

A new epidemic profile for human scabies in a general practice in the city of Tourcoing, northern France

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Research Article

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Abstract

Background: Scabies is a public health problem. In France, this disease accounts for several hundred million consultations in primary care each year. The objectives of the present study (with reuse of data collected routinely in primary care) were to estimate the incidence of scabies in a general practice and to describe the corresponding patient population.

Methods: From January 2013 to June 2015, we conducted a real-life study of consultation data from a general practice in the Lille urban area of northern France. We estimated the incidence of scabies in the area, searched for factors that might influence disease occurrence and recurrence, and looked at how patients with scabies were managed.

Results: The study included 177 patients (96 women). The incidence of scabies was similar in males and females. The infection was more common in early childhood (regardless of the sex) and in women aged 40-50. Scabies occurred more frequently during the colder months (e.g. 12.4% of all cases were recorded in January). We did not observe any significant associations between scabies and immune conditions or pre-existing comorbidities. All patients received scabicides: 163 received a systemic treatment only (ivermectin), 10 received a local treatment only (8 for benzyl benzoate and 2 for piperonyl butoxide with esdepallethrine), and 3 received both systemic and local treatments. Scabies recurred in 42 patients (23.7%; within 60 days in 16 cases (9.04%)). The median [1st & 3rd quartiles] time interval between diagnosis and recurrence was 28 days [22.3; 36.3]. The recurrence rate appeared to be significantly higher in winter than in other seasons: 68.8% of the recurrences occurred in the winter ($p=0.021$). Age did not appear to be a risk factor for recurrence ($p=0.63$).

Conclusion: The present results show that scabies is now a common pathology in general practice and is most likely to affect children and young adults in urban areas. The age and sex distributions usually described are no longer relevant. Our results also emphasize the value of reusing data collected routinely data in primary care, which can open up exciting fields in medical research.

1 Introduction

Human scabies is a ectoparasitotic skin infection caused by the microscopic mite *Sarcoptes scabiei*, var. *hominis* (1,2). The disease is characterized by intense night-time pruritis and pathognomonic burrows. The form of scabies (i.e. the clinical symptoms and parasite load) depends on the type of person infected: children, younger adults, older adults, people with an immunodeficiency, etc. (1,3). Although scabies is a benign disease, treatment is required for recovery. Many of the currently available treatments are topical: benzyl benzoate (4,5), piperonyl butoxide with esdepallethrine (6), and permethrin (a molecule that has been recently approved and is considered to be the first-line treatment in many countries) (5–7). An oral (systemic) formulation of ivermectin is also available (6–8). Lastly, treating the domestic environment (1,9) and the family circle (10) is essential for complete eradication of the parasite; if not, recurrence is frequent. Human scabies is a ubiquitous, “cosmopolitan” pathology that can affect people of any sex, age, social class or ethnic origin. At present, scabies affects 200 million people per year worldwide and

constitutes a public health issue (11). Community outbreaks (*e.g.* in care homes, schools, and nurseries) constitute the main transmission pathway in more developed countries, whereas the spread is endemic in developing countries and subtropical or tropical countries. The incidence of human scabies varies widely from one country to another. The annual incidence per 100,000 inhabitants is about 28 in Belgium (12), 230 to 380 in the United Kingdom (13), and 68.8 in the United States (14). Scabies is not a notifiable disease in France, which makes the incidence is difficult to estimate. However, the various regional and nationwide studies carried in the country show that scabies has been on the rise for the past ten years (10). Indeed, France's High Council for Public Health (HCSP) reported that the incidence of scabies increased by 10% between 2002 and 2012 (10). In 2012, the estimated incidence was 328 new cases per 100,000 inhabitants (15). This is why scabies is a growing concern and why a better understanding of the disease's epidemiology is needed. A number of individual and environmental factors are thought to influence the spread of scabies in a population; these include age (12,16–19), sex (18), health conditions (20–22), ethnic origin (12,17,21,23,24), hygiene (25,26), promiscuity (20,27), social deprivation (28–30), social status (12,23,31), and colder weather (23,28,29,32–34). Even after effective treatment, human scabies can still lead to short- and/or long-term sequelae, such as pruritus (9,35), nodular scabies, or streptococcal infections and their complications. Recurrence is also frequent, and might be related more to a patient's treatment adherence than to his/her living conditions or socio-economic status (36,37). Moreover, access to treatment does not appear to be an issue in France (38), although some medications they are not reimbursed by the French state's health insurance system. However, scabies is a health issue even in developed countries. Although the incidence of scabies is changing fast, few up-to-date epidemiologic data are available. In France, a general practitioner (GP) performs an average of around 1,900 consultations (39). Furthermore, around 106,000 primary care practices are equipped with an electronic patient record system (40). Consequently, a large amount of electronic data should be available. To the best of our knowledge, few studies have reused data from primary care patient records (41). The objectives of the present study were to (i) update epidemiologic data about scabies in a French primary care practice, and (ii) evaluate the probability and risk factors of recurrence, via the reuse of data collected routinely in general practice.

2 Materials And Methods

2.1 Design and setting

We carried out a single-centre, real-life, retrospective, observational cohort study in a three-GP practice located in the relatively poor city of Tourcoing (northern France).

2.2 Patients and data

Data for all patients in the practice were collected routinely from January 2013 to June 2015 ($n = 5,658$ consultations) and were reused in the present study: demographic and administrative data (sex, age, health insurance status, and consultation dates), biometric data (weight, height, pulse, blood pressure, and body temperature), laboratory results (including dates, values, and normal ranges), diseases (coded using

a local terminology), and prescribed drugs (including prescription dates, the Anatomical Therapeutic Chemical (ATC) code, and the indication for treatment). All data were anonymized prior to analysis.

The main inclusion criterion was the occurrence of at least one consultation with a clinical diagnosis of scabies, or the initiation of treatment with a scabicide. We considered systemic scabicide treatments (notably including ivermectin (ATC code: P02CF01)) and topical treatments (notably including benzyl benzoate (P03AX01), and piperonyl butoxide with esdepallethrine (P03AC)). For the included patients, we screened the diagnoses for factors influencing immunity (cancer, autoimmune disease, hemopathies, AIDS, and corticosteroid use) and more general factors (*e.g.* alcoholism, smoking, drug addiction, diabetes, malnutrition, sexually transmitted disease, allergies, and depression). We analysed the treatment prescribed for the primary infestation and for recurrence (if any).

Scabies recurrence was defined as the existence of a visit for scabies, occurring within 15 days or more, without any intercurrent visit. The same applies to subsequent recurrences.

The number of inhabitants in the practice's recruitment area was estimated from demographic data provided by the French National Institute of Statistics and Economic Studies (INSEE) (42).

2.3 Statistical analyses

Analyses were performed using R software (version 3.3.1) (43). Quantitative variables were described as the mean and standard deviation (SD) when normally distributed or the median (with 1st and 3rd quartiles, Q1-Q3) when not. Qualitative variables were described as the frequency (percentage). The 95% confidence intervals (95CIs) of means were calculated using the central limit theorem, and those of proportions were calculated using the binomial distribution. Bivariate analyses were applied to test the association between two variables: Fisher's exact test was used for two qualitative variables, and the Kruskal-Wallis test was used for a qualitative variable and a quantitative variable.

2.4 Ethics approval and consent to participate

This study relates to existing data, and not patients. The registry and subsequent analyses were approved by the French national data protection commission (CNIL). In line with the French legislation, no approval of ethic committee, nor internal review board, was required. All the patients of the general practice are asked to fill once only an agreement form, allowing the physicians of the practice to reuse their data for observational research purposes. All the patients identified for this study had previously agreed to have their data reused for research purposes. All data collection methods and data analyses were carried out in accordance with relevant guidelines and regulations.

3 Results

3.1 Incidence

We identified 177 cases over the study period. According to the INSEE, there were 6,836 inhabitants in the Bourgogne suburb of Tourcoing at the time of the study. The primary care practice studied here is the only one in that suburb and so we expect it to be attended by most of the locals. Hence, we estimated that the incidence rate of scabies in 2015 was 1,040 cases per 100,000 inhabitants per year.

3.2 The study population

The analysis covered 177 patients (96 women (54.2%) and 81 men (45.8%)). The median age was 23.8 (Q1-Q3: [10.6; 40.1], Figure 1).

Most of the patients (n=164, 97.0%) had state health insurance. Thirteen patients (7.34%) had “long-term condition” as defined by the French Social Security. Patients consulted a median of 17 times (Q1-Q3: [7; 35]) during the study. Fifteen of the 177 patients (8.47%) were taking oral or local corticoids, 2 (1.13%) had cancer, and 2 (1.13%) had an autoimmune disease. None had a hemopathy or AIDS. Thirty-four patients (19.2%) had an allergic background, 13 (7.34%) were anxious or depressed, 9 (5.08%) suffered from malnutrition, 6 (3.39%) had a sexually transmitted disease, 3 (1.69%) were diabetic, and 2 (1.13%) had a diagnostic code of alcoholism. There was no diagnostic code of drug addiction. With regard to complications, 8 patients (4.52%) developed impetigo within 30 days of the diagnosis of scabies. The seasonal distribution was as follows: 43 cases were observed in spring (24.3%), with 23 in summer (13.0%), 54 in autumn (30.5%), and 57 in winter (32.2%). There was a predominance of scabies during the colder months: 22 patients were diagnosed with scabies in January (12.4%), with 20 in February, in March and October (11.3%), and 18 in April and in November (10.2%).

3.3 Treatment

Data on treatment were available for 176 of the 177 patients: 163 (92.1%) received a systemic scabicide (ivermectin), 10 (5.68%) received a local scabicide (8 with benzyl benzoate and 2 with piperonyl butoxide and esdepallethrine), and 3 (1.69%) received both local and oral scabicides. As an adjuvant treatment, 141 patients (79.7%) took antihistamines, 29 patients (16.4%) had their domestic environment treated with a pyrethroid-based antiparasitic, and 29 patients (16.4%) applied emollients.

3.4 Recurrence

Patients were followed up during a median of 41.3 months (Q1-Q3: [32.2, 46.2]). Scabies recurred in 42 patients (23.7%), and 16 of these recurrences (9.04%) were observed within 60 days of the diagnosis (see the definition of recurrence in the material and methods section). The median time interval between diagnosis and recurrence was 28.0 days (Q1-Q3: [22.3; 36.3]). During the whole follow-up period, people with recurrence within 60 days consulted the GP a median of 32.5 times (Q1-Q3: [16; 48.5]), regardless of the cause. Considering the season of the first infection, winter was a risk factor for recurrence, with

recurrence in 11 out of 57 cases (19.3%) in winter versus 5 out of 115 cases (4.35 %) in other seasons ($p=0.021$, Table 1).

Table 1: Recurrence of scabies within 60 days after diagnosis, as a function of the season of the first infection ($p=0.021$)

	Winter	Spring	Summer	Autumn
Patients with no recurrence	46	41	22	52
Patients with recurrence	11	2	1	2

Age did not appear to be a risk factor for recurrence ($p=0.63$) and we did not find any other risk factor for recurrence. With regard to the 16 patients with recurrence within 60 days, 15 (93.8%) had initially received a systemic scabicide, 1 patient (6.25%) had initially received a local scabicide, and none had received both systemic and local scabicides. Within the other medical prescriptions of the 16 patients with recurrence within 60 days, 11 (68.8%) had antihistamines, 3 (18.8%) had a pyrethroid-based antiparasitic (for the domestic environment), and 1 (6.25%) had an emollient. After recurrence, 11 of the 16 patients (68.8%) received a systemic treatment, 2 (12.5%) received a local treatment only, and 3 (18.8%) received both systemic and local treatments. Their medical prescription also contained antihistamines in 12 cases (75.0%), pyrethroid-based antiparasitic for 2 cases (12.5%), and emollient for 1 case (6.25%).

4 Discussion

The objectives of the present study were to estimate the real-life incidence of scabies in a general practice in northern France and describe the patient population. The scabies incidence rate observed here was three times the mean value reported in the literature (10). This difference might reflect a particular feature of the urban area studied here or a need to update the epidemiological data (44). As in the literature, we did not observe male or female predominance (10) but did observe predominance in early childhood (16,19). Our results contradict the idea that the infection would affect older adults. Other studies have shown that the occurrence and course of scabies can be influenced by comorbidities and treatments, such as immunosuppression, AIDS (45), corticosteroid therapy (46,47), diabetes, and alcohol abuse. In the present study, we did not find any significant associations with these factors. However, no firm conclusions can be drawn because we did not study a group of control patients. With regard to seasonality, our results are consistent with the literature data: we observed a predominance of cases of scabies, and a higher recurrence rate, during the cooler months (i.e. the autumn and winter in France) (23,28,29,32–34).

The present study had several limitations. Firstly, we observed that most cases of scabies were treated with oral ivermectin. This medication was probably prescribed because of its simplicity of administration, good safety profile, absence of major contraindications, and reimbursement by the state health insurance system. Indeed, physicians in the practice from which the data were obtained explained that a majority of

their patients had financial problems, and difficulties to understand explanations related to their health. This observation leads them to prefer this treatment. However, this may also have been due to a national drug shortage of benzyl benzoate that occurred during the study period or the non-reimbursement of piperonyl butoxide with esdepallethrine. It should be noted that our study took place before permethrin gained marketing authorization; this drug has become the reference treatment for human scabies (5–7). Secondly, the number of recurrent cases in our study was low, which probably prevented us from identifying risk factors for recurrence. A larger patient population would have increased the study's statistical power. However, our result showed that the rate of recurrence was higher in winter than in other seasons. Thirdly, anonymization of the study data prevented us from identifying family clusters or treatments of family members and friends. Fourthly, the study population came from a poor suburb and so was not representative of the French general population. Lastly, the study database lacked a number of variables. For example, it was not clear which symptoms of scabies were present, how the scabies was diagnosed, and which additional examinations were carried out. It would also have been interesting to access other information on the patient, such as the socioprofessional category, private health insurance status, and feelings about this disease.

The present study had several strengths. Firstly, the total number of patients with scabies was high (n=177). Secondly, our study was probably quite exhaustive because the practice from which the data were taken is in a monopoly situation in this suburb of Tourcoing. Thirdly, the reuse of real-life data indicates that our results could be extended to outpatients more generally (41,48).

5 Conclusion

Although human scabies has long been associated with "old, dirty, poor, rural" patients in the public mind, our up-to-date results show that the disease is quite frequent in urban areas and affects individuals from both sexes, of all ages, and from all walks of life. In France, human scabies may have become a common, urban disease.

Abbreviations

ATC: Anatomical Therapeutic Chemical

GP: general practitioner

HCSP: High Council for Public Health

INSEE: National Institute of Statistics and Economic Studies

SD: standard deviation

Declarations

Ethics approval and consent to participate: This study relates to existing data, and not patients. The registry and subsequent analyses were approved by the French national data protection commission (CNIL). In line with the French legislation, no approval of ethic committee, nor internal review board, was required. All the patients of the general practice are asked to fill once only an agreement form, allowing the physicians of the practice to reuse their data for observational research purposes. All the patients identified for this study had previously agreed to have their data reused for research purposes. All data collection methods and data analyses were carried out in accordance with relevant guidelines and regulations.

Consent for publication: Not applicable

Availability of data and materials: The datasets generated and/or analysed during the current study are not publicly available due to the French law but are available (de-identified) from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests

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Author Contributions: E.C. and B.L. designed and supervised the study. A.G., P.Q., D.S., M.C., M.R., J-B.B. and E.C. developed the methodology. A.G., E.C. and P.Q. performed the formal analysis. B.L., A.G. and E.C. acquired the data. E.C. and B.L. analyzed the data. A.G., P.Q., D.S., M.C., B.L., M.R., J-B.B. and E.C. have read, commented on and approved the final manuscript.

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Figures

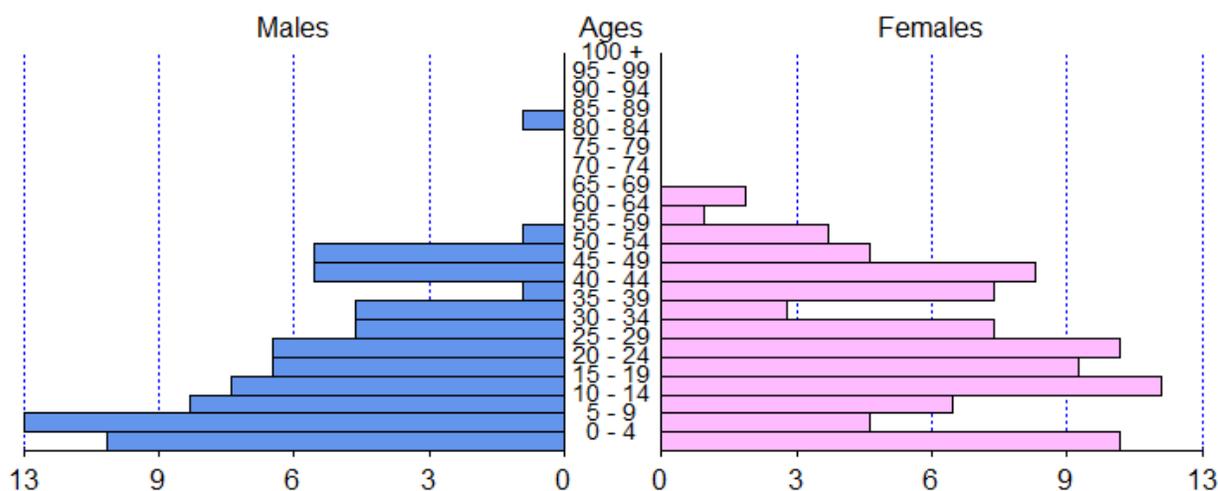


Figure 1

Age pyramid