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Children's health and mortality in the Neolithic age in the Levant and Anatolia

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ABSTRACT: *Understanding the mortality and health status of children is key to understanding the well-being of any society, because they are the group most sensitive to environmental, behavioral and pathological variables and influences. The first complex human societies appeared in the Near East during the Neolithic period, so studying the health status and death rate of these societies, especially children mortality and the diseases that affected children under five years of age, is very important to enhance our understanding of the nature of these societies.*

Keywords: Neolithic, child mortality, Weaning, Near East, paleopathology.

INTRODUCTION

About 10,000 years ago, great shifts took place in the lifestyle of the people in the Near East, who used to live on hunting and gathering. Those societies adopted a lifestyle based on settlement and food production, and these transformations were called "Neolithization" (Bar-Yosef, 1998; Kuijt and Gorring-Morris, 2002). These changes were not positive in various aspects of life, as the health of the population and the mortality rate were greatly affected in terms of the emergence of new diseases and infectious diseases, and increased of malnutrition increased due to the exclusive dependence on one type of food. Children were the most affected group, as they are the most sensitive and responsive to changing conditions.

The mortality rate and nutritional and health status of children is one of the most important indicators that reflect the level of well-being of a society, because they are the group most affected by disease, nutrition and social and economic conditions.

This review paper aims to clarify the health and nutritional status of children in the Neolithic age in the sites of the Levant and Anatolia, through a review of relevant research and studies, and an attempt to discuss and interpret them through several common pathological indicators in biological anthropology.

Weaning and children feeding

Knowing the age of weaning can also shed light on the behavioral strategies of ancient societies, especially with regard to determining and controlling population size. This is identified by measuring nitrogen isotopes in the collagen of children's bones. The values of these isotopes are higher in breastfed children than in their mothers, and these ratios are measured in bones formed during infancy, such as rib bones (Richards et al., 2003). It is assumed that newborns mirror the mother's diet, as bone collagen in these babies derives its composition from protein in the mother's diet during the latter half of pregnancy (Hillson et al., 2013). Therefore, understanding the situation of children is an indirect way of understanding the reality of women mothers in a society.

Unfortunately, weaning studies are very limited, and they are limited to studying some sites in Anatolia. An isotope study at Çatalhöyük confirms that weaning began at about 18 months to two years after the birth of the child (Hillson et al., 2013). The isotope analysis data showed that weaning in Çayönü Tepesi did not begin until 24 months and was completed at 42 months, while weaning in Asıklı Höyük began at 12 months and was completed at 24 months of age. (Pearson et al., 2010), meaning that weaning practices were similar in Çatalhöyük and Asıklı Höyük, which are two locations close to each other, while Çayönü Tepesi is located in the south, closer to the northern Levant.

Child Diseases

Anthropological analyzes indicate that children at Çatalhöyük were raised in a fairly normal developmental environment, when compared to residents of other sites (Hillson et al., 2013). Children in the late stage of settlement at the site had a smaller skeleton for their age compared to children in the middle stage, reflecting a trend towards negative living conditions (Larsen et al., 2019).

Many cases of periostitis among children and infants were found in Çatalhöyük, although significantly fewer than in adults. But it is striking that the incidence of infection in infants and newborns was the highest among children and adolescents. Some published scientific studies indicate that the frequency of these diseases among these young age groups likely reflects a biological disturbance in the development of their immune system, and thus their high level of susceptibility to non-specific infection conditions (Hillson et al., 2013).

In BademAğacı, rickets caused by vitamin D deficiency were diagnosed in two children, one aged 1.5-2 years, and the other 4.5-5 years old. Studies conducted on this disease indicate that vitamin D deficiency is caused by many factors such as lack of exposure to sunlight, closed clothing, poor socioeconomic status, poor nutrition and housing conditions, and the length of breastfeeding. But the most important of these factors is the lack of exposure to sunlight (Erdal, 2009; Haimi and Kremer, 2017). Given the environment of the site which enjoys abundant sunshine, the disease cannot be attributed to environmental reasons, thus other factors, especially cultural practices such as swaddling children, dark housing, clothing, poor nutrition and prolonged nursing period are all combined factors that may have caused this disease (Erdal, 2009).

In a research report, Johanna Geerling described the skeleton of a male from Tell Sabi Abyad, aged 13-15 years, 140-145 cm long, suffering from defective enamel formation in the upper incisors, as a result of malnutrition in his early life, and also suffers from this juvenile from the septal aperture of the left humerus (Geerlink, 1989).

Children are also affected by infectious diseases, especially diseases transmitted to them through the pregnant mother. An example of this is what was discovered at Atlit-Yam, where a child was diagnosed with tuberculosis, using PCR analysis and bone anatomical diagnosis. The child was buried with a woman with the same disease, believed to be his mother (Hershkovitz et al., 2008).

Not all diseases appear on the skeletal remains of children and infants, as the disease can lead to death before leaving traces on the patient's skeleton.

Child and Infant mortality

It is noticeable that the mortality rate of newborns and infants increased significantly in the sites dating back to the Neolith age (Table 1), such as the sites of Tell Al-Ramad, Tell Aswad, Tell Halulah and Tell Al-Karkh in Syria, the sites of Al-Beidha and Ain Ghazal in Jordan, and the sites of Neve-Yam and Yiftahel in Israel, as well as Anatolian sites such as the Çatalhöyük site where two-thirds of the skeletons excavated from the northern area of the site belonged to children, and the Bademağacı site where 23 skeletons were excavated, mostly children. (Duru and Umurtak, 2005)

The mortality rate for infants and children aged 3-4 years was also high at Çayönü Tepesi.(Pearson et al., 2013) In another Anatolian site, Asıklı Höyük, there was a high rate of neonatal mortality that may be caused by disease or nutritional deficiencies (Pearson et al., 2013). The majority of deaths at Ilıpınar and Menteşe in northwestern Anatolia were children, as residents of the two sites buried their dead in areas surrounding the site, while only children (especially newborns) were buried in residential places (Lichter, 2016).

Table 1: Illustration of the percentage of infant and child skeletons among the total skeletons at Neolithic sites

The site	The total n of skeletons	N of skeletons of children and infants	Per. Of children's skeletons	The references
Tell Ramad	45	16	45.20%	Hershkovitz et al., 1986
Tell Aswad	119	56	47%	Baker et al., 2017
Dja'de el-Mughara	130	69	53%	Chamel, 2014; Baker, 2014
Abu Hureyra	162	75	46.2%	Molleson, 1994
Tell Halula	146	66	45.2%	Anfruns et al., 2013
Tell Al- Karkh	162	68	41.9%	Dougherty, 2011
Tell Qarrassa	26	14	53.8%	Santana et al., 2015
Beidha	43	33	76.7%	Kirkbride, 1967
Ain Ghazal	81	24	30%	Rollefson, 2000
Neve Yam	15	8	53.3%	Galili et al., 2009
Yiftahel	7	2	28.5%	Hershkovitz et al., 1986
Çatalhöyük	151	95	63.3%	Abraham, 2013
Bademağacı	48	30	62.5%	Erdal, 2009

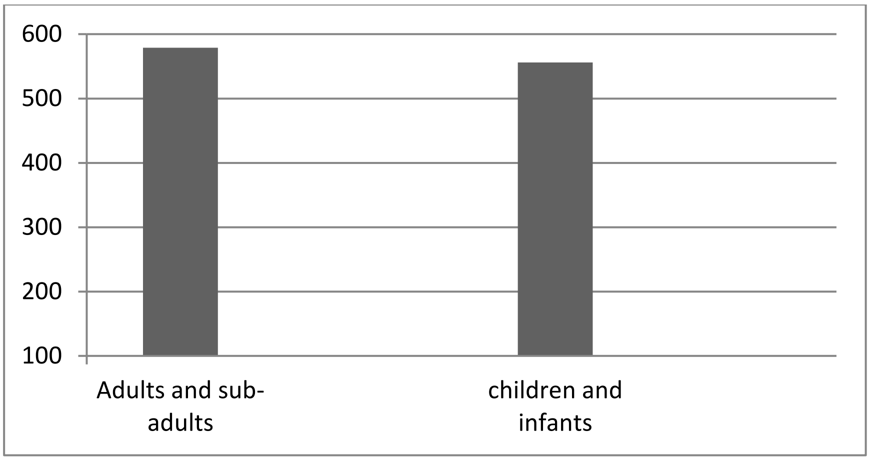
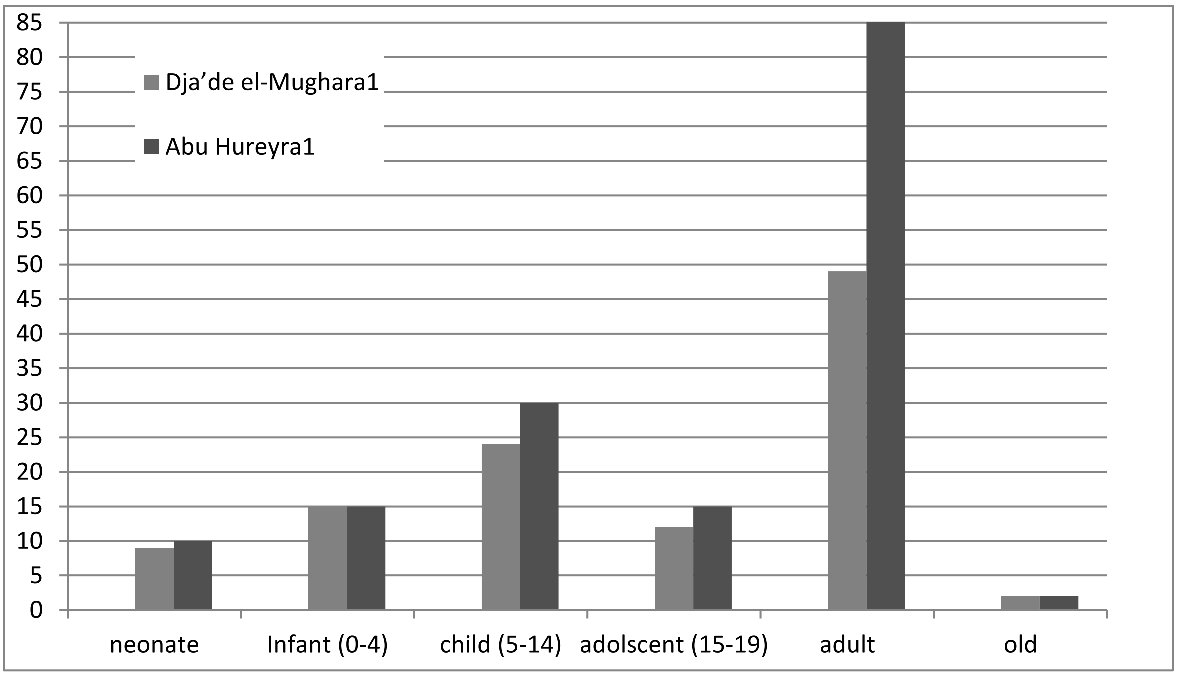


Fig.1: Total number of infant and child skeletons and number of adult skeletons at study sites shown in Table 1.

One of the problems is the identification of children and infants within the human remains, it is an issue of determining the age category that differ according to the methods used. For instance, it is suggested by Buikstra and Ubelaker (1994) suggest these categories and ages: Fetus (before birth), Infant (0-3 years), Child (3-12 years), Adolescent (12–20 years), Young Adult (20–35 years), Middle Adult (35–50 years) and Old Adults (50+ years). Although most researchers adhere to these categories, they differ in determining the ages they represent, and this makes the amalgamation of information from different sources difficult. For instance, Hillary Abraham (2013) generally followed this classification in his analysis of the human remains at Çatalhöyük. While Sean Dougherty (2011) followed the same classification, he made the category infants contain only samples that aged at death (0-1 year), and juvenile (1-12 years). As for Chamel (2014), it has created three sub-groups, "Adults" and "immature" and "perinatal", where adults included any individual over the age of 19. Group "immature" includes five categories divided by age as follows: (immature 0-1), (immature 1-4), (immature 5-9) , (immature 10-14) , (immature 15-19). As for Erdal, he put five age groups to classify individuals in the Bademağacı site, which are: Fetus, Infant (0-2,5), Child (2,5-15), young Adult (15-30), middle Adult (30-45), Old (+45) (Erdal, 2009). This difference makes the process of merging this data difficult. While figure 2 shows the age distribution of two BBNB sites, which are Abu Hureyra and Dja'de el-Mughara, figure 3 for Bademağacı, that dating back to early Neolithic (EN), figure 4 shows the age distribution of Çatalhöyük, and figure 5 shows the age distribution of Tell Al-Kerkh dating back to Pottery Neolithic (PN) (Table 2), due to the availability of more detailed data about them, in addition to the presence of many individuals in these sites. But the problem is the difference in the definition of age categories. The individuals (Immature 0-1) and (Immature 1-4) in Abu Hureyra and Dja’de el-Mughara were placed in the infant category, while the authors' definitions were adhered to with regard to the Çatalhöyük and Tell Al- Karkh sites. despite this difference, some important observations can be drawn.

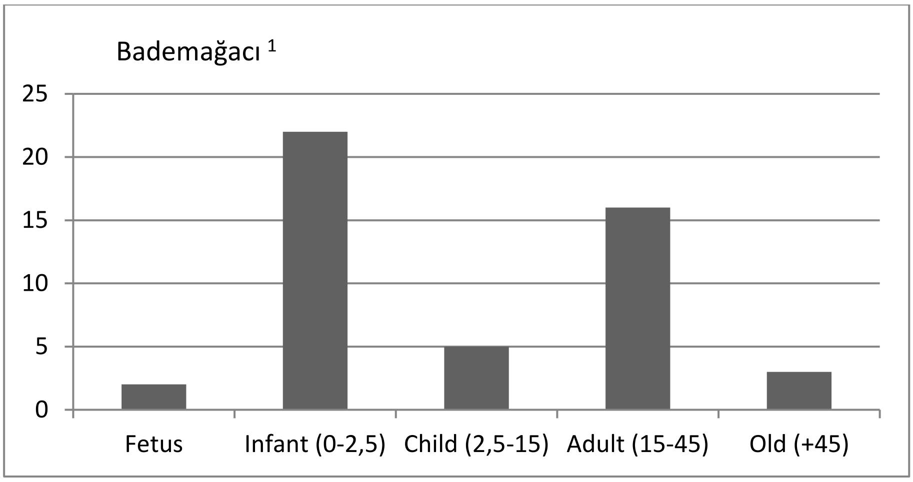
Table 2: The sites focused on in this study

Sites	Period	Reference
Dja’de el-Mughara Abu Hureyra Bademağacı	Ancient BBNB Middle BBNB, Late BBNB EN	Chamel, 2014 Erdal, 2009
Çatalhöyük Tell Al- Karkh	 PN	Abraham, 2013 Dougherty, 2011



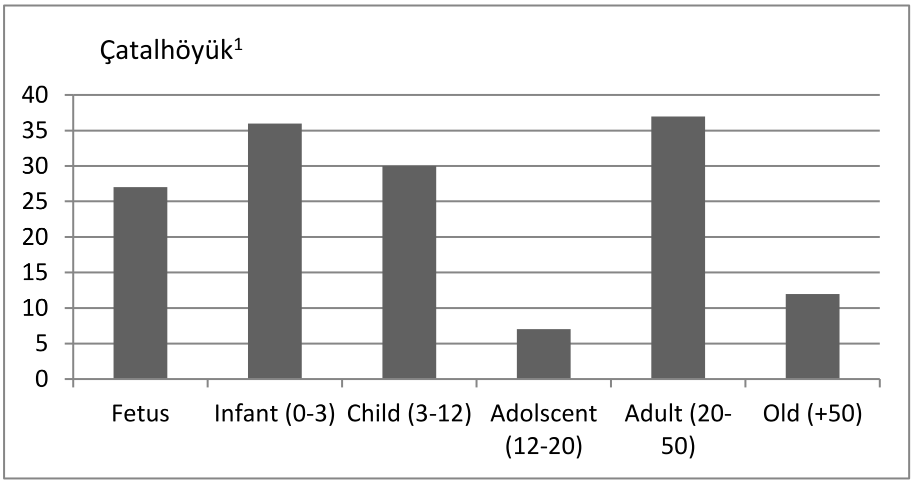
[1]Chamel, 2014

Fig.2: age distribution of some study populations.



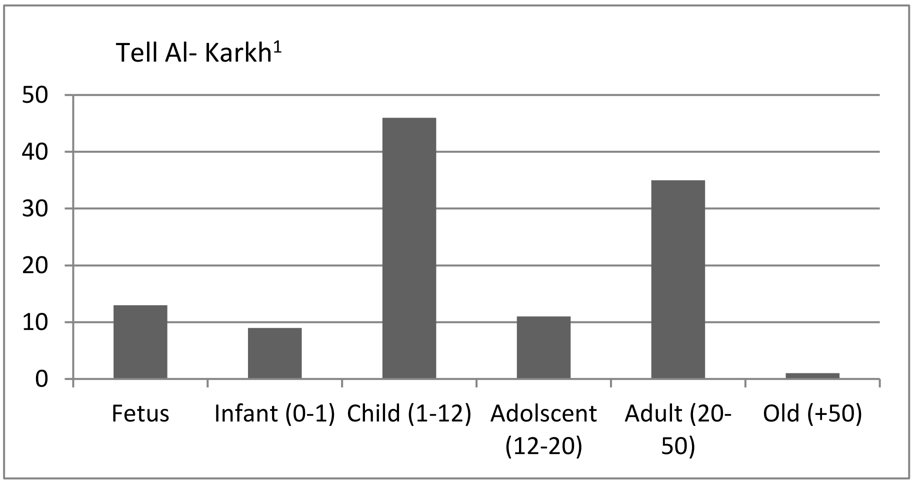
[1] Erdal, 2009

Fig.3: age distribution of Bademağacı.



[1] Abraham, 2013

Fig.4: age distribution of Çatalhöyük.



[1]Dougherty, 2011

Fig.5: age distribution of Tell Al-Karkh.

The age-at-death rates shown in Figures 2,3,4,5 indicate a significant increase in infant and under-five mortality. its suggest that around half of all children died before they reached the end of puberty. More than half of the children were infants and neonate. This reflects the stressful conditions during the early years. As for the high mortality at the neonate, it indicates the poor health of the mother, in which the fetuses and perinatal are affected. Fewer deaths in the Old adults (50+), indicates that the average life expectancy in these societies was less than 50 years.

These facts can be explained in the light of what is revealed by the study of the stages of weaning in these children and the study of isotopes in the bones of children and mothers, which show that the children were weaned early in the Çayönü Tepesi, and replaced with unfortified plant foods that cannot meet the exact nutritional needs of the child under 5 years old (Pearson et al., 2010). The presence of anemia, especially in children between birth and five years, was noted, a disease that occurs due to malnutrition, and this would weaken children's resistance to diseases and thus raise the possibility of death at an early age (Ozbek, 2004).

DISCUSSION

All previous studies showed results that the agricultural transition had negative consequences on the health status of Neolithic populations (Angel, 1966; Cockburn, 1971; Cohen and Armelagos, 1984; Larsen, 1995; Hershkovitz and Gopher, 2008; Eshed et al., 2010; Goodman and Armelagos, 1989; Chamel, 2014; Stutz et al., 2021) mothers and children were especially effected, and that early weaning and nutritional alternatives to breast milk were not sufficient, which caused high rates of infant mortality. These conclusions require further support by studying a larger and more comprehensive sample in the future.

In light of the observations that have been made, the significant increase in infant mortality can be explained. Children under the age of five are affected by intrinsic factors such as the development of the immune system and external factors represented by environmental stress such as infections, digestive disorders, infections and malnutrition. Most of the deaths of children were from infants and under puberty, which means that after this age the death rate slows down. Children were affected by early weaning, and this was compensated by food alternatives that depend on vegetable carbohydrates, and these foods were not sufficient to compensate for the nutritional deficiency that the infant derives from mother's milk. The effects of these nutritional disturbances, which may be related to weaning, are evident in the very high frequency of linear enamel hypoplasia, accompanied by cribla orbitalia and porotic hyperostosis (Anfruns et al., 2013; Dougherty, 2011; Anfruns and Oms, 2013; Pearson et al., 2013; Bocaege, 2015; Erdal, 2009; Sołtysiak and Wiercinska and Kozlowski, 2015) (Table 3), among adults in Neolithic societies.

Table 3: Percentage of stress-related illnesses out of the number of individuals observed

Sites	Number on individuals	cribla orbitalia, porotic hyperostosis	Number on individuals	enamel hypoplasia	reference
Tell Al- Karkh	221	12.3%		20.3%	Dougherty, 2011
Dja'de el-Mughara III	39/63	46.5%, 34.9%	61	50.8%	Chamel, 2014
Abu Hureyra (middle & late)	58/105	18.9%, 29.5%	114	44.7%	Chamel, 2014
Bademağacı	21/58	9.5%,17.9%	95	42.1%	Erdal, 2009

Enamel hypoplasia is closely related to nutritional level and quality, especially in developmental stages sensitive to nutritional factors. Understanding the time and rate of enamel formation allows an individual to determine the developmental age at which the disorder occurred. In adults, this can provide a record of the age from birth to 6 years (in conjunction with the development of permanent dental crowns) of the age at which they had a physiological abnormality sufficient to disrupt enamel formation (Goodman and Armelagos, 1989; Larsen, 1995). While cribla orbitalia and porotic hyperostosis are caused by several pathological factors such as thalassemia, sickle cell anemia and iron deficiency, it can indicate nutritional deficiency (Goodman and Martin, 2002; Oxenham and Cavill, 2010; Hershkovitz et al., 1991; Ascenzi et al., 1988; Ziegler, 2011). Other studies have found that delaying exclusive breastfeeding can increase the deaths of children under five (Pearson et al., 2010).

This type of disease (cribla orbitalia and porotic hyperostosis, enamel hypoplasia) should be considered as an elective survival indicator that affects some individuals more than others, and the population tends to compensate for this effect with a higher birth rate. Once the disease has been overcome, between weaning and puberty, life expectancy increases dramatically (Anfruns et al., 2013), and Early weaning can help increase the number of births who will be the target of selective pressures as well.

Babies have also been affected by infectious diseases transmitted from the mother; In some locations, they suffered as a result of cultural behaviors such as the prolonged period of breastfeeding, swaddling with fabrics, and building houses in a way that blocks the sun’s rays from children, which led to vitamin D deficiency, which resulted in rickets. These observations show that children's health is mainly associated with maternal health, as the structural record shows. It is worth noting that studies of isotopes in the bones of some sites showed a discrepancy in access to food resources between males and females, in favor of males in obtaining vegetable protein (cereals) and animal. which negatively affected the health of females; This would also adversely affect the health of newborns and infants at a later time. The proteins provided by breast milk provide natural immunomodulators that help defend against pathogens of infection and disease, and facilitate the optimal development of important physiological functions in newborns (Lönnerdal, 2003).

Another factor that harmed females is death at birth, which will cause the death of newborns. Tsuneki notes that the mother's life was short in Tell Al-Karkh (Tsuneki A. 2011). Also, deaths among females of early reproductive age (15-20 years) were significant (Hershkovitz and Gopher, 2008).

Children are the group most susceptible to environmental and behavioral adaptive factors, and understanding their health through paleopathology can provide important data about social, cultural, nutritional and environmental practices and relationships in ancient societies.

REFERENCES

Abraham, Hillary. 2013. *Household Burials and Community Organization at Çatalhöyük, Turkey*. Senior Honors Thesis in the Department of Anthropology. University of Michigan.

- Anfruns J, Estebaranz, F, Martínez, L.M, Pérez-pérez A. 2013. La poblacion Neolitica de Tell Halula (Syria) Estudio antropologico (campanas 1995-2005). In: Miquel Molist Montana (ed). *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria, Tomo II* . ministerio de educacion, cultura y deporte, Madrid, Spain, pp 440-449.

- Anfruns J., Oms J.I. 2013. Antropologia y paleopatologia dentarias de la poblacion neolitica de Tell Halula. In Miquel Molist Montana (ed) *Tell Halula: un poblado de los primeros agricultores en el valle del Éufrates, Siria, Tomo II*. ministerio de educacion, cultura y deporte, Madrid, Spain, pp 450-569.

- Angel, L.J. 1966. Porotic Hyperostosis, Anemias, Malarias, and Marshes in the Prehistoric Eastern Mediterranean. *Science*, VOL. 153. 760-763.

- Ascenzi A., et al. 1988. Diagnosis of thalassemia in ancient bones: Problems and prospects in pathology. In: Ortner and Aufderheid (ed) *Human paleopathology*. Smithsonian Institution Press, United States of America, pp 73-75.

- Baker, O. 2014. *Paléoépidémiologie de populations néolithiques datant du PPNB (Syrie) Nouvelles données sur la tuberculose avant la domestication*. Thèse de doctorat non publiée. École Pratique des Hautes Études, Paris, France.

- Baker O, Chamel B, Coqueugniot E, et al. 2017. Prehistory of human tuberculosis: Earliest evidence from the onset of animal husbandry in the Near East. *Paléorient*, vol. 43, n°2. pp. 35-51.

- Bar-Yosef, O. 1998. Agricultural Origins: Caught Between Hypotheses and a Lack of Hard Evidence. In O. Bar-Yosef (ed) The Transition to Agriculture in the Old World. *The Review Of Archaeology , Special Issue*. vol. 19, pp 58-64.

- Bocaege, Emmy. 2015. *Childhood growth in the Neolithic: a detailed case study of Çatalhöyük*. Thesis submitted for the degree of Doctor of Philosophy. Institute of Archaeology, University College London.

- Buikstra, J. E., and Ubelaker, D. H. 1994. *Standards for data collection from human skeletal remains*. (Report Number 44). Fayetteville, AR: Arkansas Archaeological Survey.

- Chamel, B. 2014. *Bioanthropologie et Pratiques Funeraires Ddes Populations Neolithiques du Proche-Orient : L'impact de la Neolithisation*. École doctorale des sciences sociales (ED 483). Université Lumière Lyon 2.

- Cockburn T.A. 1971. Infectious disease in ancient populations. *Curr. Anthropol.* 12(1): 45-62.

- Cohen, M. N., & Armelagos, G. J. (Eds.). 1984. *Paleopathology at the origins of agriculture*. Academic Press INC. New York.

- Dougherty, S. 2011. Sickness and death: evidence from human remains. In Tsuneki et al. (eds.), *Life and Death in the Kerkh Neolithic Cemetery*. Department of Archaeology. University of Tsukuba, Tsukuba, pp 27-30.

- Duru, R, Umurtak, G. 2005. *Höyücek - 1989-1992 Yılları arasında yapılan kazıların sonuçları*. Ankara.

- Erdal, Y.S., 2009. Bademagacı Erken Neolitik insanları. *Arkeometri Sonucları Toplantısı* 24, 97–117.

- Eshed V, Gopher A, Penhasi R, Hershkovitz I. 2010. Paleopathology and the Origin of Agriculture in the *Levant. American journal of physical anthropology* 143:121-133.

- Galili Ehud, Eshed V, Rosen B, Kislev M, et al. 2009. Evidence for a Separate Burial Ground at the Submerged Pottery Neolithic Site of Neve-Yam. In: *Paléorient*, vol. 35, n°1. P 31-46.

- Geerlink J. 1989. The human skeletal remains of Tell Sabi Abyad. In Akkermans PMMG (ed). *Excavations at Tetll Sabi Abyad: prehistoric investigations in the Balikh*

Valley, northern Syria (pp 295-299). Oxford: British Archaeological Reports International Series 468.

- Goodman A.H, Armelagos G.J. 1989. Infant and childhood morbidity and mortality risks in archaeological populations, *World Archaeology*, 21:2, 225-243.

- Goodman A.H, Martin DL. 2002. Reconstructing health profiles from skeletal remains. In: Steckel RH, Rose JC (eds). *The backbone of history: health and nutrition in the western hemisphere*. Cambridge: Cambridge University Press.

- Haimi M, Kremer R. 2017. Vitamin D deficiency/insufficiency from childhood to adulthood: Insights from a sunny country. *World J Clin Pediatr*; 6(1): 1-9.

- Hershkovitz I, Donoghue H,D, Minnikin D.E et al., 2008. Detection and Molecular Characterization of 9000-Year-Old Mycobacterium tuberculosis from a Neolithic Settlement in the Eastern Mediterranean. *PLoS ONE* 3(10): e3426. doi:10.1371/journal.pone.0003426.

- Hershkovitz I, Garfinkel Y, Arensburg B. 1986. Neolithic skeletal remains at Yiftahel, Area C. *Paléorient*, vol. 12, n°1. pp. 73-81.

- Hershkovitz I, Gopher A. 2008. Demographic, Biological and Cultural Aspects of the Neolithic Revolution: A View from the Southern Levant. In: J.-P. Bocquet-Appel, O. Bar-Yosef (eds.), *The Neolithic Demographic Transition and its Consequences*, Springer Science+Business Media B.V, pp 441-479.

- Hershkovitz I, Ring B, Speirs M, Galili E, Kislev M, Edelson G, Hershkovitz A. 1991. Possible Congenital Hemolytic Anemia in Prehistoric Coastal Inhabitants. *American journal of physical anthropology* 85:7-13.

- Hillson S.W., Larsen CS, Boz B, et al. 2013. The Human Remains I: Interpreting Community Structure, Health and Diet in Neolithic Çatalhöyük. In: I. Hodder (Ed.), *Humans and landscapes of Çatalhöyük reports from the 2000-2008 seasons*. British institute at Ankara Monograph 47, pp 339-396.

- Kirkbride, Diana. 1967. Beidha 1965: An Interim Report, *Palestine Exploration Quarterly*, 99:1, 5-13.

- Kuijt I, Goring-Moris N. 2002. Foraging, Farming, and Social Complexity in the Pre-Pottery Neolithic of the Southern Levant: A Review and Synthesis. *Journal of World Prehistory*, Vol. 16, No. 4, 361-440.

- Larsen C.S, Knusel CJ, Haddow S, et al., 2019. Bioarchaeology of Neolithic Çatalhöyük reveals fundamental transitions in health, mobility, and lifestyle in early farmers. *PNAS* | vol. 116 | no. 26. 12615-12623.

- Larsen, C.S., 1995. Biological changes in human populations with agriculture. *Annual Review of Anthropology* 24, 185−213.

- Lichter, C. 2016. Burial Customs of the Neolithic in Anatolia – An Overview. In: Ünsal Yalçın (ed). *Anatolian Metal VII Anatolien und seine Nachbarn vor 10.000 Jahren Anatolia and neighbours 10.000 years ago*, Bochum, Germany, pp 71-83.

- Lönnerdal B. 2003. Nutritional and physiologic significance of human milk proteins. *Am J Clin Nutr*. 77(6):1537S-1543S.

- Molleson, Theya. 1994. The eloquent bones of abu hureyra. *Scientific American*. August. 70-75.

- Oxenham M.F, Cavill I. 2010. Porotic hyperostosis and cribra orbitalia: the erythropoietic response to iron-deficiency anaemia. *Anthropological Science*, Vol. 118(3), 199–200.

- Ozbek, M. 2004. *Çayönü'nde Insan*, Istanbul: Arkeoloji ve Sanat Yayınları. 24-32.

- Pearson J, Grove M, Ozbek M, Hongo H. 2013. Food and social complexity at Çayönü Tepesi, southeastern Anatolia: Stable isotope evidence of differentiation in diet according to burial practice and sex in the early Neolithic. *Journal of Anthropological Archaeology* 32. P 180-189.

- Pearson, J., Hedges R, Molleson T, Ozbek M. 2010. Exploring the relationship between weaning and infant mortality: an isotope case study from Asıklı Höyük and ÇayönüTepesi. *American Journal of Physical Anthropology* 143, 458-457.

- Richards M.P, Pearson JA, Molleson T, Russell N, Martin L. 2003. Stable Isotope Evidence of Diet at Neolithic Çatalhöyük, Turkey. *Journal of Archaeological Science*, 30, pp 67-76.

- Rollefson G. 2000. Ritual and Social Structure at Neolithic 'Ain Ghazal. In: Ian Kuijt (ed): *Life in Neolithic farming communities social organization, Identity, Differentiation*, Kluwer Academic, New York, pp 165-190.

- Santana J, Velasco J, Balbo A., et al. 2015. Interpreting a ritual funerary area at the Early Neolithic site of Tell Qarassa North (South Syria, late 9th millennium BC). *Journal of Anthropological Archaeology* 37, 112-127.

- Sołtysiak A, Wiercinska A, Kozlowsky S.C. 2015. Human remains from Nemrik, Iraq. An insight into living conditions and burial customs in a Pre-Pottery Neolithic village. *Paléorient*, vol. 41, n°2. pp. 101-114.

- Stutz A.J, Bocquentin F, Chamel B, Anton M. 2021. The Effects of Early Childhood Stress on Mortality under Neolithization in the Levant. *Paléorient* [Online], 47-1 | 2021, Online since 01 December 2021.

- Tsuneki, Akira. 2011. A glimpse of human life from the Neolithic cemetery at Tell el-Kerkh, Northwest Syria. *Documenta Praehistorica* XXXVIII. Pp 83-95.

- Ziegler E. 2011. Consumption of cow's milk as a cause of iron deficiency in infants and toddlers. *Nutrition Reviews*® Vol. 69(Suppl. 1):S37–S42.