200 Years of Lice in Glasgow: An Index of Social Deprivation

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Who gets lice? Using detailed health records of the citizens of Glasgow over the past couple of centuries, Steve Lindsay shows that lice have in the past been associated with deprivation. This conclusion may be controversial but, with the demise of the nit nurses and their detailed records, we are no longer in a position to say whether or not the same is true today.

Louse-borne typhus has been one of the most devastating diseases affecting people throughout history. The origin and spread of this infection is difficult to determine with any great confidence because of the inadequacy of historical records and the problem of separating descriptions of typhus from other fatal fevers. However, typhus probably arrived in Western Europe from the East, reaching epidemic proportions during the 15th Century.1 Outbreaks were frequently associated with war and often these had a major impact on military campaigns. While death rates from typhus in the past are often impossible to estimate for civilian populations, the scale of devastation caused by this disease can be imagined by reflecting on the outcome of the world’s last great typhus pandemic. This occurred in Europe and Russia between 1917 and 1923, when there were massive movements of refugees under war conditions. There were 30 million cases of typhus, with three million resultant deaths. Today typhus is less common and is readily treatable with modern drugs. It is confined largely to the temperate highlands of the tropics: in Ethiopia, parts of the Central African Highlands and parts of Bolivia and Peru.

The infection is spread typically by the clothing louse (Pediculus humanus) when louse faeces infected with Rickettsia prowazeki are rubbed into bite wounds caused by the insect. These lice thrive in conditions of severe deprivation, especially during war, civil unrest and famine, when poor people congregate together.

Typhus in Glasgow

In the early 18th century, Daniel Defoe3 described Glasgow as:
‘the cleanest and beautifulllest and best built city in Britain, London excepted’.

Since then the people of Glasgow, like those of many British cities, have experienced conditions of severe poverty, and this is reflected in the changing incidence of lice infections (and typhus) found in the city. It is impossible to know when typhus was first introduced into Glasgow, but the first recorded epidemic was in 1818, following a period of recession. The disease was probably introduced into Glasgow with the many Irish immigrants who arrived in the city at this time, since in Ireland from 1816-1819 there were 700,000 cases of typhus in a population of six million. Thereafter the living conditions of the working classes in Glasgow began to deteriorate further due to overcrowding, providing ideal conditions for the maintenance and spread of lice.

From 1818 until the 1870s, Glasgow was ravaged by a series of epidemics, including typhus (Fig. 1). The greatest annual toll from typhus was 4346 deaths in 1847. Between 1865 and 1869, when typhus was differentiated from enteric fever, deaths due to typhus numbered 3607, a mortality rate of 1.6 per 1000. This was the last major epidemic, and the number of cases began to decline steadily, with the last seven autochthonous cases recorded in 1921 and 1922.

Fig. 1. Crude mortality rates in Glasgow. Some rates were estimated, since the number of people in the city each year was not always recorded. In these cases, missing denominators were estimated assuming that the population increased or decreased linearly between censuses. Arrows indicate typhus epidemics. Broken curve shows the disease-specific mortality rates.

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the spread of disease has raised 'mortality far above the level of corresponding towns in England or on the continent' (Ref. 5).

The Assistant Commissioner on the condition of Handloom Weavers said:
'I have seen some human degradation in some of its worst phases, both in England and abroad, but I can advisedly say that I do not believe until I visited the wynds of Glasgow that so large an amount of filth, crime, misery and disease existed in one spot in any civilised country' (Ref. 6).

Such severe conditions were reflected in the high mortality rates experienced in the city compared with other parts of the UK (Fig. 2). The association between disease and poverty, particularly in new arrivals, was evident to many who cared for the health of people in the city.

'The prevalence of epidemic diseases depends upon various causes, ...but the most influential of all is poverty and destitution. The houses...are ruinous, ill constructed, and...destitute of furniture...in Glasgow there are hundreds who never enjoy the luxury of the meanest bed, and who, if they attempted to put off their clothes, would find it difficult to resume them. The lodging houses are the media through which the newly arrived immigrants find their way to the fever hospital, ...[many] have not been six months in the city' (Ref. 7).

'the great mass of the fever cases occurred in the low wynds and dirty narrow streets and courts in which, because lodging there was cheapest, the poorest and most destitute naturally had their abodes' (Ref. 8).

The link between disease and poor housing was slow to gain acceptance and thus in 1849 Sutherland wrote:
'It is in...the Wynds and Closes of Glasgow that all sanitary evils exist in perfection. Moreover, for years a population of many thousands has been annually added to Glasgow by immigration without a single house being built to receive them... The overcrowding and wretchedness of late years has brought typhus with it, a disease that long ago was almost as rare in the large cities of Scotland as ague [malaria] now is' (Ref. 9).

By 1887 the association between overcrowding and disease was firmly accepted. Russell, the 2nd Medical Officer of Health for Glasgow, wrote:
'the predominant factor in the health of cities is the proportion of house-space to inhabitants' (Ref. 10).

Population factors. These slums resulted from overcrowding, poor housing and a reluctance of the authorities to intervene. Between 1801 and 1851, the population of the city rose from 84,000 to 345,000 (Ref. 11) (Fig. 3). This rapid increase occurred because of the expansion of industry and the depopulation of rural areas. The demand for labour in industry was supplied by people escaping the famine and poverty of Ireland and from the Highland clearances, but often the city attracted those from the countryside who came simply in pursuit of a better life. Conditions were particularly severe for the large number of Irish immigrants (Fig. 4). At the time of the 1848 Irish famine, up to 1000 immigrants were arriving in Glasgow each week12. Immigration peaked in 1851, as did mortality rates a few years earlier. The Irish were not welcomed in the city. The Registrar-General for Scotland in 1871 stated:
'This very high proportion of the Irish race in Scotland has undoubtedly produced deleterious results, lowered greatly the moral tone of the lower classes, and greatly increased the necessity for the enforcement of sanitary and police precautions wherever they have settled in numbers' (Ref. 13).

Housing. The dilapidated and cramped housing that awaited most immigrants was hopelessly inadequate, resulting in squalid and overcrowded conditions, ripe for the spread of contagious diseases. This was not simply a legacy of old housing, but one of design. New homes were still being built with few rooms at the end of the 19th century. Between 1862 and 1901, 66% of new houses were built with only one or two rooms.

Overcrowding was greater in Glasgow than in Edinburgh, Scotland as a whole, or England14. In the early part of the present century, there were more than four people per room in 11% of Glasgow's houses, over three persons in 28%, and over two in 56%, the corresponding values for English cities being 1%, 2% and 9%, respectively16.

The extreme overcrowding in Glasgow was due to a number of factors. First, it was cheaper to live in a
house with few rooms where less lighting and heating was needed. Second, there had been a habit of not spending such a large proportion of income on rent. Last, builders maximized their profits by constructing many small houses in a tenement.

Public Health. The authorities were slow to respond to the deplorable state of health of the working classes in Glasgow. In the early part of the 19th century, responsibility for the treatment of the sick was not considered the responsibility of the local authorities, nor was the Public Health Act of 1848 accepted in Scotland, because medical opinion there was unconvinced that sanitary improvements would benefit health. The problem was compounded by the ruling classes distrust of the slum dwellers and because the rich felt insulated from the diseases of deprivation.

Despite these difficulties, hospitals were provided by the Glasgow municipality in order to deal with the consequences of typhus. However, the decline in typhus was most probably due to improved living standards rather than better medical care. In 1862 a Police Act was passed that regulated the occupation of common lodging houses and small private homes. Houses of less than 700 ft³ in volume were closed and those under 2000 ft³ were restricted to one adult for every 300 ft³. These homes were visited at night, and fines imposed if overcrowded.

Towards the end of the century, the Burgh administration, helped by several more Acts of Health and Housing, began to make more progress in home improvement. In homes where typhus struck, the sick were taken to hospital, and the healthy quarantined in a reception house. Some substandard houses were demolished and the occupants placed in new homes (at higher rents!). In 1877 the City Improvement Trust were congratulated on removing:

'a moral sewer of a most loathsome description, crowded with a population showing by its physique the extent to which the human form divine could be degraded by drunkenness and every attendant form of vice and profligacy' (J. Whiteford, PhD thesis, Edinburgh University, UK, 1982).

Hygiene in the slums was also improved by building both bath and wash houses. Gradually typhus ceased to be a scourge and the measures designed to prevent and control the disease formed the foundations of our health service.

Headlice

Despite many improvements in living standards during the 19th century, and the declining population of clothing lice, conditions for many in the city were still deplorable, providing ideal conditions for another louse, the headlouse (P. capitis*), a more subtle indicator of social deprivation.

Headlice have been a common infection of schoolchildren in Glasgow (Fig. 5), particularly in young girls (Fig. 6). The higher prevalence among girls rather than boys is a common finding and may be due to their longer hair, to their demonstrative affectionate behaviour. In the early part of the present century, the boys' short hair style was known locally as the 'Barlinnie crop' (after the local prison) or 'paint brush style'. It is thought to have originated in 1870 when the Prussian army adopted this style to try to reduce lice infections.

Unemployment

Outbreaks of headlice between 1910-1930 may have been linked to the severe deprivation experienced during periods of mass unemployment. Unemployment figures were not recorded officially until 1922, but a proxy measure can be obtained using values of annual ship production. Between 1923 and 1938 there was a strong inverse correlation between yearly records of unemployment and ship production (cross correlation coefficient r = -0.85, n = 16, P < 0.001). It should be appreciated that at this time much of Glasgow's industry centred around ship-building.

Between 1910-30, outbreaks of headlice were inversely associated with ship production (Fig. 7; r = -0.49, n = 21, P < 0.05). That is, lice epidemics occurred when few ships were produced. An even stronger association exists between the prevalence of lice in any year and ship production three years later (r = 0.58, n = 21, P < 0.01). This relationship is best understood when one realizes that peaks in ship production often occurred two to three years after the end of a period of recession. Thus periods of unemployment may lead to conditions suitable for

* It should be appreciated that headlice probably do not transmit typhus.
outbreaks of headlouse. There may be a number of explanations for this association. First, some families of the unemployed may have moved in with relatives, increasing head-to-head contact (and thus transmission between people). Second, with little money available for combs, brushes, soap, haircuts or pediculicides, prevention and treatment would have been limited. Third, the despondency felt by adults during prolonged unemployment, particularly in areas of severe deprivation, will not have encouraged the rapid treatment of lousy children, particularly as headlouse may have been considered a trivial problem and one that children would outgrow.

World War II

The last major outbreak of headlouse in Glasgow occurred between 1939 and 1940 (Fig. 5), with 23% infected of the 74,382 children examined. Headlouse infections were the most common complaint found in children evacuated from the city, with 10% infected.20 At this time many schools closed and medical inspection and treatment was curtailed. Evacuees from different parts of the city were crowded together, often for long periods, increasing the risk of transmission. Many blamed the epidemic on girls with expensive hair styles who were said to wash their hair less frequently than other children. Dirty hair was thought to encourage lice. The Lord Provost even blamed the outbreak on girls who emulated the hairstyles of Hollywood stars, such as Greta Garbo.21 It was also suggested that many children whose heads were moderately well cared for at home might not have had the same degree of attention paid to them by their guardians.20 However:

'the most frequent cause of infection was contact with other infected members of the family in overcrowded homes' (Ref. 20).

Treatments

From the turn of the century, a large range of preparations were used to treat children with lice; many were ineffective and some were potentially harmful. These included herbal remedies, such as stavesacre seeds (Delphinium staphisagria), larkspur (Delphinium consolida), quassia chips (bitter wood, Quassia amara or bitter ash, Picrasma antillana), sebadilla (Schoenocaulon officinale), tobacco leaves (Nicotiana tabacum) and chrysanthemums (Chrysanthemum cinerariaefolium). Inorganic treatments included mercury compounds22, and other less harmful preparations, such as vinegar, oil of sassafras, oil of lemon, oil of cedar wood and phenols. Paraffin perhaps the most widely used treatment in the early part of this century and a grisly, but effective20, description of its use is shown in Box 1.

Since 1940, the prevalence of headlouse in schoolchildren has declined progressively, due most probably to the introduction of an efficient control programme.23 Empowered by new Education Acts, and assisted by the creation of the National Health Service, the number of inspections of schoolchildren increased. Free and effective treatments were also provided to all infected children. These insecticides included lthane hair oil (a combination of paraffin and thiocyanates)24, as well as DDT mixed with benzyl benzoate, which was introduced at the end of the war years.25 Since then there has been a rapid evolution of modern synthetic compounds that are highly effective insecticides and safe to use, namely, pyrethrins, gamma hexachlorocyclohexane, malathion, carbaryl and, more recently, pyrethroids. The School Health Service screened thousands of children each year and treated those found to be infected. Moreover, the quality of housing and standard of living has improved markedly this century. In the 1920s and 1930s, and again in the 1950s, the council initiated programmes of slum clearances, doing away with many overcrowded conditions and moving people to new estates, many on the outskirts of the city.26 However, many of these housing schemes developed quickly into areas of severe deprivation. With such extreme poverty existing in the city, the relationship between headlouse prevalence in 1968-1972 and social class is striking (Fig. 8). Headlouse are more common in children from the lower social classes than higher ones [multiple regression allowing for sex and year, R2 (adj.) = 73.9%, F = 47.2, P <0.001]. But does this association hold true today?

Lice and class

Most of the recent articles written about lice in magazines, newspapers and health information literature suggest that headlouse infections are not associated with social class. Thus:

'anyone with head hair can catch lice' (Ref. 27),
'[headlouse are] respecter of class' (Ref. 28),
'[the headlouse] once a problem of working
more prevalent in poorer families. Many studies have shown that headlice are more common in homes with large families and where children share beds – both measures of overcrowding30-41, which in turn is a crude index of deprivation. Many of these trials were carried out in developing countries where contrasts between rich and poor are generally greater than in developed countries. Some workers have failed to show an association between lice and overcrowding42-44, although Juranek42 found that they were more common in children from poorer homes than wealthier ones and Sholdt et al.43 showed that both the prevalence and numbers of headlice were found to increase with decreasing literacy. Evidence for headlice infections being linked with socially deprived households in the UK comes from a survey of nearly 23,000 children in English schools in 1975, which showed that headlice were more common in centres of large conurbations in disadvantaged areas48. Maunder46, using DHSS regional statistics, suggested that this association no longer holds and that infections were greatest in rural, suburban and middle class children. He indicated that the decline in lice in industrial areas may be due to successful control campaigns in English cities.

Lice today

In Glasgow today, there still extensive areas of socially deprived households. Routine health inspections of children do not take place in most Glasgow schools and the responsibility is placed on parents to look after their child’s health. Official statistics record that, among school entrants from 1990–1991, boys had lice, while the rate for girls only four per 10,000 (Scottish Health Service, unpublished). These figures probably underestimate the true prevalence of infection since a questionnaire survey of Glasgow pharmacists found that, between 19,000 and 36,000, treatments for lice were bought by the public in the same year47. While many treatments may be used to prevent headlouse infections and to treat other types of lice, and may be used by people from outside the city, these figures suggest that headlice in Glasgow schoolchildren remains a persistent and poorly monitored problem. This is a situation recognized well by those who care for young children in the city. Further studies are needed in Glasgow and other British cities to determine accurately the present levels of headlouse in the population and to identify the risk factors associated with this infection. If lice are still more common in poorer parts of our cities, then health education programmes and treatments against lice should be targeted in these areas. Closing our eyes to 200 years of history could be a mistake.

Acknowledgements

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References
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Letters

Metronidazole and Drug Resistance

Johnson and Upcroft have done an excellent job in their up-dated review on the resistance that is slowly developing in anaerobic protozoa, as well as anaerobic bacteria. Metronidazole is a nitroheterocyclic compound that selectively kills anaerobic microorganisms. According to Upcroft, it is used to control a variety of protozoal, bacterial, and fungal agents. Johnson, in his article, Upcroft and Upcroft mention that it is uncertain that giardiasis is a zoonosis. I would like to remind Upcroft and Upcroft that giardiasis has been classified as a zoonosis by WHO. It is true that diseases transmitted by the faecal-oral route are not as easy to classify as zoonoses, as it is necessary to demonstrate that the causative organism infects both humans and animals and that it can be transmitted between them.

In Canada, giardiasis is frequently diagnosed in clinical human and veterinary medicine. Running surface water used for drinking is the source of contamination for both humans and animals. For example, in rural areas of the province of Québec, unfiltered surface water is used for drinking and outbreaks of water-borne giardiasis do occur in these municipalities. However, it is unlikely that the surface water is contaminated by cysts of human origin since every home must have a septic tank in good working order. Therefore, the only possible source of contamination of surface water would be from domestic animals and/or wildlife.

References
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Reply

In reply to the letter from G.M. Faubert, we agree that it is most likely that morphologically identical parasites of the Giardia duodenalis group probably infect animals and humans alike. However, it is clear from biological and biochemical characterization of G. duodenalis (including DNA fingerprinting, karyotyping, isoenzyme grouping) and difficulty in establishing some strains in culture that this species of protozoa is extremely heterogeneous. Infections of single individuals are also genetically heterogeneous. Identifying the source of Giardia infections is more difficult than...