

What was life like in medieval England?



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Abstract

We looked for signs of parasitic worm infection in people who lived in Cambridge, England during the Middle Ages. We compared two groups of people who had very different lifestyles: Augustinian friars and common laborers. The friars had better food and lived longer than the common people. They also were more likely to have access to running water

and better toilets. Surprisingly, the friars had a higher worm infection rate! We think the reason might be that the friars used human poop to fertilize their vegetable gardens.

Introduction

If you could step into a time machine and travel to England in the **Middle Ages**, what kind of people would you meet? What would the town look like? If you visit Cambridge today, you can see tall university buildings and beautiful churches. But those buildings tell us more about the lives of the rich and powerful than about the typical inhabitants of the city. To learn about the lives of regular people, you have to dig deeper – literally!

We've learned a lot about life in **medieval** Cambridge by looking at bones from different cemeteries. Your skeleton gives many clues about your life. Bones show scars where they have broken. Your body uses nutrients from food you eat to grow and repair your skeleton, so bones offer clues about the kinds of food you have eaten. Even the amount of exercise and hard work that you do can leave signs in your bones.

People buried at the All Saints by the Castle **parish** cemetery were poorer than average. They had dangerous jobs, like farming and construction. Men living at the Augustinian Friary led a different lifestyle. Their environment was more protected and their food more nutritious. They lived together with other **friars**, wearing the same style of clothes, eating the same food, and doing much of the same work.

The town of Cambridge, about an hour north of London, England, has been inhabited for over 2,000 years. It is home to one of the oldest universities in the world.

Photo: Cajeo Zhang



Both the common people and the friars suffered from diseases and infections. **Parasitic worm** infections are common in places without clean drinking water and with poor sanitation. Worms lay eggs in the intestines of their **host**. When an infected person poops, the worm eggs are carried out of the body.

The eggs can then get onto food or into the water. Common people and the friars had different diets and lifestyles. Could that mean they also have had different struggles with worm infections? That's what we wanted to find out.

Methods

We examined the burials of 44 people: 19 friars from the friary cemetery and 25 people from the common cemetery. These people lived between 1100 and 1500 CE. Friars weren't the only people buried in the friary cemetery. But we could tell which skeleton belonged to friars because the skeletons still had the belt buckles from their uniforms.

At each burial, we took two soil samples: one from inside the **pelvis** and one from inside the **skull**. We expected that if a person had intestinal worms when they were alive, we would find worm eggs in the soil inside the pelvis – where the intestines were located. We would not expect to find such eggs inside the head. So that **second sample was our control**. If we found worm eggs inside the skull, we would know the soil overall probably had poop in it.

We dissolved each soil sample in a mixture of water and a special salt. We poured the mixture through a series of three sieves. The sieves were in order of largest holes to smallest holes. The larger holes captured the soil particles but let through the parasite eggs. The sieve with the smallest holes collected the parasite eggs. Its holes were as small as the thinnest human hairs.

To look for eggs, we used a microscope that magnified objects to 400 times their actual size. Finally, we counted the number of parasite eggs in each sample (Fig. 1).



Figure 1:

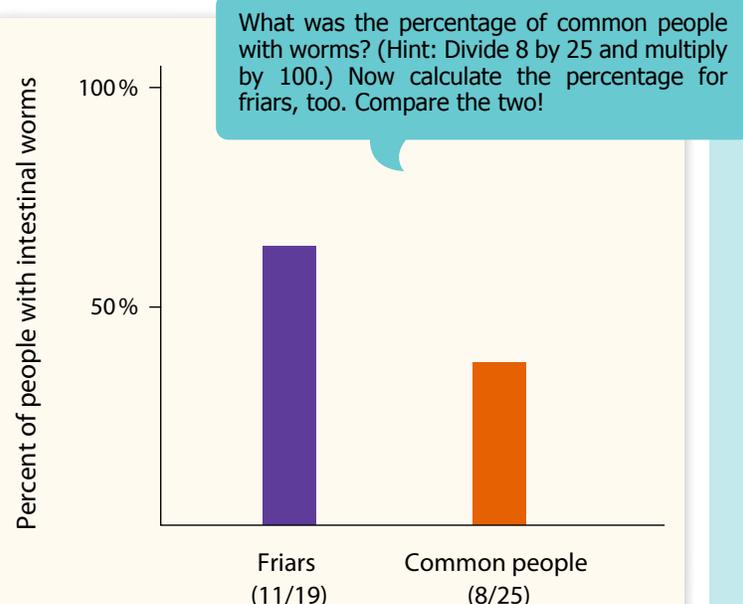
One of the parasitic worm eggs found at the parish cemetery. This egg comes from a roundworm, which was the most common type of parasitic worm in medieval people in Cambridge. It's seen under a microscope.

Results

We found intestinal parasite eggs in 11 of the Augustinian friars. We found such eggs in only 8 of the poor laborers. (Fig. 2)

Figure 2:

The percentage of friars and common people with intestinal worm infections



Discussion

We were surprised that the friars were more likely to be infected than the common people. The friars lived in a friary, where they had more sanitary toilets than the townspeople would have had. Friars also followed rules about hand washing. So why might they have had more infections?

One possibility is gardening! If you have gone to a gardening store, you may have noticed some stinky smells next to bags of manure. Manure is animal poop. Today, gardeners and farmers spread cow and horse manure around plants.

Manure has nutrients that plants need to grow. In the Middle Ages, it was common to take poop from the toilet and use it to fertilize fields. The problem is that parasite eggs from human poop can stick to plants. If the friars used human poop for their gardens, they would have been more likely to eat vegetables with parasite eggs on them. Then they would get infected with intestinal parasites when the eggs hatched in their stomachs.

Conclusion

Having worms inside you is not a nice thought! Sometimes they can make you sick. Luckily, there are things you can do to avoid getting infected. If you get a turn to help with cooking, you can make sure that fruits and vegetables are washed thoroughly. If you see animal poop in a place where

you are playing, let an adult know so they can clean it up. And most importantly, always wash your hands after using the toilet and before you eat!

Glossary of Key Terms

Augustinian friars – men who follow rules based on the writings of Augustine of Hippo. Friars are men who devote their lives to a Christian church (usually Catholic). Friars take part in town or city life, unlike monks, who live in self-sufficient communities.

Fertilize – make the soil richer in nutrients so that plants can grow better in it.

Host – the animal (or person) that a parasite is living in or feeding from.

Manure – poop from animals used for fertilizer.

Medieval period – the period of European history from 400 CE to 1453 CE. Also known as the Middle Ages.

Parasite – an organism that uses another organism (a host) for food or shelter in a way that harms the host.

Parasitic worms – parasites with long bodies and no backbone, including tapeworms, roundworms, pinworms, and hookworms.

Parish – the region and community surrounding a church. The meaning can be different depending on the religion and the historical period.

Pelvis – the bones between the trunk and the legs.

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Check your understanding

1 How did we know that the parasitic worm eggs came from an infected person's guts, rather than something that lived in the dirt?

2 How can you avoid a worm infection?

3 Friars wore distinct clothing that marked them as part of their group. What things do you hope people notice about you from the clothes that you wear?

4 Life in medieval times was different from modern life in many ways but in other ways the same. If you could talk to a person the same age as you from medieval times, what would you ask them? What do you think you might have in common with them?

5 If an archaeologist 500 years in the future was digging in your town, what clues do you think that they would find? What would be surprising or hard to understand?

REFERENCES

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