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Cover: The Early Hellenistic fortress Agios Donatos of Zervochori seen from the south. Photo: Esko Tikkala.

Layout: Vesa Vahtikari

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The People of Doliani: An Approach to the Paleodemography of the Late Byzantine Cemetery

Asterios Aidonis and Anestis Emmanouil

Introduction

The archaeological site of Doliani is located 12 km east of Igoumenitsa. The site has been linked with the ancient city of Phanote[1], one of the organized, middle-size settlements of the Hellenistic period in Thesprotia, and lies on a hill in the north bank of the Kalamas river (Fig. 1). The Hellenistic city has a fairly strong fortification that surrounds the hill in the north, while the south side is secured by the course of the river and the steep terrain. The Late Byzantine settlement mainly occupies the ancient acropolis, although building remains also have been detected on the northeast slope of the hill, between the inner and outer ancient fortification walls (Fig. 2). The archaeological research so far has brought to light at least nine houses, built around a circular threshing floor, which could be used as a meeting-square too. A network of paths leads to the houses, which were made of dry stone masonry and usually had two floors, an indoor toilet, and a yard with auxiliary rooms.

On the west tower of the north main gate of the ancient fortification are the remains of the church, which is believed to have been constructed in the Middle Byzantine period and to have stayed in use up to Late Byzantine times. A numerous assemblage of graves has been found all around the church ruins, mainly cist graves or simple pit graves, covered with crude limestone plates (Fig. 3). Only a few infant burials covered by a tile were found. The walls of the cist graves were also made of crude limestones that were placed vertically either along the entire length of the grave or only to the upper part of the body. Usually two rocks were placed bilaterally of the skull and a crude ceramic piece was put on the chest. In some cases the skull of the deceased was covered with a tile, while a tile was put just below the skull as a headrest. The deceased was inhumed in an extended position, facing east, with his upper limbs folded to the chest. No grave goods were put in the grave, except in a very few cases – four Frankish coins, wrapped in a piece of cloth, were found in one grave, and some bronze jewellery in a couple of others. Most of the graves were single burials, although tombs with two or more individuals were not exceptional. Overall, the burials follow a very distinctive style with minimal alterations and there does not seem to be any evidence of social diversification, even though a biosocial analysis has not been attempted yet.[2]

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[1] Dakaris 1972, 131-132.

[2] We wish to express our acknowledgements to G. Riginos for making available the study of the skeletal material, but mainly for his contribution to the interdisciplinary approach of archaeological research in Thesprotia. Special thanks to V. Lambrou and D. Drosou for their effectual, harmonious and pleasant collaboration during and after the excavation. We also thank E. Koulouri for her drawings and the excavation crew for the meticulous job, as well as M. Passiakos for providing the archival information and G. Pallis for translating the Turkish document. Finally we express our sincere gratitude to the Stavros Niarchos Foundation for its kind donation to the 32nd E.P.K.A., which was of premium importance for establishing, organizing and equipping the Laboratory of Osteoarchaeology.

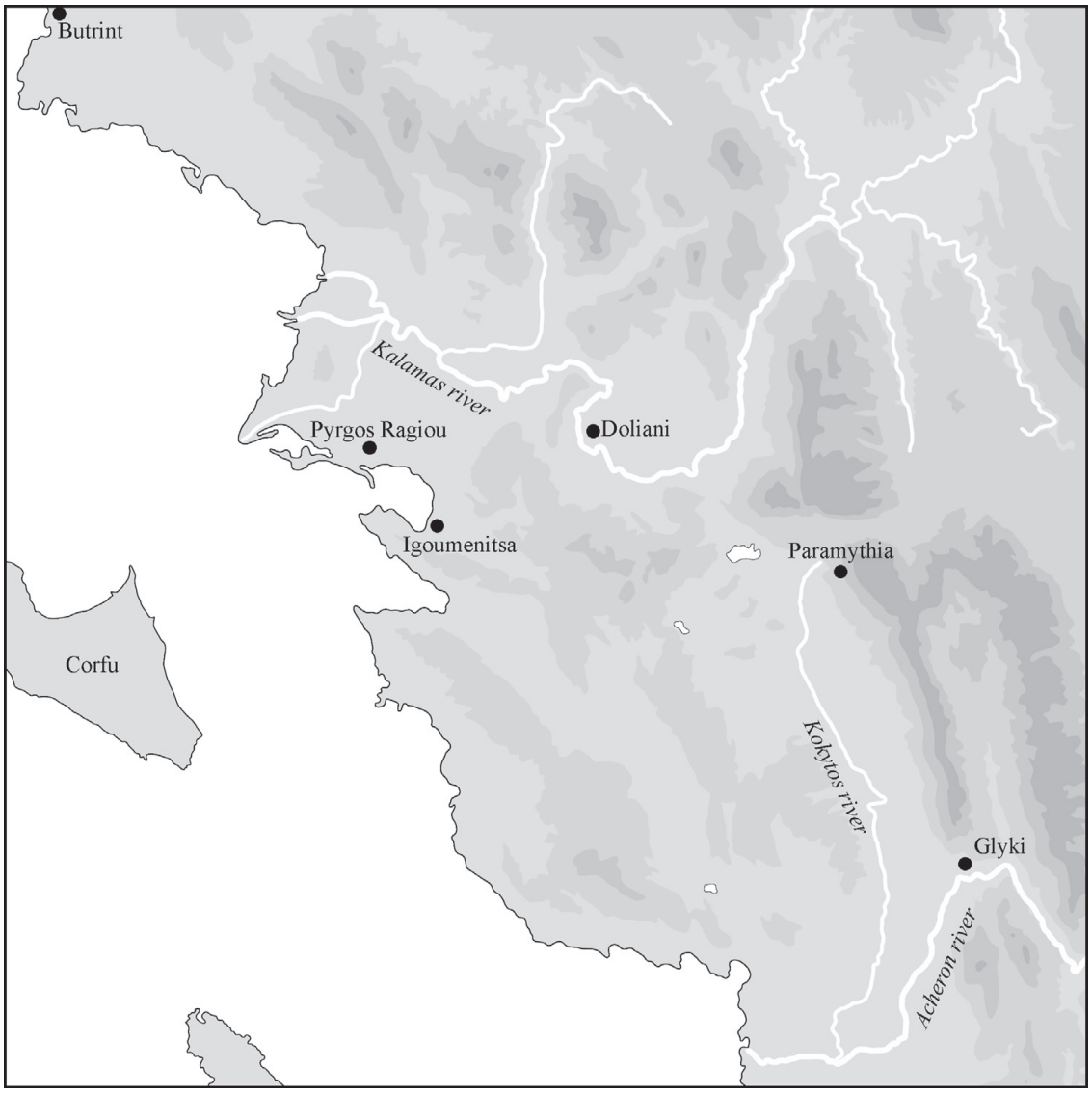

Fig. 1. The Location of Doliani inThesprotia.

Historical and chronological framework

From the thirteenth to the fifteenth century Epirus was a field of continuous conflicts. After the fall of Constantinople in 1204, the leaders of the Despotate of Epirus tried to keep their independence and/or establish their authority, either by fighting against, or making transitory alliances with, the Venetians and/or Byzantines. By the end of the thirteenth and during the fourteenth century, Byzantines, Venetians, Franks and Serbs fought for control of Epirus, while at the same time Albanian immigrants took up residence in the region. This chaotic period continued with the Ottoman conquest that took place in the fifteenth century.[3] The wider region of Epirus gradually became part of the Ottoman Empire and included in its system of public administration. By the start of the sixteenth century, the Ottomans consolidated their power in the region between

[3] Nicol 1991, 279-304.

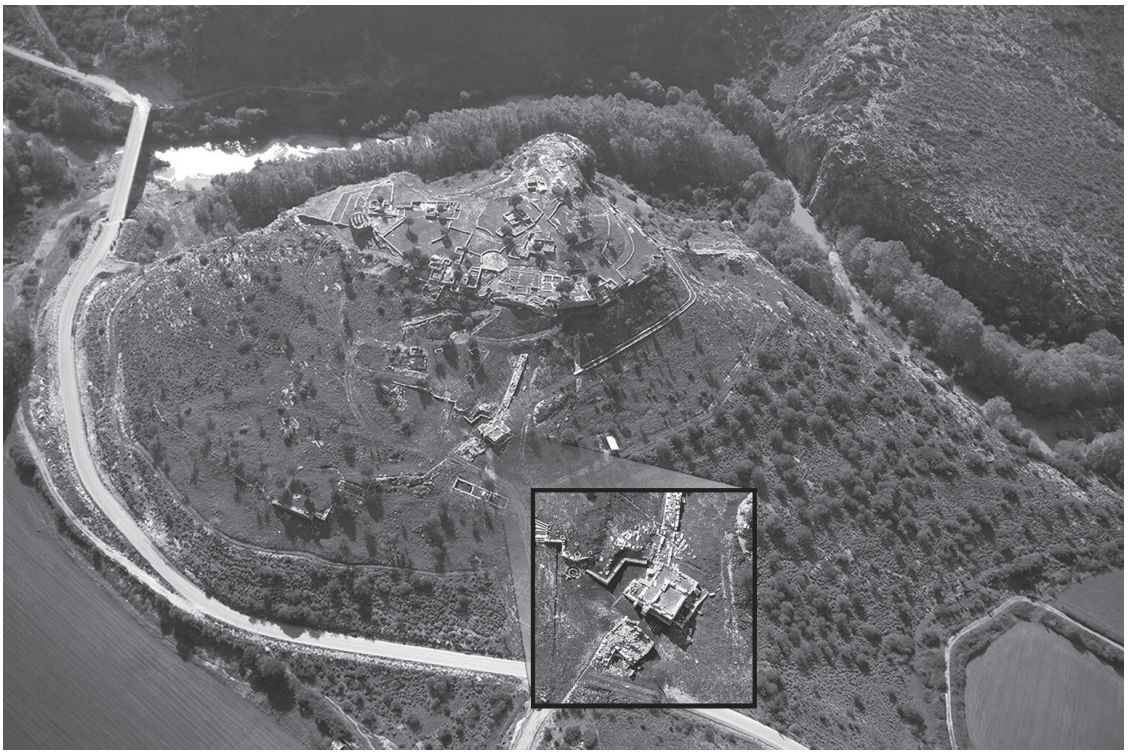

Fig. 2. The acropolis of Doliani and the Late Byzantine cemetery (enlarged area).

the Kalamas and Acheron rivers, and thus in the whole previous Byzantine province of *Vagenetia*.[4] However, the Ottoman-Venetian wars (1463-1669) for control of the region continued to produce violent disturbances and political convulsions in the area. All in all, consecutive battle events, political instability and population movements have made up the sociopolitical and historical framework of Late Byzantine to post-Byzantine Doliani.

The prevalent relative dating methods, based on the typology of the findings, commonly produce some dubiousness when trying to determine an exact chronological frame in which the use of the cemetery can be defined. At Doliani, archaeological evidence so far supports the continuous use of the ancient acropolis as a settlement, from the Middle Byzantine to the post-Byzantine period.[5] Building remains of the Middle Byzantine period, such as the small church and two pottery kilns in the area of the north gate, amplify that scenario. At this time the settlement's cemetery was northerly, at the foot of a neighboring hill, where a few graves of this period were excavated in 2000.[6] During the Late Byzantine period the cemetery was relocated to the area around the church. The Venetian coins discovered in one of the graves support that aspect. Some repairs of the inner fortification walls are dated to the end of the Byzantine era, while additions were made during the period that followed the Ottoman conquest. The tower on the top of the hill could belong to either the Late Byzantine period or the Ottoman period that followed. Finally, the building with the arch openings that is located at the southeast fortification tower could possibly have been a Muslim mosque.

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[4] Psimouli 2005, 73.
[5] Lambrou 2006, 226-227.
[6] Riginos in *ArchDelt* 55B (2000), in press.

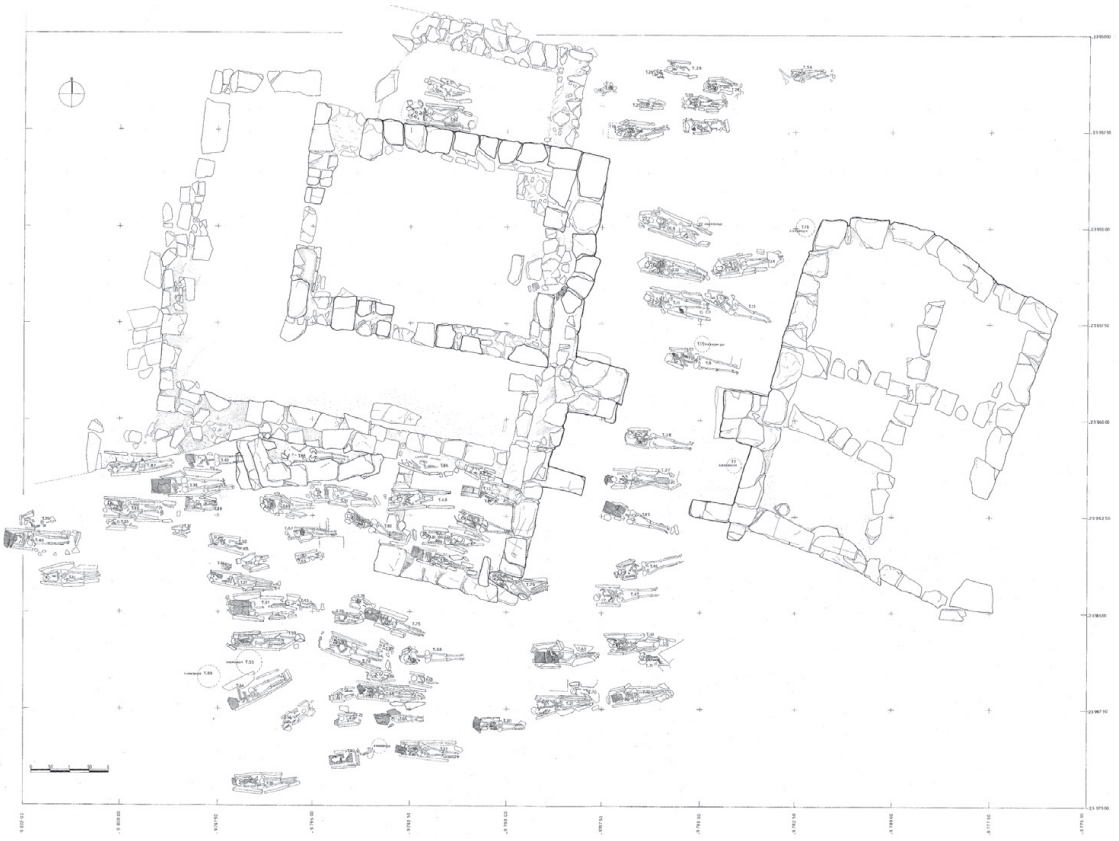

Fig. 3. Ground plan of the Late Byzantine cemetery.

The settlement is referred to as *Dolianoi* in a document which was compiled in January 1361[7] (or later[8]) by the Serb leader of Epirus, Symeon Uroš Palaiologos, who recognized Ioannis Tsapha Orsini as eligible property holder of a huge part of Epirus. The existence of the settlement at least in the first years of the Ottoman occupation as *Dulyani* is also confirmed by an Ottoman defter, which was compiled in 1431, after the Ottoman conquest of *Vagenetia*.[9] According to this unique document the settlement consisted of eight families or taxation units (*hane*) and a widow (*bive*), a total of nine taxpayer households. This means that the population of the settlement at this time was between 45 and 63 if we assume that a family consisted of five to seven members. Overall, the use of the cemetery seems to begin in the Late Byzantine period (fourteenth century) and to continue at least into the first years of the Ottoman occupation (fifteenth century), although no clear timeframes can be defined due to the lack of absolute dating.

Biases and potentials in paleodemographic studies

Paleodemographic reconstruction of a skeletal population depends to a large extent on the accuracy of sex determination and age estimation. While the techniques of assessing

[7] Aravantinos 1856, 311-315.
[8] Nicol 1991, 203-204.
[9] Inalcik 1954.

sex in adult skeletons have a high degree of accuracy (if the skeleton is in a satisfactory state of preservation), age estimation is much more problematic.[10] For subadults, aging methods are mainly based on tooth formation and eruption, processes that seem to be under tighter genetic control[11] as well as the fusion of growth centers of bones. Some variation must be expected on the basis of biological distance or affinity between the reference and target population, nutritional plane, health status and sexual dimorphism in dental development[12] and bone growth[13], but these processes occur within a comparatively short age range and can be assumed as accurate.[14]

For adults the picture is not so clear. The variety of macroscopic techniques developed so far were based on different skeletal age indicators (pubic symphysis, cranial suture closure, dental attrition, auricular surface or multifactorial methods) with different accuracy levels.[15] All these methods aim to estimate biological age by examining the degenerative-morphological changes that occur in a skeleton and their relation with true chronological age. Aging is influenced by intra- and inter-population variation, environment, heritability, nutrition, socioeconomic variables and disease, factors that are insufficiently understood or even unknown in cases of archaeological material. Moreover, methodological drawbacks such as the difficulty of aging older adults within an acceptable range of accuracy, or the tendency to classify individuals in the middle age groups, usually produce an underrepresentation of individuals over 60 and a mortality pattern that is not seen in ethnographic-historical demographic data or in model life tables.[16]

Sample representativeness is also an element of uncertainty when dealing with excavated osteological assemblages.[17] There is always some doubt whether or not the skeletons available for study constitute a representative and random sample of the once living actual population. Sample biases largely derive from preservational conditions of bones. Burial environment and mainly soil pH affect the preservation of bones, especially those of newborns and children due to their weak resistance to taphonomic conditions. Cultural and social factors such as funerary and ritual customs may also be a determinant of the sample representativeness. Furthermore, excavation methodology and strategy (e.g. inobservant recovery of bones, emphasis on grave goods rather than skeletons, as well as preferential excavation of a portion of a cemetery), could bias the sample. All the above-mentioned factors may introduce age, sex and social partiality and put a wrong interpretation on the actual structure and size of a skeletal population.

The potentials as well as the limitations of paleodemography have been discussed by several scholars.[18] In this argument, not only sample and aging methodological biases but also the theoretical approach and the analysis are central issues of discussion. For instance, the worldwide adopted "55 year old limit" for old adults reduces the mean age

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[10] Larsen 2002, 141.
[11] White 2000, 342.
[12] Hillson 1996, 125.
[13] White 2000, 349.
[14] Jakes 1992, 218.
[15] Jakes 1992, 190-191.
[16] Bocquet-Appel and Masset 1982, 321-333; Chamberlain 2006, 90.
[17] Waldron 1994, 10-27.
[18] Angel 1969, 427-438; Lovejoy *et al.* 1977, 291-293; Hassan 1981; Bocquet-Appel and Masset 1982, 321-333; Buikstra and Konigsberg 1985, 316-333; Jakes 1992, 189-224; Chamberlain 2006, 81-131.

at death, while the mode of distribution of indeterminate adults in calculations also affects life expectancy.[19] The assumptions of stationary or stable conditions produce different results when trying to interpret the demographic trends of a skeletal population. Both could match up to different periods of the existence of a community, whereas it is hard to distinguish them. Traditional aging methods and the following analysis of the data need to be treated carefully, especially as far as the accuracy of age estimation of adults older than 35 years is concerned. It is now widely accepted that paleodemographic analysis is affected by taphonomic factors and systematic biases. But it is also accepted that there is a plethora of information that derives from skeletal material, and paleodemography can provide answers on the demographic trends of ancient communities if we acknowledge those restrictions.

Materials and methods

The set of 98 graves under study that have been excavated in Doliani since 2005 constitute a large part of the Late Byzantine cemetery that surrounds the church in the area of the north ancient gate. Sixty-one of them are primary burials with a single skeleton (62.24%), while twenty were found containing two (20.41%) and eight containing three individuals (8.16%). In nine graves, four to seven were found to be the Minimum Number of Individuals (9.18%). A total of 170 skeletons were recovered. The preservation, as well as the representation of bones, varies from poorly preserved bones to skeletons in an excellent state of preservation. The major part of the skeletal material is in good condition.

Age Estimation and Sex Determination

Sex determination was based on the sex-related morphological features of pelvis and skull. Eleven traits of the pelvis and fourteen of the skull proposed by European Anthropologists[20] as well as Phenice's method[21] were used to sex the skeletons. If no skull or pelvis was available for study or the study was impossible due to the bad preservation of the above elements, or even if the study produced a neutral result, the individual was characterized as undetermined. No attempt was made to determine the sex of subadult individuals. For subadult skeletons, age-at-death estimation was based on teeth formation and eruption[22], epiphyseal fusion[23] and diaphyseal length[24]. For adult skeletons, age at death was estimated on the basis of European Anthropologists Recommendations.[25] No X-rays have been available yet in order to study the spongiosa structure of humerus and femur proximal epiphysis, and thus only pubic symphysis and endocranial suture closure were examined. Where no combination of the above-proposed methods could be applied, pubic symphyseal morphology[26], auricular surface morphology[27] and ectocranial suture

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[19] Jakes 1992, 214.
[20] Ferembach *et al.* 1980, 517-549.
[21] Phenice 1969, 298-301.
[22] Ubelaker 1989.
[23] Brothwell 1972, 58-63; Buikstra and Ubelaker 1994, 41-43; Scheuer and Black 2000.
[24] Scheuer and Black 2000.
[25] Ferembach *et al.* 1980, 517-549.

closure[28] scoring systems were used, depending on the anatomical regions which were better preserved.

Seven broad age classes were defined for the primary stages of classification: (1) *neonate:* birth to 1 year old, (2) *infant:* 2-6 years old, (3) *child:* 6-12 years old, (4) *adolescent:* 12-20 years old, (5) *young adult:* 20-35 years old, (6) *middle adult:* 35-50 years old, (7) *old adult:* 50+ years old. In cases where age estimation in adults was based on the combination of pubic symphysis and endocranial suture closure, the age derived according to the tables of Sjovold[29] and the individuals were put in 10-year age intervals. When the classification of a skeleton in an age group was impossible, an adult or subadult age estimation was assigned.

Demographic Methodology

In order to proceed with the demographic study of the Doliani population, the following assumptions must be made. As mentioned above, the excavated skeletons came from a large portion of the entire cemetery. Even though the recovery of the skeletal material was meticulous, the excavation has not been completed yet and this fact could lead to an *a priori* bias of the sample. To pursue the analysis we have to assume that the sample is random and representative of the population. We first estimate the Juvenile/Adult ratio $(J/A = D_{5\text{-}14}/D_{20+})$ proposed by Boquet-Masset.[30] This index is the ratio of children 5 to 15 years old to adults over 20 years, and has the advantage of being uninfluenced both by infant underrepresentation and by inaccuracy of adult age estimation. We then estimate the Sex ratio (Males/Females) to investigate the representativeness of the sexes, first in all adult individuals and then at different age classes (Young-Middle-Old-Senile Adults).

For the construction of the life table, individuals were distributed in 5-year age intervals, following the method proposed by Acsadi and Nemeskeri.[31] An individual aged within 10 years (e.g. 40-50) was distributed by adding half to each of the two adjacent age classes (e.g. 0.5 into 40-44 class and 0.5 into 45-49 class). In cases of broader age estimation, smaller fractions were added to the relevant age classes. As an upper limit to the life table we choose the age of 80+ as the oldest individual of the mortuary sample was estimated to be 70-80 years old. Such an advanced age limit is somewhat unusual for skeletal populations, but following the above-mentioned methodology and considering the methodological drawback of the upper limit of 50 or 60 years, we arrived at the decision to assume it reasonable. Stationary demographic conditions were presupposed in order to estimate mortality parameters such as life expectancy (e_x), probability of death (q_x) and survivorship (l_x). Stationary demographic conditions mean that during the period of use of the cemetery (at least two centuries) the growth rate of the population was equal to zero and no migration or immigration occurred. Even though these conditions are rather unrealistic for a long period of time, it seems reasonable to assume that during the use of the cemetery, the different growth rates that the population experienced, positive and negative, finally will have an outcome very close to zero.

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[26] Brooks and Suchey 1990, 227-238.
[27] Lovejoy *et al.* 1985, 15-28.
[28] Meindl and Lovejoy 1985, 57-66.
[29] Ferembach *et al.* 1980, 539-549, Appendix.
[30] Boquet and Masset 1977, 65-90.
[31] Acsadi and Nemeskeri 1970.

Age Class (years)	Subadult N	%	Female N	%	Male N	%	Undetermined N	%	Total N	%
b-1	40	51%							40	23.5%
2-5	26	33%							26	15.3%
6-10	5	6%							5	2.9%
11-15	3	4%							3	1.8%
16-20	4	5%							4	2.4%
21-35			5	16%	5	11%			10	5.9%
36-50			10	31%	13	30%	4	25%	27	15.9%
50+			12	38%	23	52%	2	13%	37	21.8%
Adults			5	16%	3	7%	10	63%	18	10.6%
Total	78	100%	32	100%	44	100%	16	100%	170	100%

Fig. 4. Composition by age and sex of Doliani skeletal sample.

Results and discussion

The composition by age and sex of the Doliani skeletal sample is summarized in Fig. 4. Of the total number of 170 skeletons, 78 (45.88%) were subadults and 92 (54.12%) adults. The representation of neonates and infants in the subadult sample is quite satisfactory, as the 0-5 age category counts 66 individuals, which is 84% of the subadult group or 38.8% of the total skeletal sample. The adult sample (20 years or older) consists of 32 females (34.78%), 44 males (47.83%), and 16 of undetermined sex (17.39%). A sex ratio of 137.5 males to 100 females was found (or 58% males and 42% females), which is far more than the expected 100-105:100.[32] When sex ratio was calculated for each age group respectively, was found 92:100 for young adults (48% males and 52% females), 149:100 for middle adults (60% males and 40% females) 90:100 for old adults (47% males and 53% females), while in the ages over 65, males have a noticeable preponderance over females with a ratio of 345:100 (78% males and 22% females).

The life table estimations (Fig. 5) reveal a life expectancy at birth (e_0) of 28.57 years. But if a newborn could survive to pass its fifth year, then it could be expected to live for 40 years more. The probability of dying (q_x) indicates a high mortality of infants, yet decreases after the fifth year of life and then gradually becomes higher after the 35th year. In adult age classes, mortality shows a slight increase in the 21-25 class and then there is a peak between 35-45 and another one between 50-60 years, giving a wavy form to the mortality curve (Fig. 6). This is probably an artificial result of aging methods based on morphological criteria.[33] The division of adult skeletons in broad age classes provides a mortality profile (Fig. 7) that follows a U-shaped age distribution, where most of the deaths occur at both extremes of the age range. The crude death rate was calculated to be 3.5%.

Subadult mortality is 23.53% in the first year of life, decreases to 15.3% between 2-5 years and then drops rapidly to 2.94% in the age class 6-10. The total frequency of individuals under 20 is 45.88%. For the estimation of the J/A ratio we calculate the index both with and without individuals below 5, because as far as the Doliani population is

[32] Alesan *et al.* 1999, 290; Angel 1969, 432.
[33] Chamberlain 2006, 90; Jakes 1992, 190-196.

Age Class x	Number of Deaths D_x	Percentage of Deaths d_x	Percentage of Survivors l_x	Probability of Death q_x	Person-yrs in age class L_x	Expectancy of Life e_x
b-1	40.00	23.53	100.00	0.24	88.23	28.57
2-5	26.00	15.30	76.47	0.20	275.27	36.21
6-10	5.00	2.94	61.17	0.05	298.50	40.77
11-15	3.00	1.76	58.23	0.03	286.73	37.70
16-20	4.00	2.35	56.46	0.04	276.43	33.80
21-25	7.00	4.12	54.11	0.08	260.26	30.16
26-30	4.00	2.35	49.99	0.05	244.08	27.44
31-35	4.50	2.65	47.64	0.06	231.59	23.67
36-40	10.94	6.44	44.99	0.14	208.88	19.92
41-45	10.94	6.44	38.56	0.17	176.70	17.83
46-50	7.11	4.18	32.12	0.13	150.16	15.90
51-55	10.31	6.06	27.94	0.22	124.56	12.90
56-60	10.81	6.36	21.88	0.29	93.50	10.78
61-65	6.66	3.92	15.52	0.25	67.82	9.17
65-70	8.16	4.80	11.61	0.41	46.03	6.43
71-75	7.66	4.50	6.81	0.66	22.78	4.19
76-80	3.92	2.30	2.30	1.00	5.76	2.50
Total	170					

Fig. 5. Life table calculations for Doliani skeletal sample (r=0).

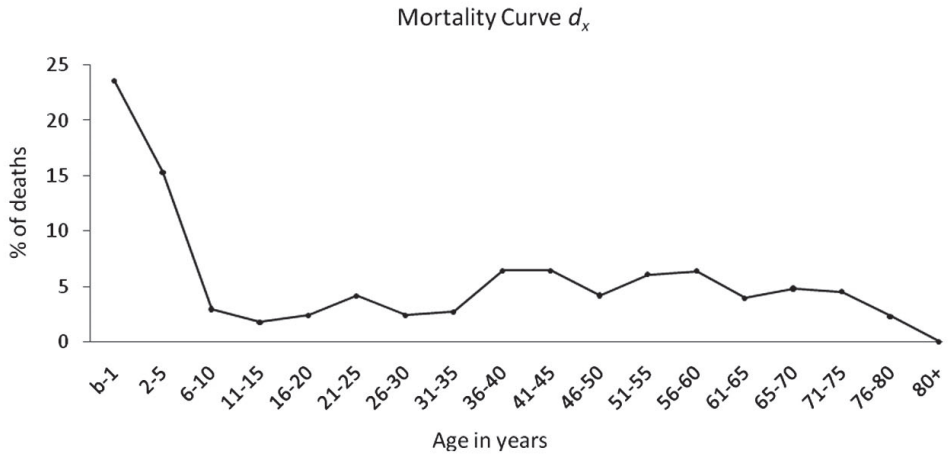

Fig. 6. The mortality curve of the Doliani skeletal sample.

concerned, it is difficult to ascertain underrepresentation of infants. A J/A ratio $(D_{5\text{-}14}/D_{20+})$ of 8 juveniles to 92 adults (J/A=0.087) was found. When the age group of 0-5 was added $(D_{0\text{-}14}/D_{20+})$ the ratio increased to 0.804. This is dramatically high for modern times, but not surprising in prehistoric[34] and in preindustrial populations.

Compared with Croatian skeletal populations of the same period (calculations based on data from Croatian composite series, from the tenth to thirteenth century, N=175[35]

[34] Angel 1969, 428.
[35] Slaus *et al.* 2002, 598-605, Table 3.

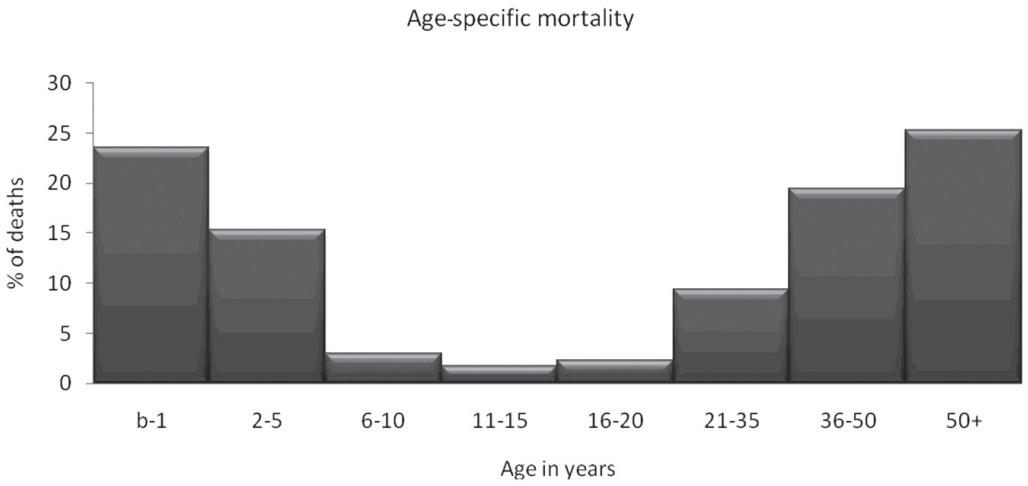

Fig. 7. Age-specific mortality of the Doliani skeletal sample.

and the Nova Raca sample from the fourteenth to eighteenth century, N=104[36]), the Doliani sample shows a lower juvenility index (Doliani $D_{5\text{-}14}/D_{20+}$ = 0.087, Late Medieval Croatian $D_{5\text{-}14}/D_{20+}$ = 0.282 and Nova Raca $D_{5\text{-}14}/D_{20+}$ = 0.286). Given the high mortality in Doliani's 0-5 children, there are grounds to presume that this difference emerges mainly from the high infant mortality rates and the low probability of dying after the fifth year of life, rather than from sampling biases – which, however, cannot be totally excluded since the excavation of the entire cemetery has not been completed so far. We avoided comparing the $(D_{0\text{-}14}/D_{20+})$ index because, as regards the Croatian samples, the authors report infants' underrepresentation. The 0-5 class mortality in the historical data from the early nineteenth century's Nova Raca parish Book of the Dead counts 32% of all deaths or 68% of the subadult group.[37] Furthermore, between 1517 and 1519 in England, 36% of children under six could be expected to die in non-plague years.[38] These figures, even though relatively smaller, are comparable with infant mortality rates of Doliani.

The impacts of high neonate and infant mortality could influence the demographic structure of the community. Newborn and infant survival is affected by endogenous and/or exogenous hazards such as gestation and birth defects, disease, socioeconomic effects and nutrition. The loss of newborns also affects the health status of the adult population and primarily the females, because it may lead to shorter birth intervals. This in turn increases the risk of perinatal complications and influences adversely the health of mothers and fetuses. This aggravation of the health status of women leads to higher mortality rates during the reproductive period, and is also related to the lower mean age at death of females in preindustrial periods. High infant mortality is also evidence of high fertility, although the latter is a complex demographic parameter that is determined by biological and social conditions. Moreover, our knowledge about fertility is somehow indistinct as it arises indirectly by looking into mortality.

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[36] Slaus 2000, 193-209, Table 1.
[37] Slaus 2000.
[38] Graunt 1662, cited in Lewis 2002; Lewis 2002, 11.

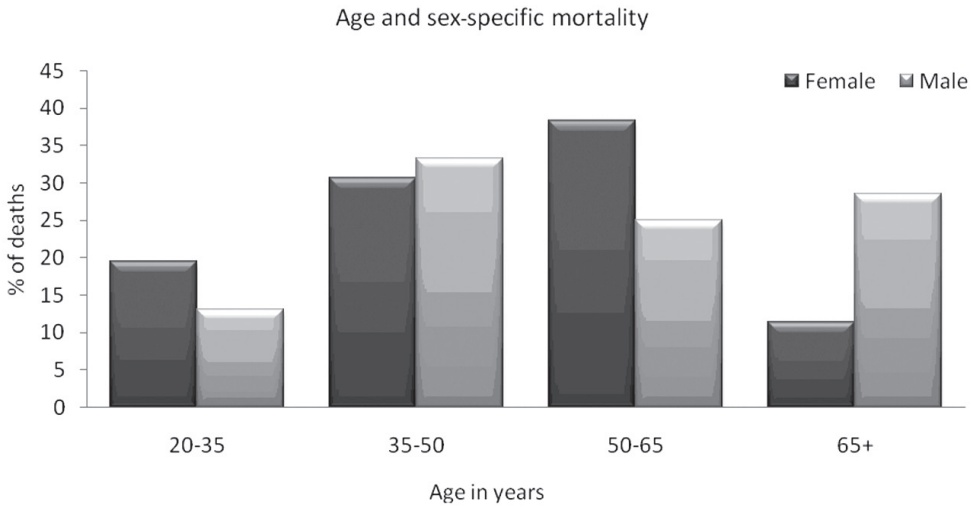

Fig. 8. Age and sex-specific mortality in the Doliani skeletal sample.

The distribution of female and male skeletons in 15-year age intervals (Fig. 8) produced a meaningful inventory of age and sex-specific mortality. While males of the 21-35 age interval are 13% of the total male group, females of the same age experienced higher risk of death since 19.5% died within this interval, half of them in the 21-25 cohort. The higher proportion of females fits in some measure with the known data from archaeological populations. Increasing mortality during the reproductive period reflects the higher risk that women experienced due to adverse effects of gestation, childbirth and lactation. It also corresponds with the high number of neonate deaths that was observed in Doliani. In the next age interval 36-50, mortality increases for both sexes to 30.7% for females and 33.35% for males, with the latter showing an increase of 20%. Females and males of older age categories show a dissimilar pattern of mortality. From 51 to 65 years, 38.35% of females and 25% of males died, while after 65 years of life, women count 11.4% whereas men 28.6%. The preponderance of males in the oldest age group corresponds with the higher probability of reaching advanced ages and the higher mean age at death that are recorded from prehistoric to historic times.[39]

Compared with the Croatian samples, the distribution of mortality is quite distinct (Fig. 9). While in Doliani the young adult mortality for combined sexes is 9.12% of the total sample, Croatian composite series show 38.9% (58.2% of females and 53.5% of males) and the Nova Raca sample shows 40.4% (69.7% of females and 54.3% of males). In the next middle adult group, mortality increases to 17.06% of all individuals in Doliani, whereas Croatian composite series decreases to 19.4% of total (20.9% of females and 34.9 of males) and Nova Raca to 16.4% of total (15.2% of females and 34.3% of males). Over the age of 50, Doliani increases to 27.94%, while Croatian composite series amount to 8.6% of the total group (16.1% of females and 8.3% of males) and Nova Raca 3.8% (6% of females and 5.8 of males). The distribution of deaths in Doliani increases proportionally from young to old adults, whereas Croatian samples reflect a mirror image, where most of the deaths are sown in the young adult group and gradually decrease to the

[39] Angel 1969, 430.

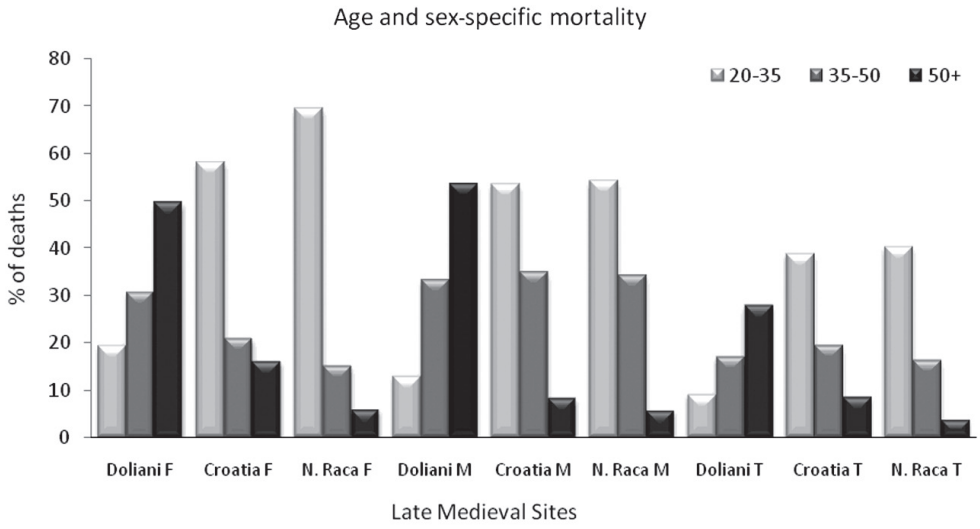

Fig. 9. A comparison of age and sex-specific mortality in adults from Doliani and Croatian sites (F: Female, M: Male, T: Total group).

lower percentage in old adults. Inter-population variation could be acceptable, but also other factors such as sample and methodological biases as well as specific environmental, biological and social conditions need to be investigated.

Conclusions

The study of the skeletal sample of Doliani provides valuable information for the structure of the community during the Late Byzantine period. Even though the excavation of the site has not been completed up to now, the data obtained so far are evidential mainly as regards infant mortality. The inhabitants of Doliani experienced high neonate and infant mortality rates which could be a determinant for the entire population. Maternal age, nutrition status and diet during and after pregnancy, birth intervals and health condition are critical for the survival or death of a fetus. Socioeconomic factors could also affect the mortality rates of infants. Breast-fed babies are more resistive to pathogens, as passive immunity is obtained through the nutrients of breast milk. On the contrary, early weaning, improper supplemental nutrition, poor hygienic conditions and quality of childcare eliminate the child's physical defense against infection and increase the risk of death during infancy.

The high infant mortality that was observed in Doliani also influences the health status of the population by having adverse effects on the health of mothers. The different mortality pattern that was observed between young adult men and women, with almost 20% of the latter dying in this age group, as well as the lower mean age at death and the lower probability of women to reach advanced ages, corresponds with the known data from archaeological skeletal material. However, the above results should be treated carefully, as underregistration of women could not be excluded. According to Angel[40]

[40] Angel 1969, 430.

childbirth and childbearing played a significant role in sex differences in longevity, but other factors should also be included in order to interpret sex- and age-specific mortality. Differentiation in stress levels and different living conditions that men and women experienced could also affect longevity, more probably with a combination of all the above-mentioned factors. The ongoing research in this direction could illuminate these aspects of life in Late Byzantine Thesprotia. Overall, the archaeological site of Doliani provides an opportunity to researchers of different scientific fields, to cooperate in order to examine in depth the various aspects of life of a settlement whose building remains, cemetery and written historical records are detected and obtainable for study.

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