

**RECONSTITUTION OF THE MAIN DEMOGRAPHIC INDICES OF  
THE POPULATION EXHUMED FROM THE MEDIAEVAL  
CEMETERY OF LOZOVA (XIV<sup>th</sup>–XV<sup>th</sup> CENTURIES)**

ANGELA SIMALCSIK<sup>1</sup>, ROBERT DANIEL SIMALCSIK<sup>1,2</sup> and VASILICA MONICA GROZA<sup>1,2</sup>

<sup>1</sup>Iași Branch of the Romanian Academy, Department of Anthropology

<sup>2</sup>“Al. I. Cuza” University of Iași, Faculty of Biology

Corresponding author: [angellisimal@yahoo.com](mailto:angellisimal@yahoo.com); [antropologie.iasi@yahoo.com](mailto:antropologie.iasi@yahoo.com)

The scope of the present study was the demographic reconstitution of the population exhumed in the years 2010-2011 from the mediaeval cemetery of Lozova (Strășeni district, Republic of Moldova), belonging to the XIV<sup>th</sup>–XV<sup>th</sup> centuries. More than that, the demographic data obtained for the skeletal series of Lozova (51 skeletons) were compared with the data of other two synchronous mediaeval communities, namely with the human osteological material (32 skeletons) exhumed at Brăila – “Sf. Arhanghel Mihail” Church (XV<sup>th</sup> century) and with the human osteological material (101 skeletons) exhumed from the mediaeval cemetery of Hudum – Botoșani (XIII<sup>th</sup>–XV<sup>th</sup> centuries). The population of Lozova is characterized by a high mortality of children and adolescents (39.2%). More than one third of the population did not attain the age of 20 years. The mortality ratio among adults attained 17.6%, while that of mature people – 43.1%. No survivor older than 60 years could be found. At the level of the whole population under analysis (0-x years), life expectancy at birth is of 27.23 years. For subjects older than 20, life expectancy is of 25.5 years – in both sexes. The average age of death calculated for the segment of adult population is of 36.5 years for men and of 42.0 years, respectively, for women, the values indicating a slight sexual dimorphism in favour of women (6 years more). The value of the masculinity index (22/13) indicates a higher ratio of men vs. women.

*Key words:* medieval cemetery, Lozova, XIV<sup>th</sup>–XV<sup>th</sup> centuries, anthropology, paleodemography.

## 1. INTRODUCTION

The mediaeval archaeological site of Lozova – *La hotar cu Vornicenii (In the neighbourhood of Vorniceni)* has several cultural-chronological horizons, which explains its special scientific importance for the mediaeval archaeology and history of Moldova, the interdisciplinary study of this site elucidating, to some extent, the problems related to its regional history during the establishment and consolidation of the province of Moldova. The site here under investigation is situated in the vicinity of the border between the actual rural settlements Lozova and Vorniceni, where, during the reign of Alexandru cel Bun (Alexander the Good) there apparently existed the village (now not present, any more), offered, together with Lozova, Vorniceni and other seven villages from the Bucovăț valley, on April 25, 1420 by the voivode to his counsellor, Minister Oană, for his „*right and faithful work*” [2, 25].

Lozova is situated in the central-western part of the Republic of Moldova, on the territory of the present district Strășeni, at a distance of about 45 km west of Chișinău. The mediaeval archaeological site of Lozova – *La hotar cu Vornicenii* is situated on the right side of the Bucovăț brook, in the eastern end of microzone *Oanța*, about 1 km eastwards the border of the actual village of Lozova, and about 0.8 km from the west border of the Vorniceni village. The oldest horizon of the site dates as early as the beginning of Middle Age (VI<sup>th</sup>–VII<sup>th</sup> centuries), the second level corresponds to the period of Golden Hoard domination (the first and second third of the XIV<sup>th</sup> century), while the most recent archaeological horizon is from the period of the settlement of the Moldavian mediaeval state, namely the end of the XIV<sup>th</sup> century – beginning of the XV<sup>th</sup> century, at this last level being discovered a cemetery of a local Christian community. The exhumed skeletons belong to the dead ones buried according to the traditional Christian rites: head westwards and sight eastwards, lying on the back, stretched legs and elbow-bended arms, hands lying on the belly, chest or shoulders. Generally, the funerary inventory is poor, represented by pieces of clothes or bronze, silver or glass paste ornaments. In the absence of coins, the funerary inventory discovered indicates that the cemetery was used at the end of the XIV<sup>th</sup> century – the XV<sup>th</sup> century [2, 25].

The archaeological investigations developed on the territory of Lozova village were initiated in 1958, when archaeological vestiges of a mediaeval rural settlement from the period of the Golden Hoard domination (XIV<sup>th</sup> century) were discovered. In 1969, at the bottom of a hill slope on the right side of Bucovăț brook, another mediaeval settlement was discovered, from the period of the Tartar-Mongolian domination. In 2006, apart from numerous ceramic fragments characteristic to the XIII<sup>th</sup>-XVII<sup>th</sup> centuries, an inhumation tomb is brought to light and studied in the following year – 2007 – by the specialists from the Center of Archaeology of Cultural Heritage Institute of the Academy of the Sciences of Moldova. The conclusion is that the rests belonged to an adult person buried according to the Christian rite [2, 25].

Along the years 2010 and 2011, ample interdisciplinary investigations have been performed in the site of Lozova, by the team of archaeologists from the Center of Archaeology of Chișinău, led by dr. Vlad Vornic, to whom the authors of the study extend their thanks for the osteological material provided, for the support and kind cooperation, as well as for all the archaeological information offered. The human osteological material exhumed during the two digging campaigns (2010 and 2011), even if representing only a tiny part of the mediaeval population having lived on the territory of Moldova, enriches the anthropological image of the region. The scope of the present study is the demographic reconstitution of this especially important population segment for the mediaeval period of Moldova. We do hope that the diggings at Lozova will continue, as the cemetery is much larger than the surface investigated up to now, the estimated number of tombs exceeding 150.

## 2. MATERIALS AND METHOD

The osteological material considered in the present study is represented by 51 human skeletons, namely 22 males, 13 females and 16 individuals with non-determined sex, the last ones belonging to the age categories *infans I* (0–7 years) and *infans II* (7–14 years). The 51 skeletons were excavated from 50 inhumation graves (tomb 12 is double) in the mediaeval cemetery of Lozova (district of Strășeni, Republic of Moldova) during the campaigns of 2010 and 2011. A general estimation of the condition of the material shows that about 50% of it is well-preserved, permitting a minute anthropological study; to this category belong most of the skeletons exhumed in the summer of 2011, a campaign to which the author of the present study took part, thus having had the opportunity of studying each skeleton *in situ*. The other part of the material, poorly preserved, is represented by incomplete or fragmentary skeletons. The skeletons exhumed in the summer of 2010 had been rendered incomplete during the archaeological diggings; from subjective motivations, only the skull and bones of the pelvis were taken over, the rest of the skeletal bones being buried in the end of the campaign without any anthropological analysis. The poor conservation condition of the skeletons discovered in the spring of 2011 may be explained by the repeated digging of the soil along the years, during the interventions made for processing and planning of the terrain. However, the general conservation condition is satisfactory, the osteological material permitting both individual and population analyses.

The anthropological study of the skeletons exhumed from the mediaeval cemetery of Lozova (XIV<sup>th</sup>–XV<sup>th</sup> centuries) begun with the restoration of the bone rests, as far as this was possible, after which marking, morphoscopic examination and taking over of anthropometric data were performed. The study of each skeleton in part – be it complete or only fragmented – began with the determination of sex and age at death. In some situations, the advanced bone deterioration permitted only estimations based on some anatomical characteristics, the final diagnosis remaining doubtful.

Determination of the age of death in individuals who did not attain the age of 20 years (*infans I*, *infans II* and *juvenis*) assumed analysis of: eruption of temporary and permanent dentition, the development stage of the dental buds, the fusion degree of the long bone epiphyses with the diaphyses and sizes of the appendicular skeleton, according to the methodology proposed by Maresh, Moorrees *et al.*, Trotter and Peterson, Fazekas and Kosa, Ubelaker, Jeanty, Scheuer and Black, Schaefer *et al.* [8, 12–14, 16–18, 22, 23].

For individuals older than 20 years (*adultus*, *maturus*, *senilis*), the characters employed for determining the age of death were: age changes in the pubic symphysis and wearing of the pelvic surface of the sacrum, modification of the spongy tissue from the long bones, the phenomena of skeletal involution and the existence of certain pathological processes caused by advanced age, the extent of synostosis of the cranial sutures and the wearing degree of the dental masticatory

surfaces. Determination of sex was based on the following complex of characters: general shape of the pelvis, size and opening degree of the greater sciatic notch, shape/size and curving degree of the sacrum, massiveness and robustness of the skeleton, development of joints and muscular insertions, development of the cranial shapes, shape and bending degree of the fore head, robustness and shape of the mandible, shape and type of the menton, shape and size of teeth. For the determination of sex and age at death in individuals older than 20 years, the methods, criteria and techniques recommended by Iordanidis, Stradalova, Ferembach *et al.*, Ubelaker, Brothwell, Buikstra and Ubelaker, Mays, Bruzek, Walrath *et al.*, White and Folkens, Schmitt, Blanchard [3–6, 9, 11, 15, 19, 20, 24, 26, 27] have been applied.

The demographic study developed on a skeletal series may contribute to the establishment of the old areas of human dwellings and of the size of the social groups, as well as to the socio-economic characterization of a community or for stating its health condition in different historical stages. Demography states that a population is a topic in itself that should be analyzed quantitatively, by the estimation of the number and density of its inhabitants, of the mean life duration of its individuals, of general and infantile mortality, of its structure on sexes and on age, of the life expectancy at birth [10]. The paleodemographic data are conclusive only in the case of statistically representative osteological series for each community, culture or historical period. As a matter of fact, distribution on sexes and age at death is only the *post mortem* demographic representation of the living populations [21]. The paleodemographic study of the population exhumed from the mediaeval site of Lozova necessitated an especially careful investigation of the characters indicating the sex and age of the 51 human skeletons. This was the more necessary as some of the analyzed skeletons were poorly preserved. Luckily, no case not permitting to establish the age at death occurred, and, in the case of adults – no sex determination was possible, so that the skeletal series here investigated is excellent for a demographic study.

Finally, for the realization of an as complex and convincing anthropological and demographic study from a paleohistorical perspective, the data obtained for the skeletal series of Lozova (51 skeletons) were compared with those of two other synchronous mediaeval communities, namely the ones published by Cantemir and Botezatu on the human osteological material (32 skeletons) exhumed at Brăila – the “Sf. Arhanghel Mihail” Church (XV<sup>th</sup> century), on one side, and with those of Antoniu and Obreja about the human osteological material (101 skeletons) from the mediaeval cemetery of Hudum – Botoșani (XIII<sup>th</sup>–XV<sup>th</sup> centuries) [1, 7].

### 3. RESULTS AND DISCUSSION

The osteological series exhumed from the mediaeval cemetery of Lozova (XIV<sup>th</sup>–XV<sup>th</sup> centuries) is represented by 51 human skeletons, of which 22 are males, 13 – females, the remaining 16 (8 belonging to the *infans I* age category and

8 to the *infans II* one, respectively) not permitting this type of determination. It was established that, out of the 22 male and, respectively, 13 female skeletons, two individuals of each category (2 men and, respectively, 2 women) died at adolescent years (*juvenis*), namely in the 14–20 years interval. There results from here that, out of the total number of 51 analyzed skeletons, 20 individuals did not exceed the sub-adult age (*infans I*, *infans II* and *juvenis*) and 31 individuals (20 men and 11 women) survived the age of 20 years (*adultus*, *maturus*). Mortality in the subadult segment, namely in persons with ages at death ranging between 0–20 years, records a quite high value (*infans I* – 15.7%, *infans II* – 15.7%, *juvenis* – 7.8%), which means that more than one third of the population (39.2%) did not attain the adult age. For the 20–x year interval, the highest frequency of deceases is registered in the *maturus* category (43.1%), while, in the *adultus* category, the ratio is of only 17.6%. Mention should be made of the fact that no individual reached oldness (60–x years).

Table 1 illustrates the structure, on sexes and categories of age, of the skeletal series of Lozova comparatively with the other two synchronous mediaeval series – Brăila (XV<sup>th</sup> century) and Hudum (XIII<sup>th</sup>–XV<sup>th</sup> centuries), with the observation that the percent data about the structure, on age categories, of the skeletal series of Hudum are slightly different from those of the original study of Antoniu and Obreja (1985). Our intervention attempted at correcting a few errors identified in statistical calculations [1, 7].

The first important observation is that mortality among children (*infans I* and *infans II*) is quite high in the population of Lozova (31.4%), especially when compared with the value of 15.63%, registered for the mediaeval population of Brăila. However, a comparison between the infantile mortality of the Lozova series and the synchronous one of Hudum indicates a reverse situation, in the Lozova population (31.4%) the value being significantly lower than that recorded at Hudum (44.51%), where almost half of the population died before the age of 14 years. For the *juvenis* category of age (14–20 years), when it is assumed that the human organism successfully faced the phenomenon of biological adaptability, mortality in the Lozova series is of 7.8% – a two times higher value than that of Brăila (3.13%), yet lower than the one recorded for the adolescents of Hudum (12.9%). Mortality in the *adultus* category of age at Lozova is 17.6%, the value observed for the *maturus* category being almost triple, attaining 43.1%. If considering the same categories of age at Brăila and Hudum, the mortality ratios are as follows: *adultus* Brăila – 15.6%, *maturus* Brăila – 62.5%; *adultus* Hudum – 28.7%, *maturus* Hudum – 7.92% [1, 7].

A comparison between the population of Lozova and the other two synchronous mediaeval populations evidences significant differences between the mortality ratios. Even if infantile mortality (0–14 years) is quite high in the Lozova population, two times higher than that recorded in Brăila, it remains lower than the values registered at Hudum, the situation being similar for adolescents (14–20 years), as well. As to the adult interval of age (20–30 years), the population of Lozova is

quite similar with that of Brăila, the values of mortality being quite close in these two communities. The mature interval of age (30–60 years) shows that, at Hudum, very few members of the community attained this age while, at Lozova, almost half of the population used to die between 30–60 years. Regarding the category of long living ones (60-x years), unlike the population of Lozova, where no old individual was found, in the comparative series, the percent values for the *senilis* category are around 3%. Thus, in the skeletal series of Lozova, the period of maximum mortality corresponds to the *maturus* age interval, similarly with the case of the Brăila population, yet different from that of Hudum, where the period of maximum mortality occurs in the *adultus* interval. Mention is again made of the fact that the *adultus* period lasts for only 10 years (between 20 and 30 years), while the *maturus* period is extended along 30 years, namely between ages of 30 and 60 years [1, 7].

*Sex ratio* or the index of masculinity for the whole deceased population of Lozova indicates a higher number of male skeletons, comparatively with the female ones (22 men/13 women), which is manifested in a striking disequilibrium “in favour” of men; the situation is valid both for the adult group of age (6 men/3 women), and for the mature one (14 men/8 women). A high value of the masculinity index may suggest that the population lived peacefully, without wars and violence.

Unlike the Lozova series, the *sex ratio* values in the other two synchronous mediaeval cemeteries are considerably different. The masculinity ratio for the whole mediaeval population of Brăila is slightly subunitary, which indicates an almost perfect equilibrium between sexes (14 men/15 women), while, in the mediaeval population of Hudum, the ratio is slightly higher than at Lozova, namely of 27 men/13 women, which indicates, again, the dominant presence of males. The observation was made that, in all the three populations, the *sex ratio* value is supraunitary in the *maturus* interval, yet without attaining the value of 2.0 (Lozova – 1.75, Brăila – 1.22, Hudum – 1.67), which shows that women survived, exceeding the adult age [1, 7]. As known, in the adult interval of age (20–30 years), a higher death risk was present, for women, in the mediaeval period, many of them not living until maturity. This interval of age is characterized by maximum fertility and, as known, the frequency of deceases during and post-birth was very high, being caused by infections, complications, lack of adequate medical assistance, high contagion, poor hygiene conditions. The fact that quite a high number of women lived after this critical moment of their life, attaining the adult age, shows that the social conditions that might have caused a high mortality ratio in this female adult period were not as unfavourable as possible.

The mean life duration, also known in demography as average age at death, calculated for the whole mediaeval population of Lozova (the 0–x year age interval), is of 27.23 years, while, at Brăila, a somehow higher value – of 36.8 years – is registered. Completely different is the case of the Hudum series, where the mean life duration recorded for the whole population is of only 16.99 years, a phenomenon caused by the extremely high ratios of infantile mortality (Tables 1 and 2).

*Table 1*  
Distribution on sexes and categories of age of the mediaeval skeletal series of the XIV<sup>th</sup>-XV<sup>th</sup> centuries, discovered at Lozova, comparatively with the skeletal series of the XV<sup>th</sup> century, discovered in the "Sf. Arhanghel Mihail" Church in Brăila, and also with the skeletal series of the XIII<sup>th</sup>-XV<sup>th</sup> centuries, discovered at Hudum-Botoşani

Sex, age	Male Lozova		Male Brăila		Male Hudum		Female Lozova		Female Brăila		Female Hudum		Indet. Lozova		Indet. Brăila		Indet. Hudum		Total Lozova		Total Brăila		Total Hudum		
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	
<i>Infans I</i> (0-7 years)	-	-	-	-	-	-	-	8	15.7	1	3.1	36	35.6	8	15.7	1	3.13	36	35.6	8	15.7	1	3.13	36	35.6
<i>Infans II</i> (7-14 years)	-	-	-	-	-	-	8	15.7	2	6.25	-	-	9	8.9	2	6.2	9	8.9	8	15.7	4	12.5	9	8.91	
<i>Juvenis</i> (14-20 years)	2	3.9	1	3.13	-	-	2	3.9	-	-	-	-	-	-	-	-	13	12.9	4	7.8	1	3.13	13	12.9	
<i>Adultus</i> (20-30 years)	6	11.7	1	3.13	19	18.8	3	5.9	4	12.5	10	9.9	-	-	-	-	-	-	9	17.6	5	15.6	29	28.7	
<i>Manus</i> (30-60 years)	14	27.4	11	34.3	5	4.95	8	15.7	9	28.1	3	2.9	-	-	-	-	-	-	22	43.1	20	62.5	8	7.92	
<i>Senilis</i> (60-X years)	-	-	1	3.13	3	2.97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3.13	3	2.97	
Indeterminabl <sup>e</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2.9	-	-	-	-	3	2.97	
<b>Total</b>	<b>22</b>	<b>43.1</b>	<b>14</b>	<b>43.7</b>	<b>27</b>	<b>26.7</b>	<b>13</b>	<b>25.5</b>	<b>15</b>	<b>46.8</b>	<b>13</b>	<b>12.9</b>	<b>16</b>	<b>31.4</b>	<b>3</b>	<b>9.4</b>	<b>61</b>	<b>60.4</b>	<b>51</b>	<b>100</b>	<b>32</b>	<b>100</b>	<b>101</b>	<b>100</b>	

*Table 2*  
Mean life duration (average age at death) of the mediaeval population of Lozova (XIV<sup>th</sup>-XV<sup>th</sup> centuries) viewed comparatively with that of the Brăila (XV<sup>th</sup> century) and Hudum populations (XIII<sup>th</sup>-XV<sup>th</sup> centuries)

Average age at death	Lozova (XIV <sup>th</sup> -XV <sup>th</sup> centuries)		Brăila (XV <sup>th</sup> century)		Hudum (XIII <sup>th</sup> -XV <sup>th</sup> centuries)	
	Total (0-x years)	Male (20-x years)	Female (20-x years)	Total (0-x years)	Total (0-x years)	Male (20-x years)
	27.23 years	36.50 years	42.00 years	36.8 years	16.99 years	31.88 years

For the adult segment of the Lozova population, namely for the subjects older than 20 years, the mean life duration, calculated separately on sexes, was of 36.5 years in men and of 42.0 years, respectively, in women, which permits the deduction that the women of Lozova lived – on the average – 6 years more than men. A comparison of these last data with those of the other two – historically synchronous – adult populations, shows that, unlike the case of Lozova, at Brăila, the members of the community used to die, generally, at approximately the same age, whichever their sex – namely, around the age of 40 years, while, at Hudum, the adult members of the mediaeval community lived – on the average – only up to ages of 31.88 years. In the mediaeval population of Lozova, life expectancy at birth takes a value of 27.23 years, while life expectancy at 20 years is equal in the two sexes: 25.5 years. Unfortunately, no comparative data are available on this demographic parameter for the synchronous populations of Brăila and Hudum [1, 7].

#### 4. CONCLUSIONS

The demographic study of the 51 individuals exhumed from the cemetery of Lozova (district of Strășeni, Republic of Moldova), belonging to the late mediaeval period (XIV<sup>th</sup>–XV<sup>th</sup> centuries), provides important information on the region, as well as on the historical moment it represents. The obtained results are extremely interesting, permitting the *post mortem* demographic representation of the mediaeval Lozova population. Worth mentioning first is the fact that the data obtained for the skeletal series here under study characterize the demographic context characteristic to the late mediaeval period in the Central Moldavian Plateau. The value of the masculinity index (22/13) indicates a higher ratio of men, comparatively with women. The population of Lozova is characterised by a high mortality in children (0–14 years) and adolescents (14–20 years) – 39.2% – which means that more than one third of the population did not live until the age of 20 years. The mortality ratio among adults (20–30 years) rises up to 17.6%, while that of the mature ones (30–60 years) reaches 43.1%. No survivor older than 60 could be discovered. Life expectancy at birth for the whole population here under analysis (0-x years) is of 27.23 years. For the subjects older than 20 years, life expectancy is of 25.5 years for both sexes. The average age at death, calculated for the segment of adult population (individuals older than 20 years), is of 36.5 years for men and of 42.0 years, respectively, for women, the values indicating a slight sexual dimorphism (with 6 years) in favour of women.

A comparison among the demographic indices of the Lozova population and those of the two other two synchronous mediaeval ones (Brăila, XV<sup>th</sup> century, and Hudum, XIII<sup>th</sup>–XV<sup>th</sup> centuries) evidences significant differences. In the group of Brăila, the masculinity index shows an almost perfect equilibrium between sexes (14/15), while at Hudum men are considerably more numerous than women (27/13), a situation similar to that of Lozova. Infantile mortality is two times higher in the



population of Lozova, comparatively with that of Brăila, yet without attaining as high values as those of Hudum, the situation being similar in the case of adolescents. The values of mortality for the adult segment of population (20–30 years) are close in the groups of Lozova and Brăila. The mature age interval (30–60 years) evidences that, at Hudum, very few members of the community attained this stage age, while, at Lozova, almost half of the population died along the 30–60 year interval. On the other hand, at Lozova, none of the members of the community reached the old age, the percent values recorded in the comparative series for the *senilis* category being around 3%. The average age of death, calculated for the whole mediaeval population of Lozova, is lower than that of Brăila (27.23 vs. 36.8 years), yet higher than that of Hudum, where this demographic parameter registers a value of only 16.99 years (mention is again made of the fact that, at Hudum, infantile mortality is extremely high). As to the adult segment of population (20–x years), if, at Lozova, men used to live, on the average, until the age of 36.5 years, and women until 42.0 years, at Brăila both sexes attained the age of about 40 years, whereas, at Hudum, the members of the communities did not go beyond 32 years.

To conclude with, the anthropological and, implicitly, demographic study of the 51 skeletons of Lozova will contribute to a better knowledge of the paleoecology of the populations having lived in late Middle Age on the territory of Moldova, as partially reflected in the living conditions of these communities.

*Authors contributions:* Angela Simalecsik (first author) – 60%; Robert Daniel Simalecsik (second author) – 20%; Vasilica-Monica Groza (second author) – 20%.

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