Quaternary International xxx (2017) 1–15

Contents lists available at ScienceDirect

Quaternary International

journal homepage: www.elsevier.com/locate/quaint

First approximation to paleodemography through age-at-death profiles in hunter-gatherers from Southern Patagonia during middle-late Holocene

Jorge Suby [a, *], Leandro Luna [b], Claudia Aranda [c], Gustavo Flensborg [d]

[a] INCUAPA-CONICET- Department of Archaeology, National University of the Center of Buenos Aires Province, Bioarchaeology Research Group (GIB), 508 Street # 881, 7630, Quequén, Argentina
[b] University of Buenos Aires-CONICET, Institute of the Cultures (IDECU), Faculty of Philosophy and Letters, Bioarchaeology Research Group (GIB), Moreno 350, 1091, Buenos Aires, Argentina
[c] Ethnographic Museum J. B. Ambrosetti, Faculty of Philosophy and Letters, University of Buenos Aires, Bioarchaeology Research Group (GIB), Moreno 350, 1091, Buenos Aires, Argentina
[d] INCUAPA-CONICET. Faculty of Social Sciences, National University of the Center of Buenos Aires Province, Bioarchaeology Research Group (GIB), del Valle Av. 5737, B7400JWI, Olavarría, Argentina

ARTICLE INFO

Article history:
Received 4 November 2016
Received in revised form
24 March 2017
Accepted 28 April 2017
Available online xxx

Keywords:
Demography
Human skeletal remains
Hunter-gatherers
Patagonia
Middle-late holocene

ABSTRACT

The aims of this paper is threefold: 1) to explore the spatial and temporal variations in age-at-death profiles of human remains from Southern Patagonia in order to test and discuss the hypothetical increasing demography during the late Holocene; 2) to evaluate probable biases in the skeletal samples derived from preservation issues, social organization features and/or mortuary behavior, and 3) to compare the results with those reported for other hunter-gatherer societies from Pampa and Patagonia regions, offering valuable insights about the age-at-death profiles and paleodemographic for other Southern South American hunter-gatherers with different social characteristics. Age-at-death profiles from Southern Patagonia below 50°S, corresponding to the middle-late Holocene (i.e., after ca. 5500 years before present -YBP-), were constructed from a skeletal series of 119 individuals. Sex and age distribution of the entire sample was firstly analyzed, and two other age-at-death profiles were thereafter built, dividing the sample by region (Santa Cruz/Magellan, Northern Tierra del Fuego and Southern Tierra del Fuego) and by chronology (5500–3500 YBP, 3500–1000 YBP, 1000–400 YBP and after 400 YBP). The results show an attritional profile with two peaks, the first one between 1.1 and 10 years-old and the other for the 20.1–35 age group. A low number of newborns younger than 1 year-old is observed. This could be the result of a low mortality rate for this age interval and a high parental care during the first period of childhood, although taphonomical and mortuary biases cannot be completely excluded. Adult males and females are similarly represented in each age category. Juvenile Index data are higher than 0.17 between 5500 and 400 YBP periods, suggesting population growth, with a particular demographic increase between 5500–3500 and 1000–400 YBP periods. During the contact period, fertility is dramatically reduced. The age-at-death profile is similar to other hunter-gatherer past populations from Pampa and Patagonia regions. Despite the differences regarding mobility strategies, social organization, demographic dynamics and mortuary behavior known for those societies, all profiles show a comparable bimodal attritional pattern, although some variation in the most represented age-groups and demographic growth is observed.

1. Introduction

Several approaches to assessing demographic changes in past human populations from Southern Patagonia have been proposed during the last decade. Probability distribution of radiocarbon dates as well as molecular, isotopic and morphometric analyses were

* Corresponding author.
E-mail addresses: jasuby@conicet.gov.ar, jasuby@gmail.com (J. Suby), lunaranda@gmail.com (L. Luna), clauaranda@gmail.com (C. Aranda), gflensbo@soc.unicen.edu.ar (G. Flensborg).

http://dx.doi.org/10.1016/j.quaint.2017.04.035
1040-6182/

considered as proxies to infer population variations in size, residential mobility and dynamic population during middle and late Holocene. Among these studies, García Guraieb et al. (2015) offered the first comprehensive analyses of age-at-death profiles for the Salitroso Lake area (north-west of Santa Cruz province, Argentina), that was discussed together with molecular, isotopic and mortuary patterns. The authors suggested that paleoenvironmental changes (e.g., MCA), reduced the residential mobility and increased the demographic growth during the last millennium in the area (García Guraieb et al., 2015). Zubimendi et al. (2015) also detected evidence of increasing occupation density during the last ca. 1500 YBP in the northern coast of Santa Cruz province through probability distribution of radiocarbon dates. Molecular studies published by de Saint Pierre et al. (2012) suggested that hunter-gatherers from Tierra del Fuego-Patagonia showed a slight increase in population size in the last 2000 YBP, possibly associated to the movement of the Mapuche people to the south.

Through a biogeographical approach, Barberena (2008) proposed the existence of temporal variations in demography during different periods of the Holocene in the Southern extreme of the continent, with a steady pattern of increasing population density during the last ca. 4000–3500 YBP and a stronger archaeological signal between 1200 and 1000 YBP. These interpretations were based on the probability distribution of radiocarbon dates, stable isotope analysis and the patterns of mobility between the inland and the coast. More recently, Pallo and Ozán (2014) also proposed an increment of demography during last ca. 1500 YBP based on the chronological distribution of archaeological sites from Fuego-Patagonia as a proxy of demographic changes. No relationship between climatic and demographic changes was found, with the exception of a regional dryer period, possibly associated with the Medieval Climatic Anomaly between 700 and 500 YBP (Stine, 1994, 2000; Haberzetll et al., 2005), which coincides with increasing signals of human occupation in the archaeological record (Pallo and Ozán, 2014). In the same vein, Zangrando (2009) and Tivoli and Zangrando (2011) suggested that the observed changes in subsistence patterns (i.e., intensification in the consumption of birds and fishes) and spatial areas of foraging were a result of an increment of the demographic density in the Beagle Channel region (Southern extreme of Tierra del Fuego) since 1500 YBP. These results are coincident with those reported by Perez et al. (2016), who recently studied the radiocarbon frequency distributions and molecular data from different areas of Patagonia. The authors propose that human population size steadily increased since 4000 YBP, reaching a maximum about ca. 1000 YBP, particularly in the region analyzed in this paper.

Despite the importance of these valuable efforts to understand the paleodemographic changes during the Holocene in the Southern extreme of Patagonia, age-at-death profiles from human skeletal remains were not considered so far, which offer alternative and complementary independent data to evaluate this topic (Hassan, 1981; Paine, 1997; Hoppa, 2002; Chamberlain, 2006; Frankenberg and Konigsberg, 2006; Milner et al., 2008; de Saint Pierre et al., 2012; Ubelaker, 2014; Perez et al., 2016). Such kind of data is highly relevant to discuss previous research and to understand the social dynamics in this region in conjunction with other independent lines of evidence, sustaining or rejecting previous hypotheses derived from other sources of archaeological data. In the present study, age-at-death profiles are provided as a proxy to infer demographic patterns of past populations and its changes over time. At the same time, they are useful tools to detect biases in sex and age-at-death distributions from skeletal series.

This paper has three major aims. First, to explore the spatial and temporal variations in age-at-death profiles of human remains from Southern Patagonia, divided in Southern Santa Cruz/Magellan, Northern and Southern of Tierra del Fuego regions (Fig. 1) during the middle-late Holocene (after ca. 5500 YBP). This analysis will be useful in order to test and discuss the hypothetical increasing demography during the late Holocene, particularly after 1000 YBP. Second, to evaluate probable biases in the skeletal samples available for further bioarchaeological and paleopathological research derived from preservation problems, social organization features and/or mortuary behavior. Third, to compare the results from Southern Patagonia with those reported from other hunter-gatherer societies from Pampa and Patagonia regions. This comparison will offer valuable data about the age-at-death profiles and paleodemography trends in hunter-gatherers from Southern South America with different social and archaeological characteristics.

Considering the previously published chronological and molecular distributions of data, it is our hypothesis that variations and increasing population growth is expected during middle and late Holocene until the beginning of the colonization process, when dramatic social and biological changes produced a declination in population size. As no age-at-death profiles are available from Southern Patagonia so far, the hypotheses about this matter are based in curves for other hunter-gatherer societies. In this sense, we expect low life expectancy and balanced representation of skeletons by sex, preferably from young and middle adults. Moreover, low frequency of infants can be expected, due to both taphonomic and mortuary biases.

2. Paleoenvironmental, biocultural and bioarchaeological context

Southern Patagonia is geographically and ecologically diverse. Its Western and Southern margins are occupied by the Andes mountain chain, bordered by forests of *Araucaria araucana* in the north and *Nothofagus* sp. at the south. In contrast, the extra-mountain region in the continent and in the Central-Northern area of the Tierra del Fuego Island is characterized by desert steppes crossed by a few mayor rivers (Oliva et al., 2001; McCulloch et al., 2005). At present, the Southwestern archipelago is a densely forested strip with irregular coasts, cooler and rainier than the north, with mean temperature variations between ca. 1 and 9 °C and precipitations from 800 to 4000 mm a year. In contrast, the Atlantic coastline shows a high environmental and ecological variation due to its wide extension, from temperate deserts and steppes in the north, with precipitations below 400 mm, to a subhumid climate in the south (Bailey, 1989; Oliva et al., 2001; McCulloch et al., 2005).

Paleoenvironmental information suggests a relative climatic stability during the last ca. 5000 YBP (the temporal span discussed here), though some local specific changes in temperature and humidity were proposed for the late Holocene, probably related to the Medieval Climatic Anomaly (ca. 700–550 YBP) and the Little Ice Age (ca. 540–180 YBP). The first phenomenon was characterized by a warmer and arid event in the area, immediately followed by the second one, evidenced by a decline in temperatures and an increment of precipitation (Stine, 2000; Haberzetll et al., 2005; Borromei et al., 2007).

The archaeological record offers clear evidence of human occupation since the Final Pleistocene (ca. 11.000 YBP) in Southern continental Patagonia and Northern Tierra del Fuego (Massone, 1987; Prieto, 1991; Miotti et al., 2003; Paunero, 2003; Massone and Prieto, 2004) and since the middle Holocene (ca. 7800 YBP) in Southern Tierra del Fuego (Orquera and Piana, 2009). Detailed reviews of the chronological data available have been previously presented (Borrero, 1999; Orquera and Piana, 2009; Steele and Politis, 2009). However, the bioarchaeological record only covers the last ca. 6500 YBP, being the taphonomical biases and the

Please cite this article in press as: Suby, J., et al., First approximation to paleodemography through age-at-death profiles in hunter-gatherers from Southern Patagonia during middle-late Holocene, Quaternary International (2017), http://dx.doi.org/10.1016/j.quaint.2017.04.035