

Prevalence and Treatment of Psoriasis in the United Kingdom

A Population-Based Study

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Objective: To measure the prevalence and treatment of psoriasis in the United Kingdom.

Design: Cross-sectional study to determine prevalence and cohort study to determine treatment patterns.

Setting: Outpatient practices of general practitioners.

Patients: We included in the analysis all patients who were registered with a general practitioner in the General Practice Research Database from 1987 to 2002.

Main Outcome Measures: The prevalence and treatment of psoriasis.

Results: We identified 114 521 patients with psoriasis of a total population of 7 533 475 patients, yielding a prevalence of 1.5%. The prevalence of psoriasis increases more rapidly in young female patients compared with young male patients and declines significantly in patients 70 years and older, regardless of sex.

Overall, 91.8% of patients with a diagnosis of psoriasis received a prescription for psoriasis treatment on or after the date of their first diagnostic code of psoriasis in the General Practice Research Database. Most of the patients (55.2%) received only 1 or 2 prescriptions for psoriasis in the first year after psoriasis was documented in the General Practice Research Database.

Conclusions: The epidemiology of psoriasis in the General Practice Research Database population is similar to that of other epidemiologic studies of psoriasis performed in the United Kingdom, the United States, and other Western countries. Psoriasis carries a substantial burden given its high prevalence and its associated need for prescription therapy. Additional studies are necessary to determine why the prevalence of psoriasis increases more rapidly in female patients and to determine why the prevalence decreases in patients 70 years and older.

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PSORIASIS IS A COMMON, chronic, inflammatory disease of the skin. Recent studies have demonstrated that psoriasis can have a substantial impact on quality of life, even in patients in whom the affected body surface area is relatively limited.¹ Additional studies have demonstrated that psoriasis has substantial economic costs to patients and the health care system.² Although the cause of psoriasis remains unknown, the evolving evidence suggests that psoriasis is a complex disorder caused by the interaction of multiple genes, the immune system, and environmental factors.^{3,4}

A recent population-based survey in the United States estimated the lifetime prevalence of self-reported psoriasis in people 18 years or older to be 2.2%.⁵ Other epidemiologic studies from around the world have estimated the prevalence of psoria-

sis to be 0.6% to 4.8%.⁵⁻²⁰ These studies have varied in the definition of prevalence (eg, point vs lifetime prevalence), the case definition of psoriasis (eg, self-report vs physician diagnosis), the popu-

See also pages 1527, 1542, 1549, 1556, 1580, and 1589

lation and ages studied, and their sampling techniques. Although many of these studies have surveyed large numbers of people, they ultimately reported prevalence in a relatively small number of patients with psoriasis, limiting the detail of subanalyses. For example, few of these studies were of sufficient size to investigate the prevalence of psoriasis stratified by age and sex.

The General Practice Research Database (GPRD) is a large database that was established in the United Kingdom in 1987

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for the purpose of allowing researchers to conduct large epidemiologic studies.²¹ About 5% of the UK population is captured by the GPRD, which is broadly representative of the general UK population in terms of age, sex, and geographic distributions. Previously, a report from our group²² used the GPRD to investigate the risk of lymphoma and internal malignancies in patients with psoriasis.

The purpose of this study was to measure the prevalence of psoriasis and its treatments in the GPRD population. We report detailed analyses of the prevalence of psoriasis in all age groups and note epidemiologic findings that warrant further investigation.

METHODS

PATIENT POPULATION AND GPRD INFORMATION

The GPRD contains electronic medical record information on more than 8 million patients from 1987 to 2002. Unlike administrative databases, which are primarily used for billing purposes (eg, Medicaid), the GPRD is used by the general practitioners (GPs) as the patient's medical record. In the United Kingdom, virtually all of the patient's care is coordinated by the GP. When patients are referred for specialty care, a treatment plan is initiated by the consultant, but ultimately most long-term therapies are prescribed and monitored by the GP. The validity of specialists' information and its capture by GPs in the GPRD has been well documented.²³ The validity of using the GPRD to study a wide range of medical conditions has also been demonstrated in numerous studies.²⁴⁻²⁷ Participation by GPs is voluntary, and they receive special training on data entry and small payments for supplying data of adequate quality for epidemiologic studies.²¹ All patients who were registered in a practice that was designated as being up to standard from 1987 to 2002 were included in the analysis. *Up to standard* is a term assigned to practices in the GPRD that, when audited by the Epidemiology Pharmacology Information Core, London, England, have been demonstrated to record 95% of prescriptions and relevant patient encounters, based on quality assurance reviews.

DEFINITION OF PSORIASIS

Diagnoses in the GPRD are recorded using Read and Oxford Medical Information System codes. General practitioners are instructed to record only diagnoses that are confirmed. Rule-out diagnoses are not recorded. We used a comprehensive coding scheme to identify patients with psoriasis. The accuracy of this scheme was described in a previous study.²² For this analysis, any patient who received a diagnostic code of psoriasis while registered in a GPRD practice was identified as having psoriasis. The coding algorithm is available from one of us (J.M.G.).

DEFINITION OF PREVALENCE

Prevalence is defined as the proportion of individuals in a population who has the disease of interest in a specified time period. The definition of prevalence used for this study approximates lifetime prevalence of psoriasis. Any documentation of psoriasis based on our coding algorithm by the GP at the time the patient was registered in the practice or at any time throughout follow-up would result in the patient being identified as having psoriasis. For example, the GP may document a psoriasis diagnosis in the electronic record at registration if the patient had psoriasis before the electronic medical record was initiated. The documentation of psoriasis could also occur at any time that the patient was registered in a practice in the GPRD to ensure capture of patients with mild psoriasis that may not have been documented at registration. The median duration of observation time for patients in our study was 7.4 years. This approach is consistent with many previous studies of the epidemiology of psoriasis, which have generally reported on lifetime prevalence.

DEFINITION OF PSORIASIS TREATMENTS

Prescriptions were identified using Prescription Pricing Authority codes and Multilex codes. These drug codes provide detailed information on the drug, dose, and route of administration. A comprehensive coding algorithm was developed to identify treatments consistent with psoriasis. Treatments were judged as consistent with psoriasis therapy on the basis of British National Formulary designations,²⁸ review of the literature for psoriasis treatments, and the opinion of two of us who are dermatologists (J.M.G. and D.J.M.). In addition, to be conservative, the identified therapies were considered to be associated with the care of a patient's psoriasis only if the patient received the prescription at the time or after the first diagnostic code of psoriasis was received. The first diagnostic code of psoriasis does not necessarily indicate the first diagnosis of psoriasis (eg, new-onset or incident psoriasis) because the patient could have had psoriasis for months or years before the start of the GPRD electronic medical record. We also determined the number of prescriptions that were consistent with psoriasis treatment that a patient with psoriasis received within the first year that psoriasis was coded by the GP. To be eligible for this analysis of therapies, patients were required to have at least 1 year of follow-up in the practice from the date of their first code of psoriasis and had to have at least 1 prescription for treatment of psoriasis.

This study was approved by the Institutional Review Board at the University of Pennsylvania, Philadelphia, and by the Scientific and Ethical Advisory Group, Department of Health, London, England.

RESULTS

We identified 114 521 patients with psoriasis of a total population of 7 533 475 patients, indicating an overall prevalence of psoriasis in the GPRD from 1987 to 2002 of 1.5%. The prevalence of psoriasis stratified by age and sex is shown in **Table 1**. Similar to findings from other studies of the epidemiology of psoriasis, the prevalence of psoriasis peaks in young adults and gradually increases among patients aged 30 to 69 years. Psoriasis is uncommon in patients younger than 10 years, with a prevalence of 0.55%. The prevalence of psoriasis increases more rapidly with age in young female patients (ie, age <20 years) compared with young male patients. Thereafter, the prevalence of psoriasis is similar by sex as the population ages. Furthermore, in older individuals, the prevalence of psoriasis declines significantly in patients 70 years and older, regardless of sex.

Prescription treatments used for psoriasis are shown in **Table 2**. Overall, 91.8% of patients with a diagnostic code for psoriasis received a prescription for therapy consistent with psoriasis on or after the date of their first diagnostic code of psoriasis in the GPRD. Topical cortico-

Table 1. Prevalence of Psoriasis in the GPRD by Age Group and Sex

Patient Age, y	Prevalence/10 000 (95% Confidence Interval)		
	Male Patients	Female Patients	Total
0-9	48.62 (47.02-50.27)	61.76 (59.91-63.66)	55.02 (53.78-56.27)
10-19	118.58 (115.20-122.02)	154.79 (151.08-158.57)	137.37 (134.85-139.93)
20-29	149.14 (146.15-152.18)	152.55 (149.86-155.29)	151.04 (149.04-153.07)
30-39	186.60 (183.01-190.25)	169.75 (166.39-173.16)	178.01 (175.55-180.50)
40-49	219.06 (214.73-233.47)	187.94 (183.39-192.01)	203.43 (200.48-206.42)
50-59	232.30 (227.07-237.61)	213.73 (208.84-218.71)	222.78 (219.20-226.40)
60-69	226.28 (220.74-231.92)	225.66 (220.50-230.90)	225.95 (222.17-229.77)
70-79	168.40 (162.50-174.46)	156.60 (151.89-161.43)	161.39 (157.70-165.15)
80-89	89.62 (82.94-96.69)	87.90 (83.43-92.55)	88.44 (84.71-92.29)
≥90	46.42 (33.03-63.40)	47.57 (40.30-55.76)	47.33 (40.85-54.53)
Total	152.74 (151.46-154.02)	151.38 (150.18-152.58)	152.02 (151.14-152.89)

Abbreviation: GPRD, General Practice Research Database.

Table 2. Frequency of Use of Prescription Therapies for Psoriasis on or After the Date of the First Diagnostic Code of Psoriasis

Treatment	No. (%) of Patients*
None	9446 (8.2)
Topical tar	28 025 (24.5)
Topical corticosteroids	70 277 (61.4)
Topical salicylic acid	1861 (1.6)
Topical anthralin (dithranol)	15 550 (13.6)
Topical vitamin D analogues	44 671 (39.0)
Topical retinoids	824 (0.7)
Emollients	6930 (6.1)
Corticosteroid combination products	46 213 (40.4)
Tar combination products	15 241 (13.3)
Anthralin combination products	1375 (1.2)
Systemic treatments	2586 (2.3)
Methotrexate	1806 (1.6)
Cyclosporine	317 (0.3)
Hydroxyurea	170 (0.1)
Azathioprine	388 (0.3)
Psoralen	14 (0.01)
Etretinate	117 (0.1)
Acitretin	159 (0.1)

*Patients may have received more than 1 therapy; therefore, the sum of all of the percentages is not 100 (N = 114 521).

steroids were the most frequently prescribed medications and were received by 61.4% of patients. The next most commonly used prescription treatment types were corticosteroid combination products (40.4% of patients), topical vitamin D analogues (39.0% of patients), and topical tar (24.5% of patients). Systemic agents were used by 2.3% of patients.

The number of prescription treatments consistent with psoriasis received by patients in the first year after the GP documented a diagnostic code of psoriasis is shown in **Table 3**. Most patients (55.2%) received only 1 or 2 prescriptions for psoriasis in the first year after a diagnostic code was entered. A substantial portion of patients (23.9%) received 5 or more prescriptions in the first year after the first GPRD record of psoriasis.

Table 3. Number of Prescriptions Consistent With Psoriasis Treatment Received by Patients in the Year After Entry of the First GPRD Diagnostic Code of Psoriasis

No. of Prescriptions Consistent With Psoriasis Treatment	No. (%) of Patients With Psoriasis (n = 84 390)
1	28 815 (34.1)
2	17 763 (21.0)
3	10 675 (12.6)
4	6969 (8.3)
5-9	13 799 (16.4)
≥10	6369 (7.5)

Abbreviation: GPRD, General Practice Research Database.

COMMENT

The epidemiology of psoriasis in the GPRD population is similar to that of other epidemiologic studies of psoriasis performed in the United Kingdom, the United States, and other Western countries. In a relatively small study, Nevitt and Hutchinson⁹ found that the prevalence of physician-confirmed psoriasis in patients identified through general practices in the United Kingdom was 1.48%, which is nearly identical to that of our study. Because the GPRD is broadly representative of the UK population, it is expected that the findings of this study would generalize to the UK population beyond the GPRD. Furthermore, to our knowledge, this is the largest investigation of the prevalence of psoriasis to date.

The size of this study allows detailed measurement of the prevalence of psoriasis based on differences in age and sex. For example, the prevalence of psoriasis in the very young (<10 years) is low in terms of the percentage affected. However, extrapolated across the population, we estimate that approximately 40 000 children younger than 10 years have psoriasis in the United Kingdom on the basis of census data.²⁹ This finding emphasizes the need for safe and effective psoriasis treatments for children with psoriasis who may be more susceptible to adverse effects.³⁰ This study also demonstrated

that the prevalence of psoriasis increases more rapidly in female compared with male patients younger than 20 years. This finding is unlikely to be due to female patients paying closer attention to their skin because the observation extends to patients younger than 10 years and the finding diminishes in patients 20 years or older. In 1974, Farber and Nall³¹ reported that female patients have an earlier age at onset of psoriasis compared with male patients, based on questionnaires mailed to patients identified through dermatologists in the United States. These findings suggest an interaction between sex and the development of the psoriasis phenotype in young patients. Psoriasis is now believed to be a helper T 1 (T_H1) cell autoimmune disease, and therefore these findings may suggest a susceptibility to development of the psoriasis phenotype at an earlier age in female patients. This observation is similar to those for other autoimmune illnesses with a T_H1 designation such as lupus erythematosus, multiple sclerosis, and rheumatoid arthritis, which have generally demonstrated a predisposition for female patients.

Our study also demonstrated that the prevalence of psoriasis declines substantially in patients 70 years and older. The prevalence of psoriasis declines by 28% in those aged 70 to 79 years and by 60% in those aged 80 to 89 years, compared with patients aged 60 to 69 years. These results suggest that psoriasis may go into remission in elderly patients or otherwise does not come to medical attention and was therefore not captured in medical examinations of older individuals. Alternatively, elderly psoriasis patients may be at higher risk for mortality due to associated comorbidities, health behaviors such as smoking, treatment effects, or possibly the disease itself. A study in Spain also demonstrated decreasing prevalence of psoriasis in older individuals, particularly those older than 70 years.³²

Our study also demonstrated that psoriasis is a substantial health burden given its common prevalence in medical practice and its associated use of treatments. More than 90% of patients required some form of prescription therapy for psoriasis. The most common treatments used were topical corticosteroids, topical vitamin D analogues, corticosteroid combination products, and topical tar. For most patients with psoriasis, only 1 to 2 prescriptions were used in the year after documentation of the disease in the medical record by the GP. Also, patients may have received additional prescription therapies from other specialists (eg, dermatologists). Nevertheless, this finding is consistent with that of a recent US population-based study,^{5,33} which demonstrated that 59% of patients with psoriasis have minimal skin involvement. In addition, a cross-sectional study⁹ in the United Kingdom demonstrated that at least 33% of patients with psoriasis identified through GPs were not using any therapy at the time of evaluation. However, for more than 20% of patients, the disease appears to create a significant burden with respect to health care utilization given that they required 5 or more prescriptions for psoriasis in the year after documentation of psoriasis by the GP. As in other population-based studies of psoriasis, the frequency of systemic medication use is low. This study, however, underestimates the use of certain systemic agents

such as psoralen because its use is restricted to dermatologists in the United Kingdom and therefore is not captured electronically by the GPs.²⁸

As with all studies, there are limitations to consider. Patients with mild psoriasis may not have come to medical attention, and therefore using a diagnosis by a GP may underrepresent the prevalence of the disease. In addition, the gold standard for diagnosis of psoriasis is an examination by a dermatologist. Nevertheless, this study found a similar prevalence to that of psoriasis in the United Kingdom based on previous studies, and other studies in the United Kingdom have indicated a good rate of accuracy of psoriasis diagnosis by GPs.³⁴ Most studies of the epidemiology of psoriasis have relied on patient self-report, which may have limited accuracy, so our study has the advantage of evaluating a diagnosis confirmed by the GP.

This study of more than 100 000 patients with psoriasis suggests that additional studies are indicated to identify the determinants of the increased prevalence of psoriasis in young female patients compared with young male patients. In addition, studies are needed to determine the cause of the decline in psoriasis prevalence seen in older individuals. This population-based study also demonstrates that psoriasis is a substantial burden given that it commonly comes to medical attention and frequently requires prescription therapy.

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ARCHIVES Web Quiz Winner

Congratulations to the winner of our September quiz, Marwah Adly Mohamed Saleh, assistant lecturer of dermatology, Elkasralainy, Cairo University, Cairo, Egypt. The correct answer to our September challenge was *AIDS-associated Kaposi's sarcoma*. For a complete discussion of this case, see the "Off-Center Fold" section in the October ARCHIVES (Jensen SL, Bowman PH. Purple polypoid masses on the legs. *Arch Dermatol*. 2005;141:1311-1316).

Be sure to visit the *Archives of Dermatology* Web site (<http://www.archdermatol.com>) to try your hand at the interactive quiz. We invite visitors to make a diagnosis based on selected information from a case report or other feature scheduled to be published in the following month's print edition of the ARCHIVES. The first visitor to e-mail our Web editors with the correct answer will be recognized in the print journal and on our Web site and will also receive a free copy of *The Art of JAMA II*.