

Phalangeal Hair Distribution and Direction in Three Ethnic Groups Living in the Republic of Turkey

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KEY WORDS Hair. Phalanges. Hand.

ABSTRACT Direction and the pattern of hair distribution were observed on the dorsum of phalanges of both hands in three different ethnic groups living in the Republic of Turkey viz., Tartars, Albanians and Gypsies. Significant differences were observed among these groups and they were found to show similarities with the western populations more than the Turks.

INTRODUCTION

Study of distribution and pattern of hair on body surface imparts enough understanding of racial and genetic background of the individual. The first study on the distribution of the phalangeal hair of hands was carried out by Danforth (1921). Since then, many investigators have been interested in racial differences in the distribution of hair over phalanges (Saldanha and Guinsburg, 1961; Dutta, 1965; Brothwell and Mollenson, 1965; Tiwari and Bhasin, 1969; Singh, 1982; Hatiboğlu, 1983; Sinha et al., 1984). In some studies differences were found among various ethnic groups, especially in the hair distribution and hair direction of middle phalanges (Danforth, 1921; Bernstein and Burks, 1942; Bernstein, 1949; Boyd, 1950; Garn, 1951; Büchi, 1954; Matsunaga et al., 1956; Saldanha and Guinsberg, 1961; Ganguly and Pal, 1963; Dutta, 1964; Brothwell and Molleson, 1965; Bhasin, 1967; Tiwari and Bhasin, 1967; Sethurman et al., 1982; Hatiboğlu, 1983; Sinha et al., 1984; Vona and Porcella, 1984).

Besides the evaluation of racial differences,

such studies on the phalangeal hair directions and distributions could be useful for identification of isolated fingers in forensic medicine (Roger, 1962).

In this paper phalangeal hair distribution and hair direction of both hands were studied in three ethnic groups living in The Republic of Turkey, viz., Tartars, Albanians and Gypsies.

SUBJECTS AND METHODS

The total sample consisted of 740 subjects (393 males and 347 females) of which 281 Tartars, 169 Gypsies and 290 Albanians.

The observation was done under daylight by using a hand lens. The distribution of hair was assigned as; +:1-4, ++:5-8, +++:9-12 and ++++:13 and over 13 hair as in Sinha's study (Sinha, 1984). Direction of hair was also recorded as ulnar (directed to medial side), vertical (directed downwards) and radial (directed to lateral side) in true sense of anatomical position as described in standard text books of anatomy. Chi-square and Mantel-Haenszel techniques were used for statistical analysis.

RESULTS AND DISCUSSION

Comparison Between Sexes

In some investigations hair occurrences on the fingers, especially over the middle phalanges shows significant differences between the sexes (Saldanha and Guinsburg, 1961). In this study there were no appreciable differences between males and females when the proximal and middle phalangeal hair distribution and direction of each finger were studied separately.

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ly in both hands in Tartars as well as Albanians, but such differences were observed among Gypsies; on the left hand hair concentration over the proximal phalanges was higher on little and ring fingers in male subjects, but higher on middle finger in females (Table 1). Over the middle phalanges of the left hand both over the proximal and the middle phalanges there were no differences in the hair distribution in both sexes.

When the phalanges hair direction were investigated, on the left hand no significant differences were observed in ulnar directed hair over the proximal phalanges. Vertically directed hair was higher over little, ring and middle fingers in female subjects when compared to male subjects (Table 2). On the right hand vertically directed hair over the proximal phalanges were higher on little, ring and middle fingers in females, but higher on index fingers in male subjects when compared to the other fingers (Table 3).

Both in left and right hands no difference was observed in hair directions on the middle phalanges between the two sexes.

Comparison of the Fingers with Each Other

In all three ethnic groups investigated in this study fingers were compared with each other in both hands for hair distribution and directions.

Hair concentration over the proximal phalanges in both hands was higher on all fingers except the thumb in the three ethnic groups. On the thumb it was significantly lower ($P < 0.001$) (Table 4). Setty also found that hair concentration on the fingers at the lateral side of the hand was lower, probably because of the external effects (Setty, 1966).

In Tartar and Gypsy populations hair concentration over the middle phalanges of the right hand showed no significant differences between the fingers. When Albanian population was considered hair concentration over middle phalanges was found higher on the ring and middle fingers when compared with the other fingers ($P < 0.001$) (Table 3). On the left hand

Table 1: Distribution of hair on proximal phalanges of left hand in Gypsies

Left hand	+			++			+++			++++		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
Little Finger	3 (3.75)	4 (4.48)	7 (4.13)	7 (8.75)	5 (5.6)	12 (7)	4 (4.42)	12 (15)	16 (9.4)	55 (68.7)	76 (85.1)	131 (77.2)
Ring Finger	4 (5)	1 (1.12)	5 (2.95)	5 (6.25)	-	5 (2.95)	2 (2.24)	9 (11.25)	11 (6.49)	61 (76.3)	86 (96.3)	147 (86.7)
Middle Finger	5 (6.25)	-	5 (2.95)	3 (3.75)	4 (4.48)	7 (4.13)	17 (19)	7 (8.75)	24 (14.16)	63 (78.75)	68 (76)	131 (77.2)
Index Finger	17 (21.25)	13 (14.5)	30 (17.7)	7 (8.75)	3 (3.36)	10 (5.9)	5 (5.6)	8 (10)	13 (7.6)	45 (56.2)	68 (76)	113 (66.6)
Thumb	24 (30)	20 (22.4)	44 (25.9)	10 (12.5)	3 (3.36)	13 (7.6)	2 (2.24)	5 (6.25)	7 (4.13)	8 (4.7)	31 (34.7)	39 (23)

Figures in parentheses indicate percentage

Table 2 : Direction of hair on proximal phalanges of left hand in Gypsies

Left hand	Ulnar			Vertical			Radial		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
Little finger	56 (70)	84 (94)	140 (82.6)	21 (26.25)	4 (4.48)	25 (14.7)	-	-	1(1.12)
Ring finger	54 (67.5)	81 (90.7)	135 (79.6)	25 (31.25)	7 (7.8)	32 (18.8)	-	-	1(1.12)
Middle finger	53(66.25)	76 (85.1)	129 (76.1)	25 (31.25)	12 (13.4)	37 (20.8)	-	-	1(1.12)
Index finger	22 (27.5)	28 (31.3)	50 (29.5)	50 (62.5)	54 (60.4)	104 (61.3)	5 (6.25)	7(7.84)	12 (7)
Thumb	-	2 (2.24)	2 (1.18)	20 (25)	18(20.16)	38 (22.4)	27 (33.7)	36(40.3)	63 (37.1)

Figures in parentheses indicate percentage

Table 3 : Direction of hair on proximal phalanges of right hand in Gypsies

Left hand	Ulnar			Vertical			Radial		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
Little finger	57(71.25)	86 (96.3)	143 (84.3)	21 (26.2)	1 (1.12)	22 (12.9)	-	-	1(1.12)
Ring finger	56 (70)	83 (92.4)	139 (82)	21 (26.2)	5 (5.6)	26 (15.3)	-	-	1(1.12)
Middle finger	50 (62.5)	79 (88.4)	129 (76.1)	28 (35)	10 (11.2)	38 (22.4)	-	-	-
Index finger	28 (35)	37 (41.4)	65 (38.3)	50 (37.5)	49 (54.8)	99 (58.4)	-	-	2(2.24)
Thumb	2 (2.5)	2 (2.24)	4 (2.36)	19 (23.7)	20 (22.4)	39 (23)	1 (1.25)	30(33.6)	31(18.29)

Figures in parentheses indicate percentage

Table 4 : Hair distribution in proximal phalanges of right hand

<i>Right hand</i>	+		++		+++		++++		<i>Total</i>
<i>Tartars</i>									
Little finger	15	(5.4)	9	(3.2)	13	(4.7)	236	(86.4)	273
Ring finger	10	(3.7)	2	(0.7)	18	(6.7)	237	(88.7)	267
Middle finger	4	(1.4)	17	(6.3)	13	(4.8)	233	(87.2)	267
Index finger	17	(6.4)	15	(5.7)	19	(7.2)	211	(80.5)	262
Thumb	51	(26.2)	32	(16.4)	19	(9.7)	92	(47.4)	194
<i>Albanians</i>									
Little finger	2	(0.6)	5	(1.7)	10	(3.4)	270	(94)	287
Ring finger	3	(1)	2	(0.7)	4	(1.4)	280	(96.8)	289
Middle finger	4	(1.3)	1	(0.3)	4	(1.4)	280	(96.8)	289
Index finger	6	(12.4)	1	(0.3)	13	(4.5)	268	(93)	288
Thumb	49	(21)	18	(7.6)	33	(14.1)	134	(57.2)	234
<i>Gypsies</i>									
Little finger	10	(6)	11	(6.6)	12	(7.2)	133	(80)	166
Ring finger	4	(2.4)	11	(6.6)	6	(3.6)	145	(87.3)	166
Middle finger	4	(2.3)	7	(4.1)	13	(7.7)	143	(85.6)	167
Index finger	22	(13)	15	(9)	11	(6.6)	118	(71)	166
Thumb	37	(43)	7	(8)	6	(6.9)	36	(41.8)	86

P < 0.001

Figures in parantheses indicate percentage

hair concentration was higher than that of the others on the ring and middle fingers only in the

Albanian population as it was in the right hand (P<0.001) (Table 6).

Hair directions over the fingers were also compared with each other. In the Gypsies no significant differences was found between the fingers when hair directions over the middle phalanges were investigated. In Albanians and Tartars ulnarly directed hair was significantly higher on little and ring fingers when compared with middle and index fingers (Table 7).

When hair directions over proximal phalanges were observed, hair was mostly directed ulnarly on little, ring and middle fingers, vertically on index finger and radially on the thumb (Table 8).

Thus it was observed that hair directions were changing from ulnar to radial while going from the little finger to the thumb. The results were similar to Sinha's investigation on Indians (Sinha et al., 1984).

Comparison of Hands with Each Other

When proximal phalangeal hair distribution of two hands were compared with each other no differences were observed between the hands in Gypsy and Albanian populations.

However, when Tartar population was considered hair concentration was found to be higher on the left thumb than on the right (Table 9).

No significant differences were found between the two hands in any of the three ethnic groups when hair distribution over middle phalanges was investigated.

When hair directions over the proximal phalanges of two hands were compared no differences was found in Albanians and Gypsies, but in Tartars ulnarly directed hair was observed to be higher on the right hand than on the left hand (Table 10).

No difference was found between the two hands when the hair directions over the middle phalanges of the two hands were compared.

Comparison of the Ethnic Groups

When the hair distribution over the proximal phalanges was considered in these three ethnic groups, some significant differences were found among them. Hair concentration over the proximal phalanges on both the hands was higher in Albanians, Tartars and the Gypsies, respective-

Table 5 : Hair distribution on middle phalanges of right hand

<i>Right hand</i>	+		++		+++		++++		<i>Total</i>
<i>Tartars</i>									
Little finger	27	(52)	7	(13.7)	6	(11.7)	11	(21.5)	51
Ring finger	55	(45)	20	(16.3)	14	(11.4)	33	(27)	122
Middle finger	48	(47)	16	(15.6)	10	(9.8)	28	(27.4)	102
Index finger	8	(53)	1	(6.6)	3	(19.9)	3	(19.9)	15
Thumb	-	-	-	-	-	-	-	-	-
<i>Albanians</i>									
Little finger	39	(51)	17	(22.3)	10	(13)	10	(13)	76
Ring finger	67	(35)	38	(19.8)	28	(14.6)	58	(30.3)	191
Middle finger	59	(44.6)	27	(20.4)	18	(13.6)	28	(21.2)	132
Index finger	18	(90)	-	-	-	-	2	(10)	10
Thumb	-	-	-	-	-	-	-	-	-
<i>Gypsies</i>									
Little finger	12	(79.9)	1	(6.6)	*	-	2	(13.3)	15
Ring finger	44	(67.6)	13	(19.9)	3	(4.6)	5	(7.6)	65
Middle finger	43	(81.1)	4	(7.5)	2	(3.7)	4	(7.5)	53
Index finger	11	(100)	-	-	-	-	-	-	11
Thumb	-	-	1	(100)	-	-	-	-	1

P < 0.001

Figures in parantheses indicate percentage

Table 6 : Hair distribution on middle phalanges of left hand

<i>Left hand</i>	+	++	+++	++++	<i>Total</i>
Tartars					
Little finger	31 (58.4)	8 (15)	6 (11.3)	8 (15)	53
Ring finger	70 (48.9)	28 (19.5)	17 (11.8)	28 (19.5)	143
Middle finger	45 (49.4)	17 (18.6)	11 (12)	18 (19.7)	91
Index finger	10 (66.6)	2 (13.3)	1 (6.6)	2 (13.3)	15
Thumb	1 (50)	-	-	- (50)	2
Albanians					
Little finger	55 (61)	18 (19.9)	7 (7.7)	10 (11)	90
Ring finger	64 (34)	39 (20.9)	26 (13.9)	57 (30.6)	186
Middle finger	62 (45)	32 (23.5)	18 (13.2)	24 (17.6)	136
Index finger	14 (53)	1 (3.8)	-	11 (42.3)	26
Thumb	-	-	-	-	-
Gypsies					
Little finger	14 (73.6)	2 (10.5)	3 (15.7)	-	19
Ring finger	39 (59)	11 (16.6)	10 (15.1)	6 (9)	66
Middle finger	33 (67.3)	12 (14.4)	1 (2.04)	3 (6.1)	49
Index finger	11 (100)	-	-	-	11
Thumb	-	-	-	-	-

P < 0.001

Figures in parantheses indicate percentage

Table 7: Hair directions on middle phalanges of right hand

<i>Right hand</i>	<i>Ulnar</i>	<i>Vertical</i>	<i>Radial</i>	<i>Total</i>
Tartars				
Little finger	41 (80)	10 (19.6)	-	51
Ring finger	83 (68)	39 (31.9)	-	122
Middle finger	57 (58.8)	45 (44.1)	-	102
Index finger	4 (26.6)	9 (59.9)	2 (13.2)	15
Thumb	-	-	-	-
Albanians				
Little finger	70 (93)	5 (6.6)	-	75
Ring finger	148 (82)	31 (17.3)	-	179
Middle finger	82 (63)	47 (36.4)	-	129
Index finger	8 (40)	7 (3.8)	5 (25)	20
Thumb	-	-	-	-
Gypsies				
Little finger	10 (66.6)	5 (33.3)	-	15
Ring finger	48 (73.8)	17 (26)	-	65
Middle finger	33 (61.1)	20 (37)	1 (1.8)	54
Index finger	8 (66.6)	4 (33.3)	0	12
Thumb	-	1 (100)	-	1

P < 0.001 Figures in parantheses indicate percentage

Table 8: Hair directions on proximal phalanges of right hand

<i>Right hand</i>	<i>Ulnar</i>	<i>Vertical</i>	<i>Radial</i>	<i>Total</i>
Tartars				
Little finger	230 (84)	43 (15.7)	-	273
Ring finger	216 (80)	51 (19.1)	-	267
Middle finger	187 (69)	84 (30.9)	-	271
Index finger	99 (37)	146 (55.7)	17 (6.4)	262
Thumb	2 (1)	79 (40.7)	113 (58)	194
Albanians				
Little finger	268 (96.7)	9 (3.2)	-	277
Ring finger	229 (89.1)	28 (11.6)	-	257
Middle finger	177 (73.7)	63 (26.2)	-	240
Index finger	112 (52)	84 (39)	19 (8.8)	215
Thumb	8 (4)	35 (17.5)	157 (78.5)	200
Gypsies				
Little finger	143 (86.1)	22 (13.2)	1 (0.6)	166
Ring finger	139 (83.7)	26 (15.6)	1 (0.6)	166
Middle finger	129 (77.2)	38 (22.7)	-	167
Index finger	65 (39.1)	99 (60)	2 (1.2)	166
Thumb	4 (5.4)	39 (52.7)	31 (41.8)	174

P < 0.001 Figures in parantheses indicate percentage

ly (Albanians > Tartars > Gypsies).

Hair distribution over the middle phalanges

was also investigated. On the left hand hair concentration was found to be higher in the Gyp-

sies when compared with Albanians and Tartars. When Albanians were compared with Tartars; it was higher on little and middle fingers in Albanians while it was higher on ring and index fingers in Tartars.

There were also some differences between the ethnic groups when phalangeal hair directions investigated. On the left hand over the proximal phalanges ulnarly directed hair was more than vertically and radially directed hair in all ethnic groups. The highest concentration of ulnarly directed hair was in Albanians population followed by Tartars and Gypsies, respectively. On the right hand concentration of ulnarly directed hair over the proximal phalanges of all fingers was higher in Albanians when compared with Tartars and Gypsies.

When hair directions over the middle phalanges were investigated there were also some significant differences between the ethnic groups. Both in Albanians and Gypsies ulnarly directed hair concentration was higher than that

of Tartars. When Tartars were compared with Albanians, ulnarly directed hair was seen higher on middle and index fingers in Tartars, but on little finger in Albanians. On the right hand no significant differences were found when the ethnic groups were compared with each other.

Most of the investigators claim that there were great variations between the ethnic groups when hair directions over the middle fingers were investigated (Danforth, 1921; Bernstein and Burks, 1942; Bernstein, 1949; Boyd, 1950; Garn, 1951; Büchi, 1954; Matsunaga, 1956; Saldahna and Guinsburg, 1961; Ganguly and Pal, 1963; Dutta, 1964; Brothwell and Molleson, 1965; Bhasin, 1967; Tiwari and Bhasin, 1969; Sethurman et al., 1982; Hatiboğlu, 1983; Sinha et al., 1984; Vona and Porcella, 1988). When the results of this study were compared with some other studies (Table 11), the present ethnic groups living in The Republic of Turkey showed similarities with the western populations rather than Turks.

Table 9: Comparison of distribution of proximal phalangeal hair of left and right hands

Population	Right hand			Left hand		
	n	ni	p	n	ni	p
Tartars						
Little finger	273	236	0.86	274	236	0.86
Ring finger	267	237	0.89	274	248	0.91
Middle finger	267	233	0.87	276	242	0.88
Index finger	262	233	0.81	276	242	0.78
Thumb	194	92	0.47	256	161	0.63
Albanians						
Little finger	287	270	0.94	289	271	0.94
Ring finger	289	280	0.97	289	276	0.96
Middle finger	289	280	0.97	291	274	0.94
Index finger	288	268	0.93	286	264	0.92
Thumb	234	134	0.57	232	144	0.62
Gypsies						
Little finger	166	133	0.80	166	131	0.79
Ring finger	166	145	0.87	168	147	0.88
Middle finger	167	143	0.86	167	131	0.78
Index finger	166	118	0.71	166	113	0.68
Thumb	86	36	0.42	103	39	0.38

P > 0.05

Table 10: Comparison of distribution of proximal phalangeal hair of left and right hands

Population	Right hand			Left hand		
	n	ni	p	n	ni	p
Tartars¹						
Little finger	273	230	0.84	174	134	0.77
Ring finger	267	216	0.81	274	213	0.78
Middle finger	271	187	0.69	276	146	0.54
Index finger	262	99	0.38	275	66	0.24
Thumb	194	2	0.01	204	1	0.05
Albanians²						
Little finger	277	268	0.97	279	268	0.96
Ring finger	257	229	0.89	257	227	0.88
Middle finger	240	177	0.74	226	159	0.70
Index finger	215	112	0.52	193	79	0.41
Thumb	200	8	0.04	189	10	0.05
Gypsies²						
Little finger	166	143	0.86	166	140	0.84
Ring finger	166	139	0.84	168	135	0.80
Middle finger	167	129	0.77	167	129	0.77
Index finger	166	65	0.39	166	50	0.30
Thumb	74	4	0.05	103	2	0.02

1. P < 0.001 2. P > 0.05

Table 11 : Comparison of distribution of middle phalangeal hair of the hand in different populations

Population	Percentage with hair	Percentage distribution on fingers				Reference
		Index	Middle	Ring	Little	
Nigeria	21.0	0.0	15.0	18.0	7.5	Singh (1982)
Ethiopia	25.6	0.0	31.1	46.7	19.3	Batmirian (1962)
Japan	36.8	2.1	33.8	49.4	14.7	Matsunaga (1956)
Tibet	44.3	6.5	33.6	43.9	15.9	Tiwari and Bhasin (1969)
Bengal (India)	49.0	3.5	30.2	52.3	14.0	Dutta (1969)
Turkey	49.0	6.0	35.0	48.0	20.0	Hatiboğlu (1983)
Tartars (Turkey)	55.2	5.3	34.3	47.1	18.5	Present Study
Gypsies (Turkey)	66.2	6.4	30.0	38.6	10.3	Present Study
Albanians (Turkey)	67.5	6.2	46.1	65.0	28.4	Present Study
Britain	70.2	3.4	32.0	42.6	23.0	Brothwell (1965)
America (white)	70.4	3.6	30.8	44.3	21.3	Danforth (1921)

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