Current management of psoriasis in the United Kingdom: patterns of prescribing and resource use in primary care

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SUMMARY
The current management of psoriasis and its associated resource use in the United Kingdom (UK) was investigated in this retrospective analysis of 789,300 primary care patient records. Most patients with psoriasis (94%) were managed on topical psoriasis agents only, 4% were prescribed systemic psoriasis agents and 2% had no recorded psoriasis treatment at all during the 12-month study period. Co-medications to treat physical or psychological comorbidities were required by 22% of patients. Referral rates into secondary care were low, 5% of patients prescribed systemic psoriasis agents and 0.7% of patients prescribed topical psoriasis agents had secondary care appointments documented in their medical records. This study demonstrates that most patients with psoriasis in UK primary care are managed on topical agents even though there are surrogate markers, such as resource use and co-medication prescriptions, which indicate that their psoriasis is not optimally controlled.

Keywords: Psoriasis; primary care; systemic agents; topical therapies; prescriptions; resource use

INTRODUCTION
Psoriasis is a chronic, relapsing skin disorder characterised by red patchy lesions, which are frequently painful, scaly, itchy and may bleed. It affects 1%–2% of the population of the United Kingdom (UK), equating to approximately 1.2 million people (1). Over the past two decades, advances have been made in the understanding of the immunogenic pathogenesis of psoriasis. It has now been established that psoriasis is an autoimmune inflammatory disorder characterised by hyperproliferation of keratinocytes and accumulation of activated T cells in the dermis and epidermis.

Psoriasis may be categorised into one of three severities according to the extent of body surface covered. Disease affecting less than 2% of the body is classified as mild, disease affecting 3%–10% of the body is classified as moderate and disease affecting greater than 10% is considered severe (2). According to these criteria, approximately 25%–30% of patients have psoriasis that is considered moderate to severe (1,3). Several studies, however, suggest that body surface area (BSA) may not provide an appropriate measure of psoriasis severity (4–6). For example, plaque location as well as the size and severity of lesions will have an impact on the quality of life (6,7). This highlights the potential problems with categorising psoriasis severity purely on clinical sign criteria and demonstrates the need to consider not only the area of lesion involvement but also the quality of life of the patient and the impact that psoriasis therapies may have on the quality of life.

There is no cure for psoriasis, and treatment is aimed at providing symptomatic relief and improved quality of life for sufferers. Treatment strategies depend largely on the severity, location and extent of lesion coverage. Topical agents, such as emollients, dithranol (anthralin), coal tar preparations, topical vitamin D3 analogues (e.g. calcipotriol and tacalcitol), topical retinoids and topical corticosteroids, are recommended as initial treatment for patients presenting with psoriasis (1,8). These agents are generally well tolerated, and their use can be managed in a primary care setting. Moderate to severe psoriasis, however, is generally less responsive to topical agents and requires more intense treatment in the form of phototherapy [psoralen and UVA (PUVA) and UVB treatments] and systemic agents such as methotrexate, ciclosporin and acitretin (8).

The use of phototherapy and systemic agents is associated with potentially fatal side-effects, including liver toxicity, bone marrow suppression (methotrexate), renal failure, hypertension (ciclosporin), hyperlipidaemia (ciclosporin and acitretin) and skin cancer (PUVA). For these reasons, guidelines from the British Association of Dermatologists state that PUVA should be limited to 150 lifetime treatments due to the increased risk of malignancy (8). Limitations have also been recommended for other systemic therapies; recommendations for the maximum duration of ciclosporin therapy have ranged from 3 months to 2 years (1,9,10). It has been
suggested that methotrexate and acitretin should be limited to 2 years of continuous use (11), although these drugs are frequently used for many years in individual patients with careful monitoring for treatment related side-effects.

Regular laboratory monitoring, such as screening for renal and liver toxicity, hyperlipidaemia and hypertension, is also required as a consequence of the cumulative toxicities associated with conventional systemic therapies (8). Rotational therapy, in which a patient receives one therapy for 1–2 years before switching to another therapy with an unrelated side-effect profile (12), is one treatment strategy that may be used in order to reduce the cumulative side-effects of individual therapies.

In addition to their cumulative side-effects, current systemic agents and phototherapy have other treatment-related limitations including a lack of consistent efficacy with time on therapy; a recent study by Feldman et al. (13) demonstrated that after 1 year of therapy, around 20% of psoriasis patients experienced treatment failure with systemic therapy or phototherapy. Furthermore, the inconvenience of many current psoriasis therapies may influence patient compliance with the treatment regimen. For example, phototherapy requires regular (two to three times per week) patient visits to specialist dermatology centres, which is a significant time burden especially for patients who are employed or in education. Topical therapies are also associated with inconveniences; their malodour, messiness in use and time needed to apply treatments result in reduced compliance (14).

In the UK, the first point of patient contact with health professionals is the family doctor, the primary care General Practitioner (GP). Much of the patients’ medical history and management is therefore documented on a centralised primary care record. The GP may decide to manage the psoriasis patient in primary care (especially where disease is mild, requiring only topical treatment) or might refer the patient to a specialist. Hospital-based dermatologists often see psoriasis patients as outpatients when their disease is more severe or requires systemic treatment. Less frequently, patients with psoriasis require hospital admission.

Access to health service resources (GP appointments, outpatient appointments, diagnostic and monitoring tools such as blood tests and treatments) is based on need. However, previous studies have suggested that management of psoriasis in the UK could be improved, because relatively few patients are referred for secondary care and many do not seek any medical help (15,16). In a large UK study (16) including 435 patients with psoriasis, relatively few participants sought medical help for their psoriasis. Forty-five percent of patients reported that they had not consulted their doctor, as a consequence of their psoriasis, during the previous 12-month period (16). The cause of these findings is unknown but potentially includes both doctor and patient effects, including prior experience with therapies and low expectation of future treatment success.

The objective of this study was to investigate the current management of psoriasis in the UK, including its associated resource use in primary care.

**METHODS**

**Data Source**

This retrospective, patient record analysis used data from a large computerised primary care medical record database.

The primary care database, DIN-LINK (Doctors Independent Network), contains complete information from over 350 general practices and 789,300 patients in England and Wales. An electronic search of the DIN-LINK database identified all patients visiting their GP for psoriasis between 1 April 2002 and 1 April 2003. A diagnosis of psoriasis was identified by the presence of one or more psoriasis read codes in the patient’s computerised medical records.

**Data Collection**

*Group 1: All psoriasis patients.* The total number of psoriasis patients identified from primary care records was 6120. For analysis purposes, this all-patient cohort was labelled as ‘group 1’. No records were excluded from this group. Data pertaining to patient demographics, prevalence, incidence, treatment and comorbidities were obtained from this cohort. This group was subsequently divided into subgroups according to the type of psoriasis therapy (Table 1). At the time of this separation, 2135 patients were excluded on the grounds that they had not been diagnosed and managed in the same GP practice for at least a year. Excluding those patients who did not have a record of continuous care ensured that there was a complete

**Table 1** The source of data allocated to each group

| Group | Description | n   |
|-------|-------------|-----|
| 1     | All psoriasis patients in primary care | 6120 |
| 2     | Psoriasis diagnosed and treated in the same GP practice for at least 1 year Patients prescribed or previously prescribed topical agents | 3836 |
| 3     | Psoriasis diagnosed and treated in the same GP practice for at least 1 year Patients prescribed or previously prescribed systemic agents or phototherapy | 149  |

GP, General Practitioner.
data set for analysis. Therefore, 3985 patients were eligible for the subgroup analyses.

Group 2: Patients prescribed topical psoriasis therapies only. Group 2 (a subgroup of group 1) consisted of primary care patients prescribed (or those who had previously been prescribed) topical treatment for their psoriasis ($n = 3836$), who had been diagnosed and managed in the same GP practice for at least 12 months; all patients had a prescription for topical therapies before 1 April 2002, and these patients had not received a prescription for systemic therapies or had no record of phototherapy in their patient records in the 12 months before the analysis period (April 2002 to April 2003). During the data collection period, it became clear that some patients who were categorised as group 2 (topical therapy) patients based on their treatment at the time of allocation (before April 2002) did not receive treatment for their psoriasis during the study period (April 2002 to April 2003). The number of patients fitting this description was recorded. Topical therapies were defined as emollients, coal tar creams, ointments and shampoos, topical corticosteroids, topical retinoids, vitamin D analogues and dithranol. These data were used to obtain information on the type of therapy, co-therapies (anti-infectives, analgesics, anti-inflammatory agents, antidepressants, sedatives and antihistamines), resource use (numbers of GP consultations, psoriasis-related outpatient appointments and hospital admissions) and the number of sick notes.

Group 3: Patients prescribed systemic psoriasis therapies. Group 3 (a subgroup of group 1) consisted of primary care patients prescribed (or those who had previously been prescribed) systemic treatment or phototherapy for their psoriasis ($n = 149$), who had been diagnosed and managed in the same GP practice for at least 12 months; all patients had a prescription for systemic or phototherapy before 1 April 2002. During the data collection period, it became clear that some patients who were categorised as group 3 (systemic therapy) patients based on their treatment at the time of allocation (before April 2002) did not receive treatment for their psoriasis during the study period (April 2002 to April 2003). The number of patients fitting this description was recorded. Systemic therapies included methotrexate, ciclosporin, prednisolone and acitretin and phototherapy included PUVA and UVB. These data were used to obtain information on the type of therapy, co-therapies (anti-infectives, analgesics, anti-inflammatory agents, antidepressants, sedatives and antihistamines), resource use (numbers of GP consultations, psoriasis-related outpatient appointments and hospital admissions) and the number of sick notes.

RESULTS

Incidence and Prevalence

Of the 789,335 patients in the DIN-LINK database, 6120 were identified as suffering from psoriasis (group 1). The prevalence of psoriasis within the DIN-LINK database was 0.8%, and the incidence was 0.1% over the 12-month study period.

Patient Demographics

The demographics of psoriasis patients identified through primary care records (group 1) are summarised in Table 2. Most group 1 patients (69.9%) were adults (19–65 years), 6.3% were children (0–18 years) and 23.9% were elderly (>65 years). Of the group 1 patients, 49.9% were male and 50.1% were female.

Psoriasis Treatment

The mean time since diagnosis for all patients diagnosed with psoriasis (group 1) was 9.6 years, although this was longer (10.6 years) for those patients prescribed systemic treatment compared with topical treatment (7.8 years) (Table 2).

Most group 1 patients (93.6%) were prescribed topical therapy only, 4.0% were prescribed systemic agents and 2.4% of patients had no recorded psoriasis therapy (Table 2). On average, patients prescribed systemic agents had been prescribed topical therapies for 3.2 years before switching to systemic agents. In addition, 5% of patients were also suffering from the comorbidity psoriatic arthritis (Table 2).

Table 2 Characteristics of all psoriasis patients (group 1)

| Characteristic                           | Primary care (n = 6120) |
|-----------------------------------------|-------------------------|
| Gender and age of patients              |                         |
| Male patients                           | 3052 (49.9%)            |
| Female patients                         | 3068 (50.1%)            |
| Patients aged 0–18 years (children)     | 383 (6.3%)              |
| Patients aged 19–65 years (adults)      | 4277 (69.9%)            |
| Patients aged >65 years (elderly)       | 1460 (23.9%)            |
| Classification according to psoriasis treatment |                 |
| Patients prescribed topical therapy only | 5727 (93.6%)            |
| Patients prescribed systemic therapy    | 245 (4.0%)              |
| Patients receiving no treatment         | 145 (2.4%)              |
| Mean time since diagnosis               |                         |
| for all patients                         | 9.6 years               |
| for topical only patients                | 7.8 years               |
| for systemic patients                   | 10.6 years              |
| Comorbidities                           |                         |
| Patients with psoriatic arthritis       | 308 (5.0%)              |
The subanalysis of patients prescribed topical therapies only for their psoriasis (group 2) showed that 129 different topical psoriasis therapies were prescribed. Calcipotriol and betamethasone were the most frequently prescribed topical agents accounting for 40.7% and 27.7% of patients with prescriptions, respectively (Figure 1). Together, these two agents accounted for more than one third of the total prescriptions.

The subanalysis of patients prescribed systemic therapies for their psoriasis (group 3) showed that methotrexate and ciclosporin were the most frequently prescribed treatments [prescribed to 36.2% and 8.1% of patients, respectively (Figure 2)]. Other agents, including prednisolone and acitretin, were each prescribed to less than 5% of these patients. PUVA or UVB treatment was not recorded for any patients in this group; however, it is possible that this intervention was used but was not documented in the primary care record, as phototherapy is usually managed in a secondary care setting. Most group 3 patients (86%) were concurrently prescribed topical agents to manage their psoriasis, suggesting that systemic therapy alone was insufficient to control their disease symptoms.

Children were prescribed less potent psoriasis treatments than adults. For example, children in group 2 (patients prescribed topical therapies only) were prescribed more psoriasis shampoos and lotions while adults and the elderly in the same group were prescribed more topical corticosteroid preparations. There were two children listed in group 3 (patients prescribed systemic therapies); however, they were not prescribed systemic agents or phototherapy during the study period.

In group 3 (patients prescribed systemic therapies), more male patients (14.1%) were prescribed ciclosporin than females (2.6%), and more females were prescribed methotrexate (41.0%) than males (30.9%). Prescription of topical therapies did not differ substantially between female and male patients in group 2 (patients prescribed topical therapies only).

Many patients had no recorded therapy during the study period. In group 2 (patients prescribed topical therapies only), there was no recorded therapy for 8.1% of children, 5.1% of adults and 2.9% of elderly patients. In group 3 (patients prescribed systemic agents), most patients (56.4%) had no recorded systemic therapy during the 12-month study period (Table 3).

Co-Medication

Co-medication was prescribed to 857 psoriasis patients (22% of 3985 patients in groups 2 and 3 combined). Co-medications included anti-infectives, analgesics, anti-inflammatory agents, antihistamines, sedatives and antidepressants (Figure 3). Anti-infectives were the most common co-medication, prescribed for 9% of group 2 (patients prescribed topical psoriasis therapies only) and group 3 (patients prescribed systemic psoriasis therapies) patients. Analgesics, anti-inflammatory agents, antihistamines, sedatives and antidepressants were prescribed more frequently for patients prescribed systemic psoriasis therapies (group 3) than for those prescribed topical therapies alone (group 2).

Figure 1  Topical therapies prescribed for psoriasis (group 2). The graph shows the frequency of prescription for each type of therapy. The final bar (‘others’) represents the 120 therapies not depicted individually, because each had only a low frequency of prescription. These therapies included emollients, shampoos, topical steroids, tar preparations, topical retinoids, dithranol preparations and vitamin D preparations.
Age appeared to correlate to the type of co-medication prescribed to psoriasis patients (groups 2 and 3 combined). Anti-infectives were prescribed more frequently in children (16.4%) than in adults (12.7%) and elderly patients (10.4%). Sedatives and antidepressants were only prescribed to adults and elderly patients. Pain relief, anti-inflammatories and antihistamines were prescribed equally across all age groups.

Time since diagnosis also appeared to correlate with the type of co-medication prescribed to psoriasis patients (groups 2 and 3 combined), possibly indicating the time-course of acceptance of debilitating symptoms. Co-medication with sedatives, antidepressants and anti-infectives were prescribed more frequently within the first 7 years of diagnosis (average time since diagnosis 6.4, 6.6 and 6.7 years, respectively). In contrast, co-prescription of antihistamines, analgesics and anti-inflammatories commonly occurred between 7 and 11 years after diagnosis.

Of the primary care patients (groups 2 and 3) prescribed anti-infectives, antihistamines and anti-inflammatories, 1.5% had outpatient appointments recorded in their medical records. None of the patients prescribed antidepressants, sedatives or analgesics had outpatient appointments recorded in their medical records (Table 4).

**Resource Use**

Healthcare resource requirements varied between groups of patients, in terms of both frequency (% of patients in group) and rate (number of requirements per patient per year). Patients receiving systemic psoriasis therapies (group 3) had a higher frequency of healthcare resource use compared with those prescribed topical psoriasis therapy only (group 2). GP consultations were required by 64% of group 3 patients and by 51% of group 2 patients during the 12-month study period. More group 3 patients required psoriasis-related outpatient visits (5.4% vs. 0.7%), hospital admissions (1.3% vs. 0.2%) and sick notes (3.4% vs. 0.5%) than group 2 patients. The rate of GP consultations, psoriasis-related outpatient visits, hospital admissions and sick notes were higher in group 3 patients compared with group 2 patients (Figure 4).

Children in group 2 (patients prescribed topical therapies only) had more GP consultations and psoriasis-related outpatient visits compared with adults and elderly patients in this group. Elderly patients had the most hospital admissions and adult patients more frequently required sick notes (Table 5).

**DISCUSSION**

Recently, a number of consensus statements regarding current psoriasis management and future developments in this arena have been published (17). Safety was the main concern with current systemic psoriasis therapies, which were deemed to be effective in the treatment of psoriasis but limited in the duration and scope of use due to unfavourable long-term safety profiles.

This study appears to confirm these conclusions by demonstrating that fewer patients are prescribed systemic psoriasis treatments than would be expected based on the severity of their psoriasis. For example, national prevalence figures state that 25%–30% of patients with psoriasis are more likely to have disease that is moderate to severe (based on BSA involvement) (1,3), and yet only 4% of patients identified in the large nationally representative primary record database were associated with systemic psoriasis treatment. It is possible that the primary care record analysis could have biased the population towards milder presentations of the disease (i.e. potentially analysing patients who have disease that is not severe enough to warrant secondary care management and not identifying secondary care-based therapies such as phototherapy).

The above findings, together with the fact that most patients identified as systemic patients (group 3) appeared to receive no systemic therapy during the study period, suggest that many patients are being prescribed topical psoriasis treatment or no treatment when systemic psoriasis treatments may be indicated. It is hypothesised that this anomaly may

![Figure 2](image_url)
result from the safety concerns and numerous contraindications and intolerances associated with current systemic psoriasis treatments, causing reluctance on the part of clinicians and patients regarding the use of these treatments. Patients with disease severe enough to warrant systemic therapy are currently left with no other active treatment choice than to continue with topical psoriasis therapies that are usually reserved, in isolation, for milder disease.

Among the many contraindications or cautionary warnings regarding current systemic psoriasis therapies is the potential for harmful effects to children and pregnant women. This study confirmed that children are prescribed less potent psoriasis therapies than adults. The recent consensus statement calls for new psoriasis therapies with favourable long-term safety profiles that can be used in patients of all ages and life stages (17).

The consensus statement also suggested that there was a need for additional psoriasis treatment options with minimal monitoring requirements compared with those currently available (17). This study found that all elements of resource use indicative of monitoring (primary and secondary care appointments and hospital admissions) were more prevalent in patients prescribed systemic psoriasis therapies compared with patients prescribed topical therapies only.

In addition to placing a large economic burden on the healthcare system, these monitoring requirements may add to the perceived inconvenience of certain therapies. For example, phototherapy requires frequent hospital attendance (two to three times per week) for administration of the treatment. Such disruption to a patient’s daily life inevitably has a negative impact, and this may constitute another reason why patients opt out of currently available psoriasis therapies. Inconvenience is cited as an additional negative attribute of current systemic therapies by the consensus statement (17).

It is of interest that among patients identified through primary care records that were prescribed only topical psoriasis therapies, 51% consulted their GP on average 1.6 times per year and yet only 0.7% of these patients had any documented secondary care appointments (referrals). Furthermore, a small proportion of patients remained on topical therapies even though they had been admitted to hospital at least once and had required an average of 2.1 sick notes for their psoriasis during the 12-month study period, indicating a lack of optimal disease control. It is hypothesised that more of these patients might have benefited from referral to secondary care for their psoriasis management. This is further supported by the analysis of co-medication data, which showed that medications, for physical or psychological comorbidities, were prescribed to 22% of patients, the vast majority (>98%) of whom had no outpatient appointments noted in their medical records.

Taken together, these results indicate that among patients identified in primary care, the management of psoriasis is not

![Figure 3](image1.png) Co-medications used by psoriasis patients. The data are presented for those patients receiving topical (group 2) and systemic (group 3) treatments for their psoriasis.

![Figure 4](image2.png) Rate of resource use (number per patient per year) by psoriasis patients. The data are presented for those patients receiving topical (group 2) and systemic (group 3) treatments for their psoriasis. GP, General Practitioner.

| Table 4 Co-medication: key findings |
|--------------------------------------|
| Patients prescribed systemic psoriasis therapies were more likely to be prescribed co-medication than patients prescribed topical therapies only. |
| Anti-infectives were the most common type of co-medication prescribed. These were prescribed most frequently to children. |
| Sedatives, antidepressants and anti-infectives were more likely to be prescribed during the first 7 years after diagnosis. |
| Only a minority of patients prescribed anti-infectives, antihistamines and anti-inflammatories had secondary care appointments (referrals) documented in their records. |
| None of the patients prescribed antidepressants, sedatives or analgesics had secondary care appointments (referrals) documented in their records. |
optimal in that there are fewer patients referred to secondary care specialists than seemingly indicated based on national prevalence rates, resource use and co-medication prescriptions. This may be due to the underestimation of primary care clinicians regarding the severity of psoriasis and/or the negative impact that it has on the quality of life. Alternatively, the decision to opt out of specialist care for psoriasis may also be made by the patient. Indeed, one survey showed that 45% of patients with psoriasis did not consult a doctor for their psoriasis over a 12-month period (16). Some patients may simply have developed a means of coping with their disease, reducing their need for health service resources, while others may have become disillusioned and unsatisfied with the therapies currently available.

It is acknowledged that the current study has some limitations. The prevalence of psoriasis in the current study was lower than that previously published (1). The cause of this is not known and may reflect differences in study design, patient demographics or geography. Because data were collected via an analysis of primary care records, the study population is more likely to be biased towards patients receiving psoriasis treatment in the primary care setting. As a result, patients with severe psoriasis who are managed in the secondary care setting and patients who receive psoriasis treatment as an inpatient may be under-represented in this study. Resource use (e.g. number of outpatient appointments) is also likely to be under-reported, as follow-up outpatient appointments are not always recorded in primary care patient records. In addition, some systemic therapies (e.g. phototherapy, methoxypsoralens and acitretin) may not be recorded in primary care notes because they are administered only in a secondary care setting. Furthermore, it is known that many patients do not seek medical help for their disease (15,16) and this would reduce the prevalence estimate in the current study, because data were collected by the analysis of medical records. Interpretation is also difficult from the current data set, because the reasons for treatment/management choices are not explicit.

Nonetheless, this study does appear to support the conclusions of the recent consensus statement (17) that there is a need for additional psoriasis therapies for patients with disease classified as moderate to severe. The statement suggested that ideally such new therapies would be administered on a long-term basis to allow continuous disease control, with minimal contraindications, safety concerns or monitoring requirements and maximum convenience and patient acceptability. The article described the anticipated availability of a new class of psoriasis therapy: biological agents, which specifically target key steps in the psoriasis pathogenesis. At present, the data suggest that such therapies fulfil the majority of requirements outlined by the consensus statement and therefore fill a gap in current psoriasis management. It is hoped that the widespread introduction of biological agents into clinical practice will meet the need for effective and safer psoriasis therapies in addition to providing an alternative treatment option for patients who are unsuitable for current systemic agents due to resistance, intolerance and contraindication.

CONCLUSION

In conclusion, the current study demonstrates that most patients with psoriasis in the UK are managed in primary care with topical agents even though there are surrogate markers (such as resource use and co-medication prescriptions) that suggest that their psoriasis is not optimally controlled. The systemic agents currently available are limited in their use due to toxicity, side-effects, lack of consistent efficacy over time and contraindications. For patients who are unsuitable for systemic agents, topical therapies and no treatment are the only available treatment options. The results indicate that there is a need for more effective and safer psoriasis treatments for patients with moderate to severe psoriasis and especially for children and females (who have limited treatment options). On this basis, there is optimism that the emerging class of biological agents will provide dermatologists with an additional tool for the management of psoriasis.

DISCLOSURES

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