



The importance of animal baselines: Using isotope analysis to compare diet in a British medieval hospital and lay population



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ABSTRACT

The results of carbon and nitrogen isotope analysis from two medieval populations are presented here, in a study investigating dietary habits within a medieval hospital population in England. We used $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ measurements of bone collagen in order to attempt to identify a distinct group diet within the medieval hospital of St. Giles, Brough, Yorkshire, and examine the reasons why the dietary habits within the institution may have been noticeably different from that of a comparative lay population. Following the results and tentative conclusions of a study conducted by Müldner and Richards (2005), it was hypothesised that religious fasting rules would result in there being evidence of greater consumption marine fish at St. Giles than at the rural township of Box Lane, Pontefract, Yorkshire. While more dietary variation was found at the hospital, it can be seen that the differences in $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ isotope values vary in relation to the animal baselines. Thus, differences between the human populations can be attributed to geological and environmental factors as opposed to dietary differences.

1. Introduction

Hospitals in medieval England served multiple functions within the local community. They were owned and administrated by the Catholic Church and operated as a 'sanctuary' for the sick, the poor and the elderly, as well as providing respite for passing traveller: these people predominantly belonged to the lower social classes. Residents of a hospital were 'inmates', rather than patients, and would be required to exchange their life's possessions in return for life-long care within the institution (Orme and Webster, 1995, pp. 57–64). This meant that many inmates spent their final years within the hospital and, in this way, the institutions could be viewed as resembling Victorian workhouses closer than the modern form of hospitals we are familiar with. Medical treatment was not the primary focus of the hospitals – rather, they cared for the inmates' souls by purging them of sin through a daily ritual of prayer and religious observation (Magilton, 2008, pp. 18–19).

After the reformation of the Church, which was instigated by King Henry VIII in the 1530s, many of the hospital buildings and their records were destroyed (Knowles, 1977, 266). This has resulted, in many cases, in the loss of primary source documents, such as inventories, orders and charters, which could be used to inform us about life within the hospitals. This is the case at St. Giles in Brough, the hospital

investigated here, whereby no original documents survive. While we understand broadly what conditions were like in English medieval hospitals, there is no evidence of what day-to-day life was like for the inmates of St. Giles, Brough. We must use, therefore, utilised evidence from material which does survive: the human remains.

This research expands upon findings of a previous study by Müldner and Richards (2005), which compared the diets of a variety of English medieval populations. Müldner and Richards reconstructed diet using stable isotope analysis, and explored potential dietary differences across different social groups. In the case of the hospital of St. Giles, Brough, unusually enriched $\delta^{15}\text{N}$ values were found in the sample population of seventeen individuals in comparison with a sample from the lay medieval village of Wharram Percy. Müldner and Richards (2005) suggested that this difference may be the result of social factors related to religious fasting, but recommended further investigation into the issue to verify this hypothesis.

The aims of the study were as follows:

1. To establish whether the occupants of St. Giles consumed marine and terrestrial protein and to compare this with dietary evidence from the lay site of Box Lane, using appropriate animal baselines to facilitate interpretation.

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2. To investigate whether priests at the hospital may have consumed a diet which was different to that consumed by the hospital inmates.
3. To confirm whether historical sources and archaeological evidence support or refute the isotope ratio analysis findings about diet at St. Giles, Brough period based on isotope analysis.

2. Diet in medieval hospitals and lay communities

2.1. The diet of the medieval low status majority

Any investigation into population-wide dietary habits cannot avoid generalisations. What people ate in medieval England on a daily basis depended on an individual's wealth, social status, age, location and personal preference (Miller and Hatcher, 1980: 159), as well as on seasonal fluctuations in what was available (Dyer, 2006: 209). For the lay majority – that is, the typical low ranking working family living in large villages or small towns – diet depended on available resources and the level of family income.

Documentary sources which are useful when determining the diet of the low status laity include grain storage records (McCloskey and Nash, 1984), the production and sale of field crops (Dyer, 1989: 127; Campbell, 1997), manorial inventories of the food supplied by lords to his labourers (Bennett, 1937: 235) and information about wages, since workers were often paid in grain, bread or pasture land for the purpose of animal husbandry (Penn and Dyer, 1990). Caution must always be exercised when referring to these sources which only record the food provisions bought and stored. While they are the best sources available to the historian, such records do not accurately depict what was actually consumed by the population, who may have foraged to supplement their diet.

The low status laity probably ate meals which were rich in carbohydrates such as bread, pottage (a grain based stew) and ale (Stone, 2006: 11; Yoder, 2012). The quality and mix of the grains consumed would depend on what could be afforded, and pulses such as peas or beans were included in cheaper bread. Wheat was an expensive commodity, so while some bread had a small proportion of the grains as wheat, wheat based ale was available only to the wealthy ranks of society (Stone, 2006: 14). Foraging and living from the land was an important supplement to the lower status diet. Fruit, vegetables, nuts and berries are likely to have been gathered from kitchen gardens and common land (Crackles, 1986). For this reason, the high status ranks considered fruit and vegetables to be the food of the poor, foraged from wherever they were available.

Protein in the lower status diet made up a very small proportion of meals, again because of expense. Meat and fish would be consumed in small quantities, but to a much lesser degree than those of higher social status (Bennett, 1937: 235). Isotopic evidence from the analysis of bone collagen of adults and children from Wharram Percy, Yorkshire indicated a small amount of fish protein in the adult diet and estimated the weaning age of children to be c. 2 years (Richards et al., 2002). These findings match dietary trends identified in adults and children from medieval Fishergate House, York (Burt, 2013). This suggests that the medieval laity may have attempted to observe religious fasting rules, but were more likely to supplement meat with dairy products in fasting days.

2.2. The diet of hospital inmates

Less is known about what food was consumed in medieval hospitals by the inmates who lived there. Inmates were generally from low status backgrounds and the function of hospitals was not only to provide care for the sick and disabled, but also to house the poor and elderly who could no longer care for themselves (Orme and Webster, 1995: 57–64; Roffey, 2012). It would seem logical then that the diet of these inmates might have resembled the carbohydrate rich diet of those at the lower end of the social spectrum prior to admittance to a hospital. However

we consider that hospitals formed separate social group in their own right. The hospital communities were closed, given that once inmates were admitted they were unlikely to leave during their lifetime. The bequeathal of property or payments of fees, either by the inmates or by a third party, could ensure a place in the hospital for as long as it was required (Rawcliffe, 1984). Therefore, estimation of the diet in hospitals cannot be based solely on what the equivalent social rank would have consumed outside of the institution.

The best sources there are of diet and lifestyle within the hospitals are from the founding charters which dictated the rules by which the hospitals would be run. The hospitals were owned by the Catholic Church, so these rules were based on Christian values, and religion dictated almost every aspect of life inside a hospital. The founding charter from St. Giles, Norwich dictates a daily regime of prayer and mass and includes instructions for the priests and brethren who looked after the institutions to also work in the community helping the poor (Rawcliffe, 1999: appendix 1). Detailed in the charter is the order to follow the dietary regulations set down by St. Augustine which dictated a period of fasting and abstinence from meat during holy days (Rawcliffe, 1999: appendix 1). Interestingly, this rule only alludes to the priests and brethren of St. Giles, Norwich, and no mention is made of the dietary requirements of the inmates. It can only be speculated that because so much of the way of life in hospitals was dictated by religious rule, that there may have been some expectation for the inmates who benefited from the institutions' care to lead a religious lifestyle. The inmates relied on the hospital to feed them as well as house them; therefore it is very probable that the diet prescribed to those in the care of the church owned hospitals followed the same rules as the order which governed them.

Past research utilising stable isotope analysis has shown that religious communities consumed a diet rich in fish. For example, Polet and Katzenberg (2003) found evidence that 12th to 15th century monks, lay brethren and children in a Belgian monastery consumed marine fish and possibly also freshwater fish. Furthermore, Mays (1997) found that there was a significant difference between stable isotope measurements of seven groups of monastic and lay individuals from the North of England which was attributed to fasting. It could be argued that the residents of a medieval hospital would have likely consumed a similar diet because of the connection with the Catholic Church, however, there is a lack of research which utilises stable isotope analysis to investigate this hypothesis.

3. St. Giles, Brough and Box Lane, Pontefract

The hospital of St. Giles, Brough in North Yorkshire was recorded as in use from c. 1181 CE to 1428 CE (Cardwell et al., 1995). There is documentary evidence which suggests that the hospital may have been an institution for individuals with leprosy, however as few as three individuals recovered from the associated cemetery displayed skeletal indicators of the disease (Cardwell et al., 1995). Hospitals in the medieval period served a different function to today's institutions which focus solely on treating illnesses and disease. Medieval hospitals were open to the sick, but also to the elderly, the poor and to travellers needing temporary respite before moving on (Roffey, 2012). Illness and disease was treated with a combination of prayer and careful adjustments to the diet in order to rebalance the four humours (blood, phlegm, yellow bile and black bile) which was believed to be the cause of sickness if this balance was disturbed (Rawcliffe, 1999: 176). The inmates of a medieval hospital were likely to remain within the institution until their death, and were buried in the hospitals' own associated cemetery.

The cemetery at St. Giles was excavated by English Heritage and North Yorkshire County Council between 1988 and 1990 and 34 skeletal individuals along with a small amount of animal bone are curated by the Biological Anthropology Research Centre (BARC) at the University of Bradford. It was estimated that between 25% and 66% of

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