair on both fingers and toes were more than the other groups.

## DISCUSSION

The distribution of hair on the phalanges of the hand shows that, most individuals have hair on their proximal phalanx and none on the distal phalanx

(Batmiriam, 1962; Dutta, 1963; Hatiboglu, 1983). Hair distribution on the middle phalanx was seen in only one subject of the entire population and this finding is consistent with observation from a previous study carried out among Yoruba's in Nigeria (Olabiyi *et al.*, 2008; Onyije and Oyinbo, 2011 ). Jean *et al.* (2007) found out that, more phalangeal hair exists at the dorsal view than other sides. Similar results are obtained from this study with the males, having more proximal phalangeal hair distribution than the females (Singh, 1982). The higher frequency of hair distribution in males may be attributed to greater involvement of the females in domestic work like, washing in this part of the world. These activities may destroy hairs and make it become sparse in number.

The most common type of hair pattern in the population was the 2-3-4 finger pattern while the least was finger pattern 3-4-5 and 4-5 (Table 1 and 2). The subject with the middle phalangeal hair actually fell under the group with proximal phalangeal finger hair pattern 1-2-3-4-5. The most common toe pattern was the 1-2-3-4 pattern and the least common was found in toe patterns 1-3-4 and 1-4 (Table 3) and 1-2, 2, 2-3 and 3 patterns (Table 4). The presence or absence of hair on the phalanges is affected by genetic endowment and job type (Uter, 1999).

It was observed that, there was variation in the density of interphalangeal hair distribution. Some subjects had scanty, some moderate, some full and others, no hair at all on their phalanges in both the upper and lower limbs (Table 5). Those with scanty hair had the highest percentage (35%) while those with full hair had the lowest percentage (17%). The density of hair on the left hand (45%) was more than that on the right hand (25%). This may be due to the fact that, more people use the right hand than the left (Dharap, 1995).

There was no significant difference in the distribution of interphalangeal hair in relation to age in this research though; teenagers and older people appeared to have higher number of hairs than the intermediate. This could be explained on the basis of less usage. The former are people of school age and the later are more elderly people who do less work

Table 7: Interphalangeal hair distribution on the upper (fingers) and lower (toes) limbs in ibibios

Sex	Hairs on both fingers and toes (%)	Hairs on only fingers (%)	Hairs on only toes (%)	Without hair on both fingers and toes (%)
Males	65 (26.0)	25 (10.0)	23 (19.2)	20 (8.0)
Females	44 (17.6)	27 (10.8)	31 (12.4)	15 (6.0)
Total	109 (43.6)	52 (20.8)	54 (21.6)	35 (14.0)

Table 8: Interphalangeal hair distribution on the upper (fingers) and lower (toes) limbs in efiks

Sex	Hairs on both fingers and toes (%)	Hairs on only fingers (%)	Hairs on only toes (%)	Without hair on both fingers and toes (%)
Males	60 (24.0)	18 (7.2)	26 (10.4)	30 (12.0)
Females	52 (20.8)	24 (9.6)	15 (6.0)	25 (10.0)
Total	112 (44.8)	42 (16.8)	41 (16.4)	55 (22.0)

(especially wet works). Thus, the hairs on their phalanges are not exposed to wear and tear.

In both ethnic groups, those who had hair on both fingers and toes were more than those who had hair on only fingers, only toes and without hair on both fingers and toes (Table 7 and 8).

The significant variation in the presence of hair on the phalanges of office and field workers, with a higher number among office workers suggest that, field workers example; fishermen and hair dressers, are exposed to labor which destroys phalangeal hair especially, if the individual had been on the job for a long period of time.

The result of this study indicates that, those with proximal phalangeal hair was more (499 subjects, 99.8%) and had the highest percentage than those with middle phalangeal hair (1 subject, 0.2%). Hair on the distal phalanges was not found in the entire population. This result is similar to that of other populations especially, the Yorubas (Olabiyi *et al.*, 2008; Jung *et al.*, 2001; Mbajiorgu *et al.*, 1996; Parmar, 1968; Saldanha and Guinsburg, 1961).

The climate of Cross River and Akwa Ibom States where the Efiks and Ibibios predominantly reside is the same. They both have tropical-humid climate marked by rainy and dry seasons. Thus, climate does not have any significant effect on interphalangeal hair distribution in both ethnic groups.

### CONCLUSION

There were variations in hair distribution pattern. About 14 different finger and toe patterns were recorded in this study. There were also variations due to sex and job types with no significant variation in age.

Efik and Ibibio ethnic groups showed significant variation of hair distribution in different phalanges in both sexes and work type but no observable difference in both ethnic groups. This suggests that, they are genetically related with no climatic difference because; they both have the same type of climate.

### RECOMMENDATIONS

Interphalangeal hair distribution is relevant in many areas such as; evaluating racial differences,

medicolegal jurisprudence and in disease diagnosis. Hence, since the distribution of hair on the phalanges of Efik and Ibibio persons was carefully studied and understood, it would proffer a wide range of possibilities in the identification of the people from the various ethnic groups.

From this study, it is recommended that field workers should put on hand gloves during working hours to protect the hair on their phalanges, which are important receptors in the body (Harrison and Davies, 1999). Both field and office workers should be careful in handling chemicals like spray paint, liquid petroleum products, antiseptics, pesticides and reagents while in office or even at home (WHO, 1984; Babatunde, 2001; Oyedumade, 2001). Only prescribed types of detergent and soap should be used for washing especially for domestic purposes (Akinsola, 2006).

Nigeria, a multi-ethnic nation with over 350 ethnic groups, is the most populous country in Africa. Therefore, it may not be appropriate to use the data of a particular ethnic group, in determining the distribution of interphalangeal hair in Nigeria. As such, research should be done on other ethnic groups that have not been reported, in view of establishing a general hair distribution pattern for Nigerians.

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