

Demographic Specifics of Skeletal Population from Early Bronze Age Necropolis of Bereketska Mogila - Preliminary Results

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On a preliminary state of investigation, skeletal remains from 36 structures from Early Bronze Age necropolis of Bereketska mogila are examined. Skeletal remains from at least 75 individuals are recognized. Being demographically unrepresentative for mortality and life expectancy in child ages the material provided opportunities for reconstruction of some demographic features of adult population.

Key words: Early Bronze Age skeletal population, paleodemography

Introduction. Archaeological situation and dating

Bereketska mogila site is situated near the South-West outskirts of the contemporary town Stara Zagora. It is a multilayer settlement, which, with satellite settlement structures around the tell, presents cultures from a vast chronological limits of Praehistory from the Neolithic to the Early Bronze Age up to the Iron Age [6, 7, 9]. The unearthed necropolis is situated in East direction according to the mound and presents structures mostly from the Early Bronze Age, nevertheless reduced number of graves date from the Late Eneolithic period (from the Kodzhadermen-Karanovo VI- Gumelnitsa culture) [9]. The present study concentrates on the Early Bronze age series.

Material and Methods

The present study concentrates on the series from necropolis from Bereketska mogila, preserved in the National Anthropological Museum in the Institute of Experimental Morphology, Pathology and Anthropology. The material is obtained during the excavations held in 1970s [6, 7, 9] and consequently transferred for investigation

in the Department of Anthropology. Many of the graves from the necropolis, 12 (10 from Bronze Age), are registered being disturbed from later field works and they do not present skeletal remains, or present only singular bone fragment, which is not preserved for anthropological investigation. These are Bronze Age burials N 7, 11, 22, 24, 28, 29, 36, 38, 41 and 45 [9]. Other, 10 graves, also present disturbed fragmented, incomplete skeletons with no anatomical position of bones, also interpreted as a result of later field works. These are graves N 4, 5, 10, 14, 16, 19, 30, 49, 55 and 77. Most of them are noted in the field documentation as containing incomplete, fragmented skulls [9]. The skeletal remains from these graves also are not committed for preservation in the National Anthropological Museum. The preserved material presents high degree of fragmentation and destruction, which obstacles the anthropological investigation.

At the preliminary stage, the investigation aims recognition of number of individuals in the skeletal remains from each grave and age and sex identification of individuals. It is achieved at first after the detected graves with multiple burials on field [9]. In the materials from some of the studied complexes are detected bones from more different skeletons than registered on field. This is achieved after registered duplication of bones and bone locations on fragments, detection of bones from skeletons, which present individuals with different anthropological features as sex, stage of development, anatomical specifics or anthropological type. Many complexes present skeletal remains from more than one individual (**Table 1**).

The age and sex of the individuals are reconstructed after classical methods of assessing morphological features of skeleton of both sexes and stages of development, maturation and aging. For individuals in childhood and juveniles the age at death is ascertained after methods for assessment the dental development [15, 18], the timings of epiphyseal fusion as summarized by Schwartz [14], Alekseev [2] and Bass [4] and lengths of long bones compared to the tables of Maresh [11]. In single case of bone from a newborn, its fetal development is assessed after the length of radius by the methods of Fazekas and Kosa [8]. In adults age is ascertained after stages of cranial sutures obliteration after Olivier-Simpson methods [3], symphyseal surface relief after Todd's scale [13] and auricular surface relief after Lovejoy et al. [10]. Sexual dimorphism is assessed after the features of preserved fragments from pelvic bones based on the methods, summarized in Acsádi and Nemeskéri [1] and of cranial fragments as summarized in Walrath et al. [16]. After results of osteometry study performed after the standard methods, the measurements are correlated to tables of mean values for both sexes summarized in Bass [4] and Alekseev [2]. In complex of features used for sex determination priority is given to the data obtained in the investigation of the pelvic bones.

In analysis of sex and age distribution at first step, the identified individuals are distributed in the qualitative age groups and both sexes (**Table 2**). At the next stage of analysis, in order to reconstruct mortality and survival conditions in the population are used methods of paleodemography as defined in Acsádi and Nemeskéri [1]. High level of fragmentation of the material obstacles the precise determination of the age in 5-year age intervals. In overcoming this situation, the analysis is proceeded in 10-year age intervals (**Table 3**).

In the investigated material are analyzed also skeletal remains from two complexes dated in the Late Eneolithic, graves N 64 and 69. Results for age and sex of the individuals (**Table 1**) are excluded from the statistical analysis, performed for Early Bronze Age

complexes. Position of skeleton in the Grave No 35 [9] presents a deviation from the one, characteristic for the burial ritual in the necropolis, most pronounced in the upper limbs, and results for age and sex of this individual (**Table 1**) are also excluded from the demographic analysis of the series. Similar position is registered in grave No 34 [9], material from which was not available for anthropological investigation.

Results and Discussion

The investigation recognized in the bone material many complexes, which contained skeletal remains from more than one individual. In some cases, different skeletons are recognized on field, in other – there is no documentation for recognition during excavation of ascertained individual in the studied material. Anthropological investigation ascertained 18 complexes with multiple (double and more) burials (47.37 % from investigated complexes) and 20 singular burials (52.63 %). Complexes, for which only field archaeological data are available, also present multiple burials (one, from grave No 19 being quadruple) [9]. From these published complexes the proportion of multiple vs. singular burials is 2:11. Lack of anthropological investigation of the material from these complexes and their high destruction makes this proportion unsure.

Specific for the demographic distribution of the skeletal population is the highly reduced number of children in the first age group 0-7 years (**Tables 1-2, Fig. 1**). The identified individuals under 7 years at death are ten (13.89%), from graves N 1, 20, 25, 31, 39, 50, 58, 59, 72 and 74. In all these cases, excluding grave No 20, these individuals are found in complexes with burials of more than one body, laid simultaneously. Similar situation is reported in the publication of the necropolis for grave No 19 with no anthropological investigation [9]. In most cases individuals from this age group (0-7 years) are found with skeletal remains from adults, in graves with double and multiple burials – graves No 25, 31, 39, 72, 74 (**Table 1**). In grave No 1 an individual at the age ca. 4 years at death is found in a double burial with an individual at age of about 7 years of age. Only in one case, grave No 20, is identified a single burial of an individual at about 6 years of age. Under one year of age are identified only two individuals – from graves No 50 and 72. In both graves are found skeletons from multiple burials, in grave No 50 are recognized skeletal remains from five individuals and from grave N 72 – two individuals. Both infants are identified after singular bone fragments. In grave No 50 is found a preserved right radius, which presents a length close to the mean value of full term newborn at 40 weeks of gestational development. The presence of this fragment in the grave may be explained as clue for the hypothesis that in the grave had been buried a pregnant female. The fragment from grave No 72 does not allow measurement, but may be associated with a newborn or a breast fed baby. Both graves contain female skeletons, the one from grave No 50 at the age of 40-50 years and the one from grave No 72 – at 35/40 up to 45 years. As in most skeletal populations the relative number of individuals in the age group of Infants II is reduced in comparison to the juvenile and adult ages.

As in many paleopopulations male to female ratio in the studied skeletal population (28:21) presents a predominance of male sex with 57.14 to 42.86 %. Specific for the age-sex distribution of the studied skeletal population is the relatively equal representation of specific age groups in both sexes (**Fig. 2**).

Nevertheless relatively similar distribution by age groups in males and females, after the analysis in more precise age intervals of 10 years, a higher mortality and lower survival in females in relation to males is visible in paleodemographic indices (**Table 3**).

The investigated series is one of the few known from the period in Bulgaria. The other site, which presents graves from the people from the settlements on the tells in the Thrace region is Yunatsite. Here are studied intramural grave complexes, which mostly present remains of small children [5, 12]. The demographic distribution is the opposite of the observed in the necropolis of Bereketska mogila, where in general a lack of individuals under one year of age is ascertained, with two exceptions, one explained with possible burial of a pregnant woman, or case of death during childbirth and no singular burials of individuals under 6-7 years of age are detected. The comparison between both sites could be interpreted as a confirmation of the hypothesis for specific ritual rules in populations from the Early Bronze Age in Thrace, which prevented burials of small children in the regular necropolis and their deposition in settlements.

The other materials from the period of the Early Bronze Age from Bulgaria, those from the Pit-grave culture, also present small representation of child ages in necropolises. Published materials are mostly from the dispersal of the culture in the regions North from Stara planina mountain with one exception of necropolis near Boyanovo, Yambol district, which is in the area of the Thracian Plain [17, 13]. In sex distribution of identified from these sites a higher prevalence of male sex in comparison to the observed in population from Bereketska mogila is visible. The studied Pit-grave complexes present also higher mortality in females at younger ages, respectively lower life expectancy by them, than ascertained for the population from Bereketska mogila.

Conclusions

Obtained results for age and sex distribution of identified individuals from studied series suppose a situation of unfavorable conditions for survival in the population. This assumption is supported from high incidents of simultaneous burials in the grave complexes. Different ages and sex of buried in these graves suppose dispersal of infectious diseases as a possible cause of death of the individuals in these complexes.

The specific age distribution can be explained with deposition of deceased in early age in distant area from the necropolis, possibly in the settlement. Some uncertainty in this conclusion cannot be excluded, as material from some graves remains unavailable for anthropological study. Some of these complexes present high level of destruction of skeletal material.

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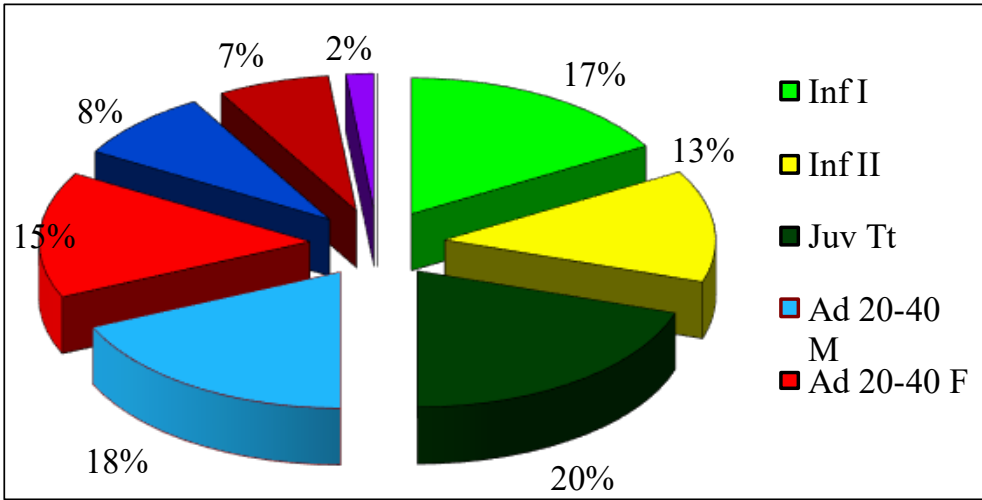


Fig. 1. Age and sex distribution of studied material.

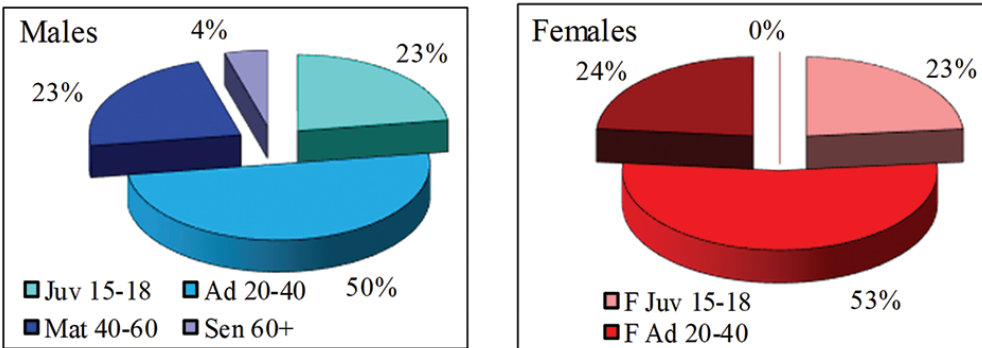


Fig. 2. Age distribution of identified individuals in both sexes.

Table 1. Individual identification of studied skeletal remains. y. – age in years; * – individual identified in laboratory analysis of the skeletal remains; S - individual identified in laboratory analysis after a single bone fragment; 0- sex unidentifiable; ? – features for sex identification are controversial and some are assessed with priority; M/F – features for sex identification are controversial and none can be assessed with priority; 30+ – over the specified age/20+ – individual with completed skeletal development.

Gr. N	Sex	Age y.	Gr. N	Sex	Age	Gr. N	Sex	Age
1	0	4	40	F	18/20-25	61	F?	15-18
1A*	0	7	46	M?	14-16	62	M?	14-16
2	M?	40/45-50	47	M	17-18	64	M?	30-40
2A*	F	20+	48	F	30-50	65	M?	40-60
2B*	F	20-30	50A	F	40-50	65A*	F?	30-50
6	0	15-18	50B	M	20+	66	F?	20-30
8	F?	16-18/19	50C	M	20+	68	M?	40-50
15	M	25-30	50S	0	0	67	M	25-30
18	F	20-25	50E*	0	5/6-10/11	69	M	25/30-35
18A*	0	12-14	51A	M	30-40	70	0	14-18?
18B*	0	10-11	51B	F?	20-25	71A	M	16-18
20	0	~6	51C	M	30-40	71B	F	17-18
25	M	30-40	51D*	M	50-60+	71C*	M	18/20-25
25A*	F	36-39	54A	M?	25/30-40	72A	F	35/40-45
25B*	0	6-7	54B	M	60-70	72B	0	0-1
25C*	0	10-11	54C*	F	20-25	73A	M	16/18-20
32	F	20+	54D*	F	40-45	73B	M	18/20-25
32A*	M	20+	56	M/F	30-40/45	74	M?	20+
31	M	50-60	57	M?	20+	74A*	0	20+
31A*	0	7-8	58	F?	20+	74X*	0	5-7
31S	0	14+	58A	0	~2	76A*	0	12-13
31S	0	2-6	58A*	M?	31-35?	76B*	F	20-30
35	M	30-35/40	58B	0	~2=58A	76C*	M?	25/30-35
37	M	18/20-25	59A	0	7-8			
39	M	20+	59B	0	3?			
39A*	F	20+						
39B*	F?	14-16						
39X	0	<7						

Tabl. 2. Individual identification of studied skeletal remains

	Inf		Juv			Ad		Mat			Sen	Tt	Ad+			Tt*	
	I	II	M	F	Tt	M	F	M	F	M	M		M	F	Tt		
N	10	8	5	4	12	11	9	20	5	4	9	1	60	6	4	12	72
%	17	13	8	6	20	18	15	28	8	7	15	2					
%*	14	11			17			28			13	1	83			17	

Table 3. Paleodemographic indexes for first 10-years age intervals for anthropological groups of *InfansII-Juvenis*, *Adultus*, *Maturus* and *Senilis* for both sexes and total population. Distribution of identified skeletons. $D_{(x)}$ by age intervals; $d_{(x)}$ – relative number of dead by age intervals; $l_{(x)}$ – relative number of survived by age intervals; $q_{(x)}$ – risk of death by age intervals; $e_{(x)}$ – mean life expectancy by age intervals; $a_{(x)}$ – mean life span by age intervals; M – males; F – females; Tt – total population; * – in the number of identified are added individuals with no sex identification in the age group.

Age	$D_{(x)}$ (M)	$d_{(x)}$ (M)	$l_{(x)}$ (M)	$q_{(x)}$ (M)	$e_{(x)}$ (M)	$a_{(x)}$ (M)
10\19	5	22.73	100	0.23	21.82	36.82
20\29	7	31.82	77.27	0.41	16.76	41.76
40\49	3	13.64	27.27	0.50	11.67	56.67
60\69	1	4.55	4.55	1.00	5.00	70.00
	22					
Age	$D_{(x)}$ (F)	$d_{(x)}$ (F)	$l_{(x)}$ (F)	$q_{(x)}$ (F)	$e_{(x)}$ (F)	$a_{(x)}$ (F)
10\19	3	18.75	100	0.1875	18.75	33.75
20\29	7	43.75	81.25	0.5385	11.923	36.923
40\49	3	18.75	18.75	1	5	50
	16					
Age	$D_{(x)}$ (Tt)	$d_{(x)}$ (Tt)	$l_{(x)}$ (Tt)	$q_{(x)}$ (Tt)	$e_{(x)}$ (Tt)	$a_{(x)}$ (Tt)
10\19*	15	33.33	100	0.33	18.11	33.11
20\29	14	31.11	66.67	0.47	14.67	39.67
40\49	6	13.33	20.00	0.67	9.44	54.44
60\69	1	2.22	2.22	1.00	5.00	70.00
	45					