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Original Research Article

PLEISTOCENE HOMININ FOSSIL FEMORA AND HUMERI

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ABSTRACT

Aim: To report morphometric analysis on six rare fossil femora and three humeri of the Pleistocene prehistoric humans who roamed about the Central Narmada valley (M.P.) during 300,000 to 40,000 years ago.

Methods: Fossils were discovered through intensive explorations and trial excavations. The sites were mapped and shown in their lithostratigraphic contexts. The fossils were cleaned and measured for linear measurements with Mitutoyo Digital caliper for statistical analysis. They were digitally photographed and mCT scanned for detailed morphological observations. The morphometric comparative analysis was done and the segment proportions were used for estimating the statures of the hominins.

Results: The prehistoric femora and humeri display general similarities with their modern counterparts but also variations from the archaic to early modern morphology, especially in robustness. The statures estimates from the bone segment ratios reveal that most of the Narmada valley humans were 'short and stocky' and at par with the Andaman pygmies.

Conclusion: Through the predominant occurrence of the 'very short and stocky' Pleistocene hominins it may be postulated that Narmada valley contained common ancestors of the Holocene 'short-bodied' populations of Indian mainland, including the pygmies. This conclusion is also supported by recent genomic studies indicating Indian origins of the short-bodied populations and concurs with the "Out of Africa" theory of modern human origins in South Asia.

KEY WORDS: Pleistocene, Fossil Femora, Humeri, Morphometry, Stature, Narmada valley.

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INTRODUCTION

Current understanding of human evolution in South Asia greatly owes to the central Narmada valley which stands alone for gifting us unambiguous Middle to Late Pleistocene hominins and numerous mammalian fauna and Palaeolithic implements dating back to 300,000 years ago. At first came a chance discovery of a half skullcap [1] of the archaic hominin that received considerable attention and phylogenetic debate [2, 3]. It was followed by the discovery two clavicles and a partial rib by the author [4, 5, 6] as an outcome of the explorations conducted by him and associates during 1980s. After a gap of 25 years, the author re-initiated fresh explorations during 2005-2010 which brought out a huge collection of over 1200 mammalian fossils and over 8000 stone implements housed in the Palaeoanthropology Repository of the Anthropological Survey of India, Kolkata. Owing to his superannuation he could make only a preliminary scrutiny of the collection which led to the discovery of a humerus and a femur [7, 8, 9]. But, it was only recently during December

2015 - February 2016 that he got an opportunity of visiting fellowship; he re-scrutinized the entire fossil collection and recognized a number of additional human fossil remains from several sites and at different stratigraphic levels in the Central Narmada Valley (Figure 1a,b). The present report is based on nine post-cranial bones comprising of six femora and three humeri shown with their anatomical segmental positions (Figure 2).

MATERIALS AND METHODS

The human fossils femora and Humeri described here were discovered in different sites in the Central Narmada valley as:

(1) NTK-F-07-05- a left distal femur shaft from Netankheri (Fig.3)

(2) UMR-F-08-07- a left femur distal shaft from Umaria (Fig.4)

(3) GRL-F-16-06 - a left femur distal shaft from Gurla (Fig.5)

(4) DKC-F-05-09- a left femur distal shaft from Devakachar (Fig.6)

(5) HTN-F-18-05- a right proximal shaft from Hathnora (Fig.7i)

(6) HTN-F-45-08- a distal femur shafts from Hathnora (Fig.7ii)

(7) NTK-F-02-07- a left humeral distal shaft from Netankheri (Fig.8i)

(8) DHG-F-42-06- a left humerus mid-shaft from Dhanaghat (Fig.8ii)

(9) BDG-F-04-07- a left humerus mid-shaft from Budhni (Fig.8iii)

The present study presents an illustrated account of the nine human fossil femora and humeri (Figure 1a) housed in the Palaeoanthropological Repository of the Anthropological Survey of India at Kolkata. Their proper stratigraphic sections were measured (Figure 1b) following the standard stratigraphic nomenclature and lithostratigraphic symbols [10]. The fossils are described systematically by following anatomical nomenclature used in *Gray's Anatomy* (2005), including the mCT scans and line drawing sketches, besides the photographic images. Their statistical analysis has been done for calculating various indices by taking linear measurements using Mititoyo Vernier caliper.

Stature estimation was done following the formulae mentioned in the Table 1.

Fig. 1a: Map of the Central Narmada Valley showing select sites, and those having yielded human fossils shown with star.

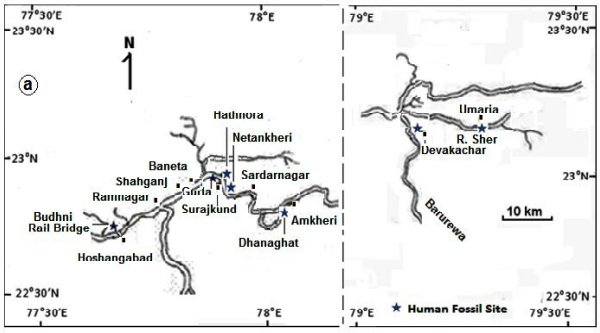


Fig. 1b: Stratigraphic sections of the sites of the new human fossil findings from Central Narmada valley.

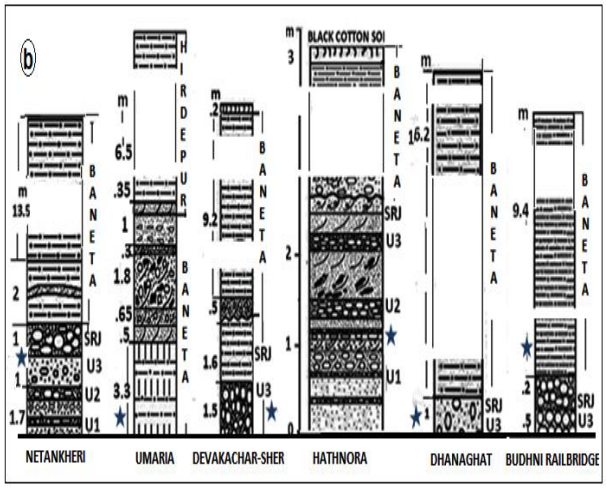


Fig. 2: Anatomical positions of the femoral and humeral specimens.

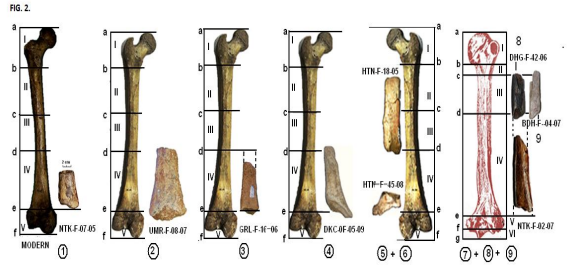


Fig. 3: NTK-F-07-05, a left hominin femur distal shaft from Netankheri in anterior, posterior and cross section views.

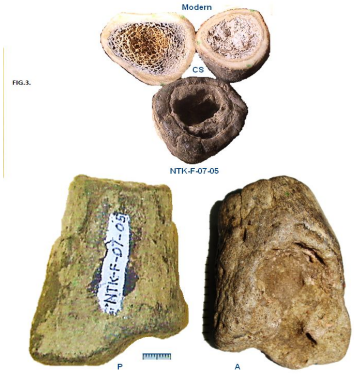


Fig. 4: UMR-F-08-07-a left femur distal shaft from Umaria; above, the bone in anterior, posterior, lateral, medial views; below the scans in the same views.

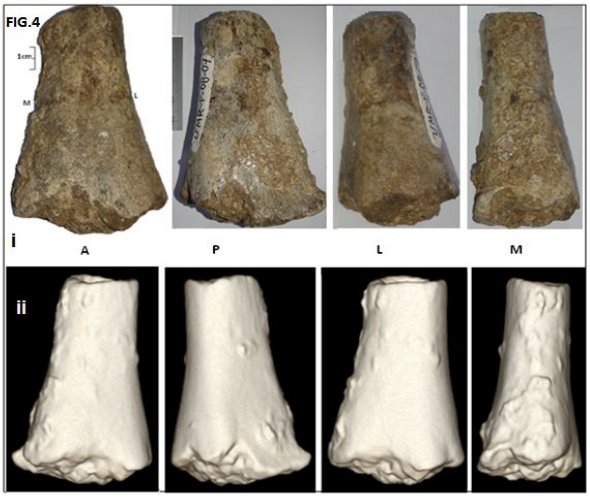


Fig. 5: GRL-F-16-06-a left femur distal shaft from Gurla in anterior (A), posterior (P), medial (M), lateral (L) views (above) ; mCT scans in the same views (below).

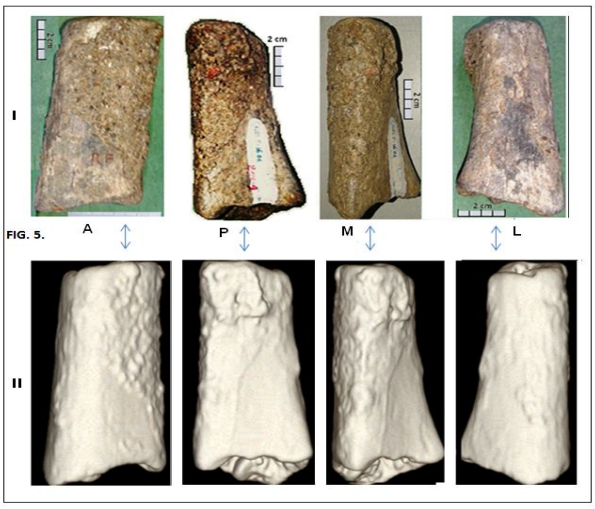


Fig. 6: DKC-F-05-09 . Left distal femur from Devakachar in anterior, posterior, lateral and medial views (above); mCT scans of the same (middle);proximal cross sections (below) distal cross sections.

Fig. 7i: HTN-F-18-05**-** right proximal femur fragment and its mCT scans in different views: A A' anterior, P P' posterior, M M' medial, L L; lateral views; cross sections: i. proximal, ii, ii', iii distal ends.

Fig. 7ii: Bottom: HTN-F-18-05**-** right distal femur fragment: P posterior, cross section and antero-posterior view.

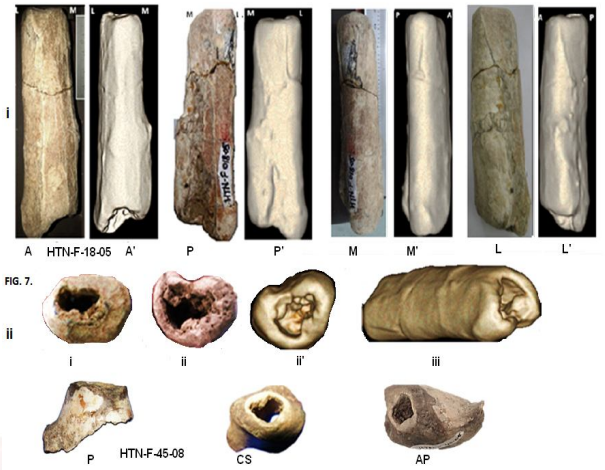
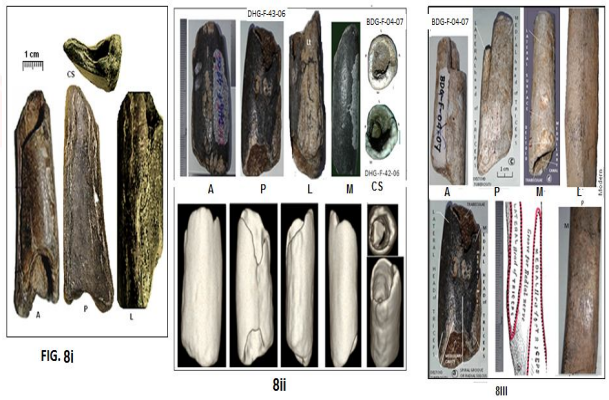


Fig. 8i: NTK-F-02-07 left Humerus midshaft. In anterior, posterior and cross section.

Fig. 8ii: DHG-F-42-06in anterior (A), posterior (P), lateral (L), medial (M), and cross sectional (CS) views; below: mCT scans.

Fig. 8iii: BDG-F-04-07 left humerus midshaft fragment (above) and DHG-F-42-06 left humerus(below) compared with modern humerus from Gray's Anatomy.



RESULTS AND OBSERVATIONS

The stratigraphy of the fossil localities: The fossil findings are shown by stars (*) in their lithostratigraphic sections (Figure 1b) prepared following the standard classification [10].

The famous stratigraphic section that yielded two femoral portions HTN-F-18-05 and HTN-F-45-08 falls near village Hathnora (22°51'53"N: 77°52'28"E) along the right bank of river Narmada in district Sehore. It is well known for the hominin calvarium [1], derived from its basal cemented conglomerate (U1) bed of the Surjakund Formation [10, 11]. The two femora

were discovered from the overlying U2 cemented gravel bed, which has previously yielded two clavicles and a rib [4-6]. Both femoral parts bear similar light brown colouration and mineralization, and are likely the parts of the same bone, though collected at different times. Regarding the dates of the Hathnora hominins, initially, a very wide range of dates of ~ 650 - 75 Kya [12, 13] were suggested for the Surajkund Formation which contained the hominin remains. Later workers limited that to ca. 250 Kya [14] for the Hathnora calvarium, but of late, some of them assumed a possibility of a wider range, 280 - 40 Kya [15] for the Hathnora calvarium; the youngest upper limit, however, makes no sense considering the highly mineralised skullcap and clavicles. Hence, unless new dates are forthcoming, it is worthwhile to depend upon the biostratigraphic/ faunal ages of the Middle to Late Pleistocene [16].

The GRL-F-16-06 femur comes from Gurla **(**22°51'26"N: 77°52'08"E) is located just opposite to Hathnora across river Narmada along its left bank falling in Hoshangabad District. It is 10.4m thick and similar to the Hathnora section in composition, comprising pebbly sand (1.2m) and conglomerated pebbles in the loose sand bar due to erosion U1 and U2 of the gravel beds of the Surajkund Formation. It is overlain by dark brown concretionary silt containing thin sand lenses (8.2m) of the Baneta Formation.

The Section of the DKC-F-05-09 left femur falls at Devakachhar (on river Sher), a tributary of river Narmada (23°00'25"N: 79°07'32"E) between Umaria and Devakachhar in district Narasimhapur (M.P.). The exposed section is 15.5m thick of Surajkund Formation, disconformably overlain by the Baneta Formation comprised of quartz, chert, agate, jasper and few number of quartzite, etc., sealed by a 0.2m thick black soil at the top.

The section at Umaria is located at 23°00'50"N, 79°01'18"E) on the right bank of river Umar, a tributary of Sher south of village Umaria in Narasimhapur district. From the base upwards the about the half section is of the Baneta Formation and the remaining (6.5m) of Hirdepur Formation. The fossil of UMR-F-08-07 left femur distal shaft has come from the bottom layer of the Baneta Formation, extensively exposed there, and therefore could be dated to around 75 kya in consideration of the YTA signatures found within the Baneta Formation [12, 13].

The Section at Dhanaghat that yielded the DHG-F-42-06 left humerus midshaft fragment is located at 22°49'50"N: 77°58'29"E along the left bank of Narmada under Babai sub-division of district Hoshangabad. It is an extensive sand bar of 16.2m brown calcareous silt of the Baneta Formation. Only its base of one metre thickness is comprised of pebbly sand of U3 gravels of the Surajkund Formation which have yielded the humeral fragment. In consideration of the YTA limit [12, 13] a probable date of 75 Kya may be assigned to the Dhanaghat humerus.

The BDG-F-04-07 left humerus midshaft fragment was found near the rail bridge section (22°45'53''N: 77°41'32''E) along the right bank of Narmada in Budhni sub-division of district Sehore. The discovery site is situated on the exposed bedrock where a 10.5m thick section is exposed comprised of cemented gravel of Surajkund Formation, followed by fine brown concretionary silt and fine sand lenses of Baneta Formation which have yielded the humeral fragment in the lower part of the section. So, on consideration of the YTA limit [12, 13] a probable date of 75 Kya may be assigned to the Budhni humerus.

Morphological Description of Fossil Femora: The fossil findings are briefly described below and the Tables 1 to 3 presents the summary of major comparative features and metric data.

NTK-F-07-05 - A left distal femur shaft from Netankheri: It is distal-most shaft of the fully mineralized left femur detached from the condyles. The popliteal surface is well preserved while articular surface of the patella intercondylar fossa is eroded. The specimen shows a typical cylindrical shape of the hominin femur body or corpus femoris, which broadens and flattens distally near the condylar region forming a distinct triangular popliteal surface on the posterior aspect. The lateral surface is larger and rounded compared to the relatively narrow and slightly pinched medial surface above the condyles, which flares more medially backward indicating its left laterality.

The preserved length is 8.1 cm, ~ 60% of the

Segment 4, which would be 13.5 cm when fully preserved and would give 30.43 cm length of the femur. Accordingly, the stature would be 159.82 cm (female) and 164.83 cm (male). We may consider it that of a male in consideration of the robustness representing an archaic hominin of medium height.

UMR-F-08-07: Left Femur from Umaria: It is distal body shaft detached off the condyles. The bone shows evidence of mineralization and on the medial aspect of the upper body a small chip of the cortical bone is cut off likely due to taphonomic causes or eroded. The specimen shows a typical cylindrical shape of the hominin femoral body or corpus femoris, which broadens and flattens distally near the condylar region forming a distinct triangular popliteal surface on its posterior aspect where it is strengthened by two lips of longitudinal ridges of the linea aspera, which are quite prominent and blunt. Distally, the epiphyseo-diaphyseal condylar contact lines are more visible with their eversion in the middle towards the adductor tubercle medially.

The preserved bone 10.3cm is a 66.67% part of the Segment-4, such that the complete segment 4 would be 15.45 cm which would yield total length of the femur as 30.43 cm, and therefore, the stature 129.26 cm (female) and 136.13cm (male). As the femur belongs to an archaic robust individual, so we may prefer a male stature of 136.13 ± 5cm, which falls among the 'short and stocky' early modern humans and at par with the Andaman pygmy.

DKC-F-05-09: Left Femur from Devakachar: It is a 12.17 cm long distal body shaft detached from the condyles and preserves a bit of the Segment 3, the full Segment 4 (9.7 cm) and a bit of the condylar Segment 5 intact. Proximally, a chip of the cortical bone is deeply chipped off from the medial aspect; the bone is mineralized and patinated. The specimen is typical human femur with a cylindrical body, slightly arched and more convex in front anteriorly (dorsally) and slightly concave or flattish behind (ventrally). Due to patination the surface turned featureless, and the two lips of the linea aspera are indistinct, though the mCT scan reveals the cortical thickness along the length and elliptical medial flair. The anterior (dorsal) surface is medial flair. The anterior (dorsal) surface ismedial flair. The anterior (dorsal) surface is distal cross section. The shaft shows distinctmedial flair. The anterior (dorsal) surface is smooth, convex, and slopes medially thereby broadening the lateral surface, whereas the posterior (ventral) surface is nearly rounded but slightly flattened distally in the popliteal area. The gracility of the bone and non-muscular character indicates a young adult female.

The total femoral length may be estimated from the length of the Segment 4 (9.7 cm) x 3.17 = 30.75 cm, and accordingly the mean stature of the DKC individual comes to be: female = 130.05 cm; male = 136.87 cm. Hence, the DKC female hominin would be 130.05 cm, quite 'short and stocky' hominin as found at Hathnora and Netankheri.

GRL-F-16-06: Left Femur from Gurla: It is the distal shaft detached from the condyles, proximally preserved from the point where the lateral border flares out unto the lower half of the segment-3 where the linea aspera divides into medial and lateral supracondylar lines. Distally, apart of the shaft and the condyles are detached off. The femoral body or corpus femoris has a typical cylindrical shape of the humans; it broadens and flattens (pillaster) distally near the condylar region forming a distinct triangular popliteal surface on its posterior aspect. The two lips of the linea aspera are very prominent, blunt and highly twisted and give the bone a slightly confusing triangular look like that of the proximal diaphysis of the tibia. However, the tibia is antero-posteriorly elongated and narrow, whereas femur is elongated and narrow mediolaterally and posterior surface flattish as is the specimen under reference. It has an axial twist with distinct supracondylar lines form the two ridges of the linea aspera are indicative of a very robust man with weight –bearing legs. The laterality (left side) is revealed by the larger and rounded lateral surface compared to the relatively narrow and pinched medial surface which flares more medially when the femur is held perpendicularly. The anterior surface is rounded and smooth, but posteriorly, the features are more prominent such as the deeper triangular popliteal surface enclosed by two prominent but blunt ridges of the linea aspera

rising up and arching and drawing closer upwards. The lateral border is wider and convex whereas the medial border is like a narrower strip.

The preserved fragment is 10.5 cm long, but the Segment-4 is about 13. 4 cm, which would yield total femur length 42.48 cm, and the stature 159.03 cm (female) and 164.08 cm (male). Thus, Gurla individual belongs to a very robust individual of medium height 164.08 cm.

HTN-F-18-05: Right Femur from Hathnora:

It preserves 12.8 cm long proximal mid-shaft, comprising a bit of the Segment 2, the full Segment 3 (7.5 cm) and a little of the Segment 4. It is mineralized and has cracks in middle and the lateral border is eroded along the pectineal curve by taphonomic agencies or gnawing by the carnivores indicated by an elongated dental depression. Proximally, the bone is broken at the base of the lesser tubercle below the lesser trochanter at its medial junction where the spiral line emanates and gives attachment to the pectineus muscle, and laterally at the gluteal tuberosity; it is the anatomically weak region liable to break. The pectineal line is distinctly curved ridge-like and forms the medial lip of the linea aspera. Dorsally it is convex and roughened by muscle lines anteriorly, and nearly cylindrical and slightly arched. The posterior (ventral) surface is typically flattened or concave and strengthened by two prominent longitudinal ridges of the linea aspera with intervening groove.

The Segment 3 with correlation value 4.18 [17] yields total femur length 31.35 cm, which gives statures of 131.53 cm (female) and 138.26 cm (male). We may regard it a male considering the robustness of the bone, hence 138.26 ± 5 cm, which again falls among the 'short and stocky' individuals.

HTN-F-45-08: Right Femur from Hathnora:

It preserves only 1/4th of the distal shaft, just 2.5 cm of the estimated 10 cm long Segment 4. It is mineralized and shares the colouration of the HTN-F-18-05 right femur, and likely represents its distal part from which the condyles have been detached off. The total femur length from 10 cm long segment 4 comes to 31.7 cm and statures 132.4 cm (female) and 139.07 cm (male). Similarity in stature indicates that both Hathnora femur fragments are likely derived from the same individual, who was very 'short and stocky' later Middle Pleistocene hominin. Similar stature estimate came from the previous Hathnora clavicles [7, 8, 9].

A recent study [19] preferred pygmy standards for estimating stature of the Plio-Pleistocene australopithecines using a formula: Stature (cm) = [0.331 x femur length (mm)] + 15.876; R= 0.89, s e e= 3.7. However, they yielded very low of statures (around 100 cm) for the Narmada hominins which sounds unrealistic, and may not hold good for such later Middle to Late Pleistocene hominins.

Table 1: Estimation of the total femoral lengths (TFL) and the statures from their proportions of the segment 3 and 4 to the respective mean total femoral lengths and total humeral length. The correlation value for femoral Segment 3 is 4.18 and for Segment 4 is 3.17. For humerus the SEG 3L= 21.5 % of total humeral lengths (THL); SEG 4L= 37.3 % of THL (after Kantha and Kulkarni, 2014: Table 3 [18]. All measurements in centimetre; the value in bold is preferred in consideration of the estimated sex.

FOSSIL FEMUR	PRESERVED FRAG	SEGMENT 4/3 LENG (cm)	TFL (X)	STATURE (male) 2.32 X + 65.53 ± 5 (cm)	STATURE (female) 2.47 X + 54.10± 5 (cm)
NTK-F-07-05	8.1 (60%)	SEG 4 13.5	42.8	**164.83**	159.82
HTN-F-18-05	12.8	SEG 3 7.5	31.35	**138.26**	131.53
HTN-F-45-08	2.5 (25%)	SEG 4 10	31.7	**139.07**	132.4
GRL-F-16-06	10.5	SEG 4 13,4	42.48	**164.08**	*159.03*
DKC-F-05-09	11.1 (SEG 3+4)	SEG 4 9.7	30.75	136.87	**130.05**
UMR-F-08-07	10.6 (66.67%)	SEG 4 9.6	30.43	**136.13**	129.26
FOSSIL HUMERUS	Preserved SEG	SEG LENG (cm)	THL (cm)	STATURE (male) *3.08* X+ 54.10 cm*	STATURE (female) *2.89 * X+ 54.10 cm*
NTK-F-02-07	SEG 4	11.0 est	29.49	144.93	139.33
DHG-F-42-06	SEG 3	6.6	30.7	148.66	142.82
BDG-F-04-07	SEG 3	6.8	31.63	151.52	145.51

Morphological Description of Fossil Humeri: The knowledge of the morphometric values of humerus segments is important in order to identify unknown bodies and stature and also helpful for the clinician in the treatment of proximal and distal humerus fracture. The correlation values of the humeral segments were followed after [18] for estimation of the total length from humeral segments; the humerus divided into 6 segments (Fig. 2: 6-9): a) the most proximal point

of the head; b) the most distal point of the circumference of the head; c) the convergence of two areas of muscle attachment just below the major tubercle; d) the lower end of the deltoid tuberosity; e) the upper margin of the olecrannon fossa; f) the lower margin of the olecrannon fossa; g) the most distal point on the trochlea.

All the three Narmada humeri fragments are of the left side. The NTK-F-02-07 retains nearly the complete Segment 4, the other two (DHG-F-42-06 and BDG-F-04-07) retain Segments 3. The Segment-3 (c-d) is between the convergence of two areas of muscle attachment just below the major tubercle and the lower end of the deltoid tuberosity, whereas the Segment-4 (d-e) is between the lower end of the deltoid tuberosity and the upper margin of the olecranon fossa and is the largest segment, and therefore more reliable for estimation of the humeral length [18].

NTK-F-02-07 – Left humeral distal shaft from Netankheri: It is a fully mineralized left distal shaft fragment, about 78% of the Segment 4 (8.4 cm), and the full segment could have measured about 11.0 cm, below the radial sulcus (spiral groove) unto the upper margin of the olecranon fossa. It exhibits post-fossilization linear cracks, especially on the medial border. The specimen is cylindrical proximally, widening and turning prismatic distally. It is bounded by three borders and three surfaces, and shows a medial bend on the posterior surface, where the brachialis narrows upward and widens downward. Distally, the posterior surface is flattened and covered by the lateral and medial heads of the triceps brachia that give rise to part of the. It is relevant to know whether the NTK humerus is of an archaic hominin or of modern human. A study [20] shows that archaic vs. modern human differentiation could be established by the proximal end of the ulna, and not by the distal humerus. Nevertheless, fossilization and stout morphology may indicate a "late archaic" character of the NTK fossil humerus.

DHG-F-42-06: Left Humerus from Dhanaghat: It is almost the complete Segment 3, retaining 7.2 cm mid fragment of the shaft (corpus humeri) with the medullary cavity visible and reinforced at the ends. The bone fragment is about a third of the way to the elbow where the humerus swells into the deltoid tuberosity, a triangular elevation that supports the insertion point of the deltoid muscle, marked by the coraco-brachialis medially. Its upper extent is up to the mid of the pectoralis major and teres major muscular region, just below the beginning of the lateral head of the triceps. It is typically the cylindrical upper humeral body part with the lateral and medial heads of the triceps enclosing a distinct radial sulcus or the spiral groove for the radial nerve. Only a little part of the lower body is preserved which reveals the distal widening, which turns prismatic below. We can notice a medial bend or distinct twist on the posterior surface of the mid-shaft body where the brachialis narrows upward medialward and widens downward lateralward. Nearly the whole of the body surface is covered by the lateral and medial heads of the Triceps brachii, the former arising above, and the latter below the radial sulcus, a broad but shallow oblique musculospiral groove or depression. The specimen bears mineral signatures of the Surajkund Fm U2/U3 cemented gravel showing dark colour and whitish grey patches of quartz depositions, suggesting considerable antiquity.

BDG-F-04-07: Left Humerus from Budhni: The specimen was collected from the Baneta Formation and bears its brownish grey colour of the sediments with some mineralization attesting younger Upper Pleistocene age. It is a 7.7 mm long mid-shaft fragment of the body shaft (*corpus humeri*) above the deltoid tuberosity and represents the complete Segment 3. It shows very little mid medial twist, indistinct muscular markings, slightly smaller size, more flattish posterior surface is flattish, indistinct spiral groove is; rounded and narrower lateral border.

The estimated total humeral lengths and statures from them are presented in Table 1 lower rows. The preserved Netankheri (NTK-F-02-07) humeral fragment is 8.4 cm, which about 78% of the complete Segment 4, estimated to be 11.0 cm if fully preserved. The preserved fragments of other two humeri, DHG-F-42-06 and BDG-F-04-07, measure 7.2 and 7.7 cm respectively. But, their segments 3 are complete, which measure 6.6 cm and 6.8 cm, respectively. Using the proportion of the segment 3 to the total humeral length [18] (21.5 %) and of the segment 4 to total humeral length (37.3 %)[18].

DISCUSSION

With reference to the Table 1, it may be noted that there is not much variation in the estimated humeral lengths of all the three Narmada humeri, though the Segment 3 yields slightly higher estimates of the humeral lengths. It is noteworthy that segment- 4 is the largest segment and much more reliable [18]. Considering this, the estimated humeral length of the NTK-F-02-07 segment 4 (29.49 cm) is near to reality and tallies with the mean length of five Chaurite humeri (29.14 ± 1.3 cm) as well as from a larger sample of 33 mixed mainland Indian including Chaurite (28.47 ± 2.72 cm). Interestingly, the Chaurite Nicobari population is shorter and stockier from the western early human populations, which includes Omo Kibish and Cro-Magnon-1 [21, 22]. Therefore, the Netankheri hominin was also quite 'short and stocky' having 144.93cm male and 139.33 cm female statures, which falls within the range of the Andaman Negrito pygmy.

Coupled with the earlier findings of two clavicles and a rib, the NTK humerus thus, suggests that the Central Narmada Valley was continuously occupied by "short and stocky" early to late archaic or early modern *Homo sapiens* populations during Middle to Late Pleistocene of South Asia, and it is not unlikely they included the ancestors of similar short-bodied ancient Indians/ South Asians including the Andaman Pygmy [2, 3, 7, 8, 9]. The other Narmada hominin humeri also present a similar picture, especially the Dhanaghat humerus; Dhanaghat is located on the bank of River Narmada opposite to Netankheri. It is likely that it was the same hominin population of the archaic short and stocky hominins whereas the Budhni hominin was relatively taller and modern. Overall, we can observe that the Central Narmada Middle to late Pleistocene hominins were robust and 'short and stocky'. Probably, the palaeoenvironmental scenario [23] with prevalence of warm climatic conditions in the Narmada valley favoured 'short-bodied' hominin populations during the later Middle to Late Pleistocene (300 to 40 Kya). The unpublished detailed study by the author [2] had also hinted at similar inferences. On such body adaptations, it may be reasonable to postulate that the Narmada hominins might contain the common ancestors of the 'small-bodied' later Pleistocene and Holocene ancient populations that inhabited Indian mainland, including the Andaman pygmies [24 -27], who also shared mtDNA signatures until their split ~25 kya [28-30].

CONCLUSION

Present study provides hitherto unknown rare fossil evidence through a number of important long bones of the prehistoric humans of South Asia so far known only from the Central Narmada valley. The study provides interesting insight to Indian ancestry of the 'small-bodied' ancient populations of South Asia including the Andaman pygmies. Thus, study concurs the "Out of Africa" theory of modern human origins of the 'small-bodied' populations of South Asia.

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