

## Infant and Juvenile Mortality in Populations from Bulgarian Lands in the Osman Empire (XV-XVII c.)

*V. Russeva*

*Institute of Experimental Morphology and Anthropology, Bulgarian Academy of Sciences, Sofia*

Data about age distribution into five years age intervals based on anthropological material from necropolises dated to XV-XVII c. in present Bulgaria have been analyzed using methods of paleodemography. Valuable results about infant mortality in the period have been obtained, which have been correlated with data for Central European and Balkan contemporary populations.

*Key words:* infant mortality, populations XV-XVII, Bulgaria.

### Introduction

Infant mortality is one of the most sensitive demographic indicators of changes in survival conditions of social and nature environment. Individuals of infant age are most vulnerable of negative influences like infections diseases, malnutrition, decrease in hygiene. These factors cause high variations in human life span in the first age after birth, which appears as an important indicator of social development. The study of infant mortality and survival in the period of XV-th-XVII-th c. is of importance for understanding the demographic processes in Bulgarian populations during and after Ottoman conquest of Balkans.

### Material and Methods

The present study makes use of data about age distribution of the anthropological material from the following necropolises: by town Kavarna and cape Kaliakra, which represent Christian populations of the flourishing trade centers of North Black Sea coast of Early Osman Empire, inheritors of Bulgarian populations from XIII-XIV c. [2, 14, 15, 17, 18, 21]; by villages of Krivina, Vladimirovtsi, Iliyantsi, Balsha, some of them dated in more wide chronological limits to XVIII c., which represent Bulgarian, Christian, rural populations [20, 22], by village Gradishte, near Shoumen, which represent Islamic population from the epoch [16, 19, 23]. The relative number of infant skeletons in the material from these necropolises exceeds 30 % (with a single exception of the big series from Iliyantsi with 29,5 % of infant skel-

etons) and the relative number of skeletons, assigned to the individuals in the first age interval of 0-4 years surpasses that of individuals of the second age interval of 5-9 years of age. The portion of infant skeletons exceeds even 40 % in more of the studied populations — Kavarna, Kaliakra, Krivina, Vladimirovtsi, Gradishte.

Data about age distribution of anthropological material are used in construction of life tables after the methods of paleodemography, using five years age intervals [1]. In analysis parameters from life tables, that directly describe mortality, are used, namely relative number of dead and risk of death in five-year age intervals of infant (Infans I, 0-7 years and Infans II, 7-14 years) and juvenile (Juvenis, 15-19 years) ages.

## Results and Discussion

The relative number of dead in the first age interval (0-4 years) (Table 1, Fig. 1) exceeds 25 % in populations from necropolises Kavarna, Kaliakra, Gradishte and Krivina. The population from Vladimirovtsi approaches to this group with a value of this parameter of 24.14 %. The population from Krivina is distinguished with the value of 41.94 %. The populations from Kaliakra, Gradishte and Krivina with this mortality frequency in first age interval show fast decrease in mortality for the second age interval of 5-9 years of age. On the contrary, in population of Kavarna such decrease has not been observed. It seems that some unfavorable factors have been acting in this case, which led to increase of mortality in the second age interval, instead of decrease as it has been more often observed. An increased infant mortality in the second age interval in the population from Kavarna is established as well in values of risk of death (Table 1, Fig. 2), being higher in the second age interval. Similar unfavorable distribution of values of relative number of dead and risk of death is established also for population from Vladimirovtsi. In populations from Kaliakra, Gradishte and Krivina values of risk of death for the first age interval are higher than calculated for second age interval.

Table 1. Values of relative number of dead and risk of death

	Kavarna		Ilienzi		Kaliakra		Gradiste		Balsha		Krivina		Vladimirovzi		Mean	
	dx	qx	dx	qx	dx	qx	dx	qx	dx	qx	dx	qx	dx	qx	dx	qx
0-4	27,30	0,27	14,24	0,14	26,85	0,27	26,56	0,27	16,67	0,17	41,94	0,42	24,14	0,24	19,61	0,20
5-9	22,37	0,31	12,08	0,14	14,79	0,20	9,90	0,13	10,00	0,12	6,45	0,11	20,69	0,27	14,36	0,18
10-14	6,26	0,12	3,18	0,04	3,89	0,07	5,73	0,09	6,67	0,09	6,45	0,13	3,45	0,06	4,64	0,07
15-19	2,66	0,06	7,59	0,11	3,11	0,06	6,77	0,12	3,33	0,05	6,45	0,14	10,34	0,20	4,92	0,08

Values of relative number of dead and risk of death (Table 1, Fig. 1, 2), calculated for first (0-4 years) and second (5-9 years) age intervals, are also close for the population from Iliyantsi. In this case this feature is due to the reduced mortality in the first age interval.

The lowest mortality is established in all of studied populations in the age interval of 10-14 years. In this age interval values of relative number of dead are low and values of risk of death are the lowest in populations from Ilientsi, Gradishte, Vladimirovtsi, and very close to the lowest values in the remaining studied populations (Table 1, Fig. 1, 2).

Mean values of the relative number of dead in the first and the second age intervals for the period are estimated to be 19.61 % and 14.36 %, respectively, so they have a relatively low difference of 5.25 % in-between. These values are strongly influenced by data from small series, where the relative number of infant skeletons is

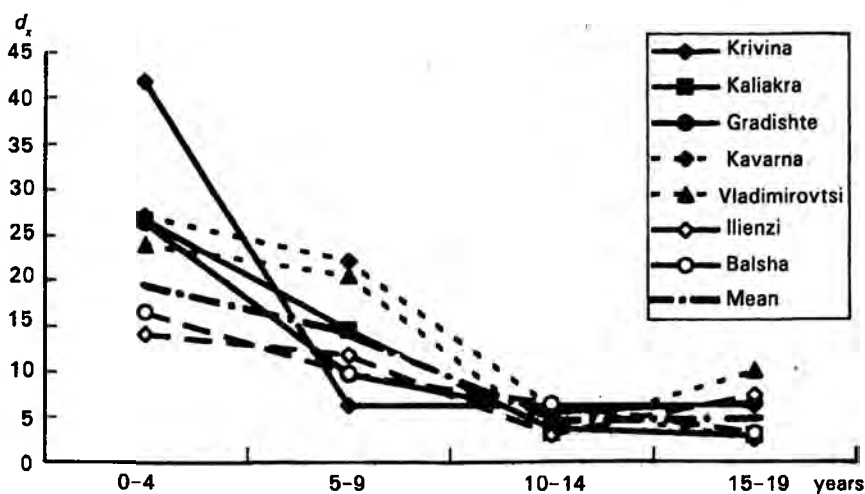


Fig. 1. Distribution of values of relative number of dead ( $d_x$ )

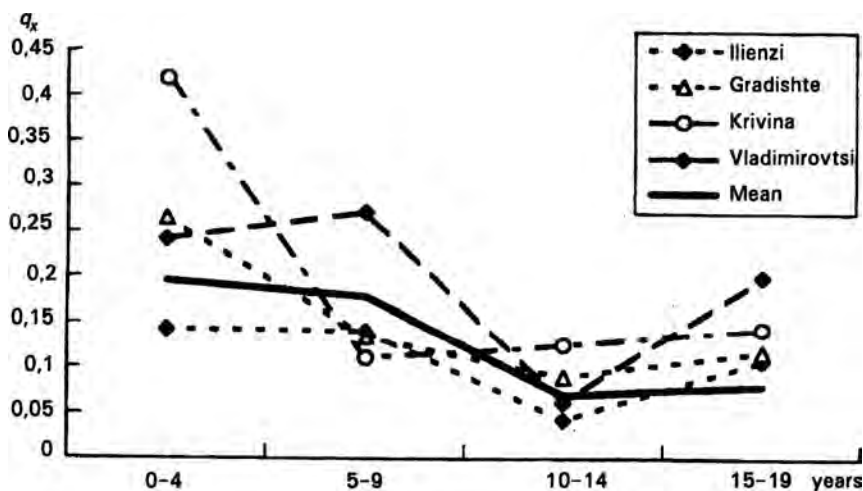


Fig. 2. Distribution of values of risk of death ( $q_x$ )

reduced, or from bigger series from Chiprovtsi, Bozhenishki Urvich and Debnevo, where infant mortality is not satisfactorily represented in the anthropological material from these necropolises.

A peculiarity of the studied populations is the increased juvenile mortality, established from the relatively high values of relative number of dead in the age interval 15-19 years (Table 1), in a large number of populations exceeding 6 % — Iliyantsi (7.59 %), Gradishte (6.77 %), Krivina (6.45 %), и Vladimirovtsi (10 %). The high juvenile mortality is associated with Christian populations, as with the studied Islamic population from the period. This feature could be caused by the premature physical and social overloading of individuals from this age group, expressed in in-

creased role of their labor in the agriculture and handicrafts, increased economical and military obligations to the state, premature marriages and subordinate position in the extended patriarchal families. Increased juvenile mortality is a negative tendency in demographic development of Bulgarian populations from the period.

Results obtained for infant and juvenile mortality in the populations from Bulgarian lands in the Osman Empire are comparable to the features of contemporary Balkan and Central European populations. In most of investigated skeletal populations, where infant mortality is satisfactorily represented in the first age interval it remains at a high level and does not strongly differ from the preceding period. At the beginning of the period in Rumanian populations from Măicănești-Străulești I (end of XIV-XV c.) [7, 8, 9] infant mortality exceeds 40 %, and the relative number of dead in the first age interval is the highest with 25.69 %. The relatively high infant mortality is kept in populations from XV-XVII c. In the population from the necropolis Străulești II (XV-XVI c.) infant mortality is reduced (34.75 %), but the relative number of dead in the first age interval remains the highest with 20,30 % [9]. In Borlad (XVI-XVII) infant mortality reaches 53.85 % [4], in Bucov — 45.16 % [10], in Radovanu XV-XVII c. Infant and juvenile skeletons (Infans I and II and Juvenis) to 19 years of age are 51.5 % from the anthropological material [11]. Lower relative number of infant skeletons (0-14 years of age) is established for populations from Brigadiru-Zimnicea — 25 % and Căscioarele — 18.18 % [10]. Summing up in the period preserves the pattern of age distribution of relative number of dead, where in the first age interval 0-4 years or in the group of Infans I (0-7 years) fall the highest values of relative number of dead. This is observed in Cernica, with 20.48 % skeletons from Infans I [3], Sînnicolau de Beiuș, with 36.5 % and Borlad 30.77 %. No strong changes in infant mortality in Rumanian populations are established from the end of the period XVII-XVIII c. In Sonnicolau de Beiuș infant mortality reaches 52.37 % [12], in Cernica — 2.58 %. Only population from Strehaia exhibits much reduced relative number of skeletons of infant individuals (0-14 years of age) (8.75 %) [10]. Considering data from the other sites this value could be due to the lack of material.

High infant mortality is established for population from the necropolis Nova Rača, Croatia. Here the relative number of dead in the first age interval reaches 50 % [13]. In the series from Kranj, Sloveniathe relative number of infant skeletons is reduced — 31.1 %, which is estimated by researchers as to low to be a representative one [6]. These two populations from Slavonic territory of the Habsburgian Empire, on the border with the Osman Empire show close parameters for infant mortality to the studied Bulgarian populations from the period. In population from Czech territories of the Habsburgian Empire in Dukovo infant mortality is estimated to be 30.9 % in spite of the upper chronological limit of the necropolis in the XIX c. [5].

## Conclusions

Three groups of necropolises with similar mortality pattern of infant and juvenile mortality can be derived from the demographic situation in the XV-XVII c. — first group — Krivina, Gradishte and Kaliakra with very high and high mortality in the first age interval, second group — Kavarna and Vladimirovtsi with high mortality in the first age interval and specifically high mortality in the second age interval, where in most of the studied populations the mortality is reduced and third group of populations from Iliyantsi and Balsha with favorable low values of mortality parameters below the mean values for the period. For most of the populations from

the period it is established an increased juvenile mortality.

The infant mortality rate in the studied Bulgarian populations correlates to that established for the Second Bulgarian Kingdom. A significant increment is established for the juvenile mortality.

Results about studied Bulgarian populations are close to that obtained from the investigations in the Balkans and Central Europe.

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