

## PATIENT AND PHARMACIST PERCEPTIONS OF A PHARMACIST-LED EDUCATIONAL INTERVENTION FOR PEOPLE WITH PSORIASIS

ROD TUCKER, DEREK STEWART

Robert Gordon University School of Pharmacy and Life Sciences,  
Sir Ian Woods Building, Garthdee Road, Aberdeen Ab10 7GJ

**Key words:** dermatology, primary care, community pharmacists, consultation

### ABSTRACT

**BACKGROUND:** Chronic plaque psoriasis is an inflammatory skin condition that affects up to 3% of the UK population and most patients have mild to moderate disease that can be effectively managed with topical therapies in primary care. In recent years, community pharmacists in the UK have been encouraged to adopt a more clinically focused role, particularly around supporting those with long-term conditions. However, little is known about how pharmacists might help support those with long-term skin conditions.

**OBJECTIVES:** To determine patient and participating pharmacists' views of an educational intervention delivered in community pharmacy to those with mild to moderate chronic plaque psoriasis.

**METHODS:** Pharmacists recruited patients either opportunistically when they presented at the pharmacy with a prescription for psoriasis treatment, or via a letter of invitation to those identified from their pharmacy medication records as using prescribed topical treatment for psoriasis. The intervention consisted of one face-to-face consultation and a follow-up appointment after approximately 6 weeks.

Structured telephone interviews were conducted with 38 of the patients who participated in the intervention after completion of the follow-up visit. The interviews sought information on patients' reasons for joining the study, measures of satisfaction with the pharmacy consultation and perceptions on whether the pharmacist's advice improved their skin condition. The data generated were analysed quantitatively with open responses coded for subsequent analysis.

In addition, semi-structured telephone interviews conducted with all seven participating pharmacists, explored their perceptions on the value of the intervention for both themselves and patients and the potential for wider adoption of such a service. All interviews were audio-recorded, transcribed verbatim and analysed thematically.

**RESULTS:** Nearly three-quarters of patients (74%) joined the study to learn more about their condition and its management and half, (51%) reported improvements in knowledge after the intervention. The majority (84%) of patients believed that their psoriasis had improved as a result of the advice they received during the intervention.

Pharmacists also improved their knowledge of psoriasis and its management and welcomed the opportunity for greater patient interaction, believing that patients benefited from the intervention and saw pharmacists as members of the healthcare team managing their condition. However, ensuring patients returned for the second appointment and juggling the demands of the study with other work was sometimes problematic. There were mixed views on the wider adoption of the intervention.

**CONCLUSION:** In the present study, patients felt that their psoriasis improved as a result of the advice from pharmacists and this view was shared by pharmacists. Further work with a larger patient cohort is necessary to explore the extent to which these findings are generalisable to the wider population of pharmacists and patients with mild to moderate psoriasis.

## INTRODUCTION

Plaque psoriasis is a chronic inflammatory skin condition that is thought to affect up to 3% of the UK population<sup>1</sup>. Though not life-threatening, psoriasis it is associated with a significant impairment of quality of life<sup>2</sup> and emotional well-being<sup>3</sup>. Most patients with plaque psoriasis have mild to moderate disease which can be managed with topical therapies in primary care<sup>4</sup>. Nevertheless, adherence to topical regimes is often poor<sup>5,6</sup>. Furthermore, qualitative studies in those with psoriasis have revealed an often erratic and inconsistent use of topical therapies, a desire for advice on the correct use of topical therapies (which is usually absent in consultations) and a perception that healthcare professionals lack sufficient knowledge and expertise of psoriasis<sup>7-9</sup>. Consequently, patients frequently sub-optimally manage their condition often in isolation from healthcare professionals due to the absence of adequate advice on treatments. These studies clearly illustrate the need for more effective community based information, education and support for those with psoriasis.

Educational interventions for those with a skin problem aim to lessen the impact on quality of life and reduce disease severity and there is some evidence that adjunctive patient education for those with skin problems such as atopic eczema, leads to improvements in disease outcomes<sup>10</sup>. However, recently, it was concluded that educational interventions for patients with psoriasis employed in clinical trials have met with limited success with respect to improving disease severity and quality of life<sup>11</sup>.

Previous studies suggest that educational input by pharmacists is beneficial in the management of hypertension and diabetes, though results are mixed for other medical conditions<sup>12</sup>. There is a paucity of data on the role of community pharmacists in the management of patients with long-term skin conditions except for one small pilot study in 50 children with atopic eczema. This study, though uncontrolled and limited by sample size, did find that educational advice on the use of emollients given to the parents of children with atopic eczema, produced a small, but statistically significant reduction in itch and irritability<sup>13</sup>.

In a recent uncontrolled study, we demonstrated that an educational intervention by community pharmacists to patients with psoriasis, appeared to improve knowledge, disease severity and quality

of life<sup>14</sup>. In this paper, we explore the perceptions of the patients and participating pharmacists from that study.

The aims of the study were to:

- Explore patient views of the pharmacist consultation
- To explore patients' views of the impact of the intervention on their condition
- Examine pharmacists' perceptions on the delivery of the intervention.

## **MATERIALS AND METHOD**

### **Design and setting**

The study was conducted in a total of seven community pharmacy sites in the South West of England and Yorkshire and Humber (Eastern England). The local clinical research networks (CRNs) were approached to help identify pharmacists who had registered an interest in undertaking research work (and had completed good clinical practice training) to participate in the study.

Patients were recruited either opportunistically when presenting at the pharmacy with a prescription for psoriasis treatment or via a letter of invitation sent by the pharmacist to those prescribed topical treatments for psoriasis identified through the pharmacy computer system records. Pharmacists gained informed consent and enrolled patients into the study. As a part of the consent process, patients provided telephone details and suitable times (a.m. or p.m.) to allow them to be contacted by a researcher at a later stage for a follow-up interview.

### **Intervention**

The details of the intervention have been described elsewhere<sup>14</sup>. In brief, pharmacists conducted one face-to-face consultation with patients and a follow-up visit approximately 6 weeks later and used the person-centered dermatology self-care index (PEDESI)<sup>15</sup>, to assess individual patient's educational and support needs. This instrument is designed to explore various aspects of a patient's knowledge about their skin condition and its management including possible triggers, the role of prescribed treatments, adverse effects etc. The pharmacists then provide tailored advice to enhance a patient's level of understanding of each topic. In the study, disease severity and quality of life were assessed prior to the consultation using the self-assessed psoriasis and severity index (SAPASI)<sup>16</sup> and the dermatology quality of life index (DLQI)<sup>17</sup> respectively. At the follow-up appointment all three measures (PEDESI, SAPASI and DLQI) were re-assessed.

### **Patient interviews**

Structured telephone interviews were conducted with patients after completion of the follow-up appointment by one of us (RT). The questions captured data on gender, age, the length of time (in years) that patients had suffered with psoriasis and included several questions on consultation satisfaction which were based on an instrument derived from a validated scale developed for general practitioners<sup>18</sup>. Participants provided verbal consent to have the telephone interview audio-recorded and in conducting the telephone interviews, the researcher read the questions

and potential answers to participants and recorded their answer. For open ended questions, i.e., in describing what participants liked most and least about the intervention and any further comments, responses were transcribed verbatim and coded into categories which were then quantified and independently checked by both authors.

The questions were piloted with one patient who revealed no problems and who was subsequently included in the final analysis.

### Pharmacist interviews

All participating pharmacists provided informed and written consent to participate in semi-structured telephone interviews which were conducted by the same researcher (RT) and arranged at a mutually convenient time after completion of the patient follow-up appointments. The topic guide for the interviews is shown in Table 1.

**Table 1: Topic guide for the pharmacist interviews**

- How much did you know about psoriasis before undertaking the study?
- What are the main things that you have learnt about psoriasis from doing the study?
- What were the things that you liked about the study? Was there anything that you disliked?
- What if anything, were the main problems in providing the service? How might these problems be overcome?
- How do you think customers viewed your role in relation to the management of their psoriasis as a result of the study?
- Do you feel that the service was of value to patients? In what ways?
- Do you think that the intervention could become a model for an enhanced service in pharmacies?

### Analysis

Responses to the patient interviews were entered into SPSS (SPSS Inc., Cary, NC version 21.0) and analysed descriptively. Comments to open questions were coded in SPPS.

The pharmacist interviews were transcribed verbatim and analysed thematically using Nvivo (QSR International Pty Ltd. Version 10, 2014).

## RESULTS

### Patient characteristics

In total 42 patients completed the two consultations, though only 38 (20 males and 18 female) patients were contactable for the follow-up interview. Reasons for lack of contact included incorrect telephone numbers and failure to respond to answerphone messages.

The mean age of interviewed participants was 61 years ( $\pm$  16.9) compared to the overall sample mean of 59 years, with a range of 69 years. The youngest participant was 21 and the oldest 90 years of age. Interviewed participants had suffered with psoriasis for a mean of 24 years ( $\pm$  17.9) with a range of 65 years.

### Patient interviews

Patients’ reasons for joining the study, most favourable aspects of the consultations and their perceptions on whether the advice/information received improved their skin condition are shown in Table 2. The level of agreement with several aspects related to patient satisfaction with the pharmacist consultation are shown in Table 3.

**Table 2: Participant perceptions of the intervention**

Reasons for participating in the study*	N	%
Wanted more information about psoriasis and treatment	42	74
Concerned about their psoriasis	7	12
Invited to join the study	8	14
Aspects of the study most liked by participants*		
Improved knowledge of condition and treatment	33	51
One-one interaction	21	33
Advice on emollient use	7	11
Nothing	3	5
Do you think your psoriasis improved as a result of the pharmacist's advice?		
Yes	32	84
No	4	11
Not sure	2	5

\*participants could give more than one answer

**Table 3: Level of agreement with statements**

Statements*	Median score	IQR	N
I understand my psoriasis much better after seeing the pharmacist	4.00	2.00	38
The pharmacist told me everything about my treatments	5.00	1.00	38
I am happy with the length of time I spent with the pharmacist	5.00	0.75	38
The follow-up visit was beneficial to me	5.00	1.00	36
I am totally satisfied with my visits to the pharmacist	5.00	0.00	38
Some things about my consultation could have been better	2.00	0.00	38
I would recommend this service to others	5.00	0.00	38

\*Based on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree)

IQR = Interquartile range. Cronbach's alpha = 0.74

### Pharmacist interviews

All seven pharmacists involved in the study participated in follow-up semi-structured telephone interviews. The pharmacist characteristics are shown in Table 4.

**Table 4: Pharmacist and Pharmacy characteristics**

Gender	Age	Years qualified	Pharmacy type	Pharmacist code
Male	29	29	Suburban (Independent)	PH1
Male	30	30	Rural (Independent)	PH2
Male	40	40	Rural (Independent)	PH3
Male	38	38	Suburban (Multiple)	PH4
Female	39	39	Urban (Multiple)	PH5
Male	48	48	Rural (Independent)	PH6
Female	37	37	Suburban (Independent)	PH7

### What did pharmacists know about psoriasis before the study?

The key theme with respect to prior knowledge was how little pharmacists knew about the condition before undertaking the study. With the exception of two pharmacists (one had created a local training guide and another who suffered with guttate psoriasis) none of the others knew much about the condition as one pharmacist reflected:

*“It wasn’t something that I probably had an in-depth knowledge of... I knew the basics that it was thickening of the skin but didn’t really understand what was causing that thickening ... and how the treatments worked.”* [PH4]

This view was echoed by another:

*“I didn’t have a special interest in it, I had obviously done dermatology lectures as an undergraduate and I’ve done a few bits of CPD since qualifying... but before I did the study I didn’t really have a decent knowledge on it.”* [PH2]

### What have pharmacists learnt about psoriasis from undertaking the study?

The main theme to emerge was an enhanced understanding of psoriasis with three sub-themes which were:

- Impact on patients
- Greater treatment knowledge
- Improved confidence

### **Impact on patients**

One pharmacist remarked on how he now had a greater insight into the psychological impact of the condition:

*“[I’ve learnt] more about the impact on life ... how it takes over routines. That it can be an embarrassment, the way people go out of their way to disguise it or hide it. And also [the] psychological impact, the frustration they might have, the embarrassment.”* [PH1]

### **Greater treatment knowledge**

Several commented on how they were unaware of the importance of emollient therapy but had noticed big improvements in patients’ condition after recommending emollient use as one pharmacist explained:

*“I think [I have a] much better knowledge of how to manage it for patients and the importance of emollient therapy as well as active treatments. I probably wasn’t fully aware of quite how beneficial emollients can be to patients.... [I’d] talk to patients about using their Dovonex or their Dovobet [active treatments] but not about whether they’re using an emollient with it, whereas now it’s the first thing that I talk about....”* [PH4]

### **Improved confidence**

One pharmacist mentioned how the study had improved her confidence when discussing psoriasis with patients:

*“Now I feel a lot more confident when talking to a patient who suffers with psoriasis, about what it is, how to treat it, how to use the different treatments, I couldn’t have given proper advice before....”* [PH5]

### **What did pharmacists enjoy most about participating in the study?**

The key theme to emerge was the notion of increased job satisfaction with three sub-themes:

- Greater patient contact
- Making a difference
- Giving patients time

Pharmacists enjoyed the time spent with patients. It was perceived by most as a welcome opportunity to discuss the condition with patients, something that was clearly absent in previous encounters with healthcare professionals, as portrayed by one pharmacist:

*“The feedback I got from a lot of them was that they’d been diagnosed with it [psoriasis] a long time ago and left to get on with it and probably didn’t ever have that sit down time with anyone since they first saw a dermatologist who diagnosed it 20 years ago and now they just muddle through and no one’s taking an active role. The patients certainly appreciated that time to talk through what they’re doing....”* [PH4].

### **Making a difference**

A consequence of spending more time with patients was the importance of being able to make a

difference for patients. The follow-up consultation provided the prospect of assessing the impact of their advice on the patient's condition as summed up by one pharmacist:

*"I certainly enjoyed meeting the patients and helping them because there's a lot of satisfaction you can gain from that ... also just having the patient come back to you and having your clinical intervention assessed."* [PH3]

This was elaborated on by another, who gained satisfaction from being able to make a difference:

*"I think patients really gained a lot from it [the study] which I liked, spending that little bit of extra time with someone talking [about] treatments, making sure that they know what formulation should be used and when and just helping them with all the basic things helped giving me a bit of job satisfaction."* [PH2]

### **Giving patients time**

The importance of spending sufficient time with patients was also seen as valuable by one pharmacist as many patients lacked very basic knowledge about their condition:

*"I think they were very grateful that someone had actually taken the time to sit down and talk to them about it because I don't think many people had that intervention. Even one of the ladies who really had quite bad psoriasis and had consulted at secondary care about it [in the past] and I don't know what her care had been, but her understanding was probably one of the worst."* [PH2]

### **What problems/difficulties did pharmacists encounter during the study?**

A predominant theme to emerge was the concept of research struggles for which there were three sub-themes:

- Study paperwork
- Patient engagement
- Juggling with other work

#### **Study paperwork**

Few pharmacists mentioned any major difficulties undertaking the study though one, while accepting that documentation was a necessary burden, felt that this was something they disliked:

*"Paperwork that was it [what they disliked]. But that's something that any clinician would moan about but unfortunately at the end of the day we have to record it so I understand that."* [PH3]

Two pharmacists had specific problems with the study paperwork. One, for instance, felt that the questionnaires, were difficult to follow:

*"I didn't like a lot of the questionnaires, how they were defined, I felt they perhaps they weren't very well phrased ... I felt the questions weren't formulated in a very accessible manner."* [PH7]

The other was unclear about how to calculate the SAPASI (disease severity) score, as he explained:

*"The worst thing for me was probably the paperwork side. It was not always clear on the mathematics; I think the sheets weren't very clear on the sums."* [PH1]



### **Patient engagement**

Identifying suitable study patients was problematic for one pharmacist as they explained:

*“For me it was probably just the population I’m dealing with, highlighting the right customers, either people weren’t coming in, they were sending somebody else in or perhaps they were under specialist care...”* [PH1]

In addition, two of the pharmacists highlighted the difficulties in getting patients to return for the follow-up appointment as one described:

*“For the second consultation one of them was impossible to get in touch [with]. I think I rung maybe 10 times and there was no answer and [for] two patients it took a few phone calls before I managed [to get] them to come back.”* [PH5]

Another spoke of his concerns about ensuring that patients returned within the specified time-frame:

*“We were trying to get them between 6 and 8 weeks post the first intervention but it wasn’t always that possible. I didn’t know really how that was going to impact on the study results if I didn’t get them in on that times-scale.”* [PH2]

### **Juggling with other work**

A more practical difficulty for some was the fine balancing act required to consult with study patients and meeting the demands of others as one explained:

*“As with anything in pharmacy, juggling the time taken to do it [the study], while you’re needing to catch up when you come back ... you have to try and manage it in the day ... so that you weren’t putting yourself behind for the rest of the patients ...”* [PH4]

Though some pharmacists had arranged specific times for the follow-up appointment, the unpredictable nature of the workload in the pharmacy created a degree of anxiety for one pharmacist if they were busy at the allotted time for a study patient:

*“It’s like maybe there was [sic] patients waiting or the [study] patient came at a time where we were very busy. It’s just the stress of knowing there are other people waiting for prescriptions.”* [PH5]

### **How did pharmacists believe patients viewed their role as a result of the study?**

The main theme to emerge was the concept of an augmented clinical role with sub-themes of:

- Information providers
- Members of the management team

### **Information providers**

There was a general consensus that patients benefited greatly from the study. Virtually all pharmacists described how at the initial consultation, few patients understood much about their condition, possible triggers and perhaps more importantly, how to use prescribed treatments. In some instances, pharmacists felt that their input, especially on the correct use of treatments avoided the need for a GP appointment as summed up by one:

*“A lot of them [patients] had got the creams and didn’t understand how best to use them, in which order, how much, how often, that kind of thing. They don’t understand that you can use it once or twice a day. We gave that education in getting the best out of it [treatment] without having to go back to the GP.” [PH1]*

This view was echoed by another who was surprised that emollient use by patients was low:

*“Some of them didn’t even know that they had to use emollients and two of them had never used [emollients] before. The difference was massive when they started using them. It was the knowledge about the treatment and how to use it [that] was very, very low and some patients had been suffering with psoriasis for many years.” [PH5]*

One pharmacist identified a patient who had stopped using emollients and continued with his active treatment even though this was not effective:

*“He had a satisfactory level of knowledge about how to use the steroid but his condition had never been brought under control in the first place, so the idea of stopping therapy just sort of never came into it. He had stopped using the emollients that the doctor prescribed initially because he didn’t perceive that they were of any benefit, so I had to explain their role” [PH6]*

### **Members of the management team**

After the study, pharmacists believed that patients would now perceive them as a member of the primary healthcare team looking after them. This view was, to some extent, re-enforced when pharmacists proactively recommended treatment changes to the GP as one described:

*“I took the responsibility to contact their prescriber and gave a few suggestions of emollients that they could prescribe and quantities that I would be expecting them to use. And the local prescribers did what I’d asked them, which was really empowering. And I think they really appreciated it.” [PH2]*

One pharmacist commented on how patients continued to mention their psoriasis after the study finished:

*“There are patients from the study [who] still come in and let me know how their psoriasis is going now, several months later and they’re still feeding back that it’s improving, it’s still working well and so they definitely valued the input that was given to them.” [PH4]*

### **Do pharmacists think the intervention could be rolled out nationally?**

There was no one overarching theme but several themes identified were:

- Extension to MURs
- Training required
- Viable service
- Unlikely to be standalone service

The question as to whether the intervention could be developed an enhanced service and more widely adopted in pharmacies, generated a mixed response.

### **Extension to MURs**

Some felt that the intervention could be incorporated into existing services such as the MUR (Medicines use Review) as one pharmacist explained:

*“Definitely [could become a national service] ... the MURs are getting extended into other areas, the target groups are getting increased so it definitely seems like a sensible option to include that [the intervention] somewhere like that.”* [PH1]

Another felt that it could become embedded within an MUR for a patient with psoriasis:

*“I think it would make a good bolt on to an MUR, specifically added on to the end. The regular business of the MUR done but now I’d like to take things a bit further, just use the last 10 minutes to do this questionnaire [PEDESI]”.* [PH6]

### **Training required**

While believing that the service could be more widely accepted, the need for further training was felt to be obligatory by two pharmacists in order to reassure GPs that community pharmacists were providing the correct advice to patients as one outlined:

*“Potentially [could be a national service] provided the GPs are aware that the pharmacies have had the training.”* [PH6]

The importance of training was reiterated by another pharmacist:

*“I think the training [for the service] needs to be more solid, it must be able to give confidence to the pharmacists that they have done it the right way, have they said the right things, have they provided the right advice.”* [PH7]

### **Viable service**

One pharmacist was positive that the intervention could be rolled out nationally, especially as the few patients she recruited had such a poor understanding of how to use treatments:

*“If it was treated as an enhanced service that every pharmacy in the United Kingdom could do that would be great. I’ve seen only 7 patients but after what I’ve seen about how little they know about the treatment and how to use it, what about all the other patients who go to other pharmacies ... It couldn’t be just the few people who are doing the study, it could be everywhere.”* [PH5]

### **Unlikely to be standalone service**

In contrast, another pharmacist was more circumspect about whether an intervention focusing purely on psoriasis would be able to attract any funding even though the concept of pharmacists helping patients with long-term conditions was of value:

*“I think there’s definitely scope for us to manage those kind of long-term conditions where it would need careful management. Because it’s such a small patient group, it would be difficult to skill up and deliver that service for just your own population... the remuneration would be skewed too far out to warrant the funding. But if you could have different pharmacies specializing in different things that you refer to each other locally, I think that might be a better model.”* [PH4]

## DISCUSSION

### Main findings

The main findings of this study are that patients with psoriasis valued the educational input provided during consultations with community pharmacists and believed that this enhanced knowledge improved their skin condition. This perception was echoed by pharmacists who also felt that the intervention boosted their level of job satisfaction and engendered the belief that they made a significant contribution to patient care.

The fact that most patients expressed the desire for information on psoriasis and its management was somewhat surprising given that on average, patients had suffered with the condition for 24 years. Nevertheless, the demand for more advice on psoriasis, associated triggers, co-morbidity and prognosis has been identified in previous work<sup>19</sup> and as illustrated in Table 2 this request was one of the central benefits derived from the pharmacist consultations, signifying that they were able to fulfil an unmet need.

Despite the potential benefits to patients, interviews with some of the pharmacists implied that wider adoption of the service might be more difficult. The unpredictable nature of the workload in pharmacies combined with the small number of those with psoriasis per pharmacy were possible stumbling blocks to the commissioning of such a service. Although pharmacists were able to embrace the service alongside their existing workload, if such an intervention be implemented among the wider pharmacy community, commissioners should learn the lessons encountered with other services. For example, one recent examination of the new medicine service advocated engagement with all relevant stakeholders as well as more robust planning to ensure an effective national roll-out of the service<sup>20</sup>.

The major strength of this study is that it appears to be the first exploration of the role of pharmacists in helping patients with psoriasis and as such adds to the limited body of information that is currently available on this topic. It also highlights the feasibility of delivering an educational intervention in pharmacies for such patients. The perception of benefit among patients is an important finding because as described by Ersser<sup>7</sup> and Nelson<sup>8</sup>, irregular use of topical therapies by patients was partly related to insufficient knowledge of the beneficial therapeutic effects achieved from consistent use of treatment. Nevertheless, the study does have some recognized limitations. The unavoidable use of a convenience patient sample meant that the problem of non-respondent bias could not be examined in any detail. Furthermore, the single follow-up meant that we were unable to determine the longer-term impact of the educational advice on disease severity. In addition, the small number of participating pharmacists curtailed a more comprehensive exploration of views on the acceptability and potential benefits of the intervention.

An aspiration of Pharmacy in England<sup>15</sup> is that pharmacists expand and improve the range of clinical services they offer, especially to those with long term conditions such as psoriasis. The present study implies that educational advice from pharmacists goes some way towards addressing patients' needs.

## CONCLUSION

This study revealed that patients with psoriasis perceived a benefit from an educational intervention by community pharmacists, who welcomed the opportunity for greater patient interaction, enabling them to make an important contribution to patient care. Whether the intervention could be added to the range of existing clinical services in pharmacy requires further investigation. In order to establish more clearly the role of pharmacists in the care of those with psoriasis, future studies need to explore whether the reported benefits observed are sustained over the longer-term and are greater than those that might be expected from standard care.

**Correspondence to: Rod Tucker, Robert Gordon University School of Pharmacy and Life Sciences, Sir Ian Woods Building, Garthdee Road, Aberdeen Ab10 7GJ. Email: rodtucker.tucker@gmail.com.**

**Funding/Support: Funding for the study was provided by a grant from The Psoriasis and Psoriasis Arthritis Alliance.**

## REFERENCES

1. Psoriasis Association 2012, About Psoriasis, available from: <https://www.psoriasis-association.org.uk/pages/view/about-psoriasis> [accessed December 2015].
2. Langley, R.G.B., Krueger, G.G. & Griffiths, C.E.M. Psoriasis: epidemiology, clinical features, and quality of life, *Ann Rheum Dis.* 2005;64 (Suppl 2): 18-23
3. Kimball, A.B., Jacobson, C., Weiss, S., Vreeland, M.G. & Wu, Y. The psychosocial burden of psoriasis. *Am J Clin Dermatol.* 2005; 6 (6): 383-392.
4. Griffiths CEM, Taylor H, Collins SI et al. The impact of psoriasis guidelines on appropriateness of referral from primary to secondary care: a randomized controlled trial. *Br J Dermatol* 2006; 155:393–400.
5. Storm A, Andersen ES, Benfeldt E, Serup J. One in three prescriptions are never redeemed: primary non adherence in an outpatient clinic. *J Am Acad Dermatol* 2008; 59: 27-33.
6. Richards HL, Fortune DG, O'Sullivan TM, Main CJ, Griffiths CEM. (1999) Patients with psoriasis and their compliance with medication. *J Am Acad Dermatol* 1999; 41(4): 581-583.
7. Ersser SJ, Cowdell FC, Latter SM, Healy E. (2010) Self-management experiences in adults with mild to moderate psoriasis: an exploratory study and implications for improved support. *Br J Dermatol.* 2010; 163: 1044-1049.
8. Nelson PA, Chew-Graham CA, Griffiths CE, Cordingley L; IMPACT Team. (2013) Recognition of need in health care consultations: a qualitative study of people with psoriasis. *Br J Dermatol.* 2013; 168: 354-361.
9. Nelson PA, Barker Z, Griffiths CE, Cordingley L, Chew-Graham CA; IMPACT Team. 'On the surface': a qualitative study of GPs' and patients' perspectives on psoriasis. *BMC Fam Pract.* 2013; 14:158- 16
10. de Bes J, Legierse CM, Prinsen CA, de Korte J. Patient education in chronic skin diseases: a systematic review. *Acta Derm Venereol.* 2011;91(1):12-17.
11. Larsen MH, Hagen KB, Krogstad AL, Aas E, Wahl AK. Limited evidence of the effects of patient education and self-management interventions in psoriasis patients: a systematic review. *Patient Educ Couns.* 2014;94(2):158-69.

12. Rotta I, Salgado TM, Silva ML, Correr CJ, Fernandez-Llimos F. Effectiveness of clinical pharmacy services: an overview of systematic reviews (2000-2010). *Int J Clin Pharm*. 2015;37(5):687-97.
13. Carr A, Patel R, Jones M, Suleman M. (2007) A pilot study of a community pharmacy intervention to promote the effective use of emollients in childhood eczema. *Pharm J*. 2007; 278:319-322.
14. Tucker R, Stewart D. The role of community pharmacists in supporting self-management in patients with psoriasis. In *J Pharm pract*. 2016 [Epub ahead of print]
15. Cowdell F, Ersser SJ, Gradwell C, Thomas PW. The Person-Centered Dermatology Self-Care Index: a tool to measure education and support needs of patients with long-term skin conditions. *Arch Dermatol*. 2012;148(11):1251-5.
16. Fleischer AB Jr, Feldman SR, Dekle CL. The SAPASI is valid and responsive to psoriasis disease severity changes in a multi-center clinical trial. *J Dermatol*. 1999;26(4):210-5.
17. The Dermatology Quality of Life Index. Available on-line at: <http://sites.cardiff.ac.uk/dermatology/quality-of-life/dermatology-quality-of-life-index-dlqi/> [Accessed February 2016]
18. Baker R. Development of a questionnaire to assess patients' satisfaction with consultations in general practice. *Br J Gen Pract* 1990; 40(341): 487-90.
19. Uhlenhake EE, Kurko D, Feldman SR. (2009) Conversations on psoriasis – what patients want and what physicians can provide: A qualitative look at patient and physician expectations. *J Dermatol Treat* 2009; 204(4). 1–7.
20. Latif A, Waring J, Watmough D, Barber N, Chuter A, Davies J, Salema NE, Boyd MJ, Elliott RA. Examination of England's New Medicine Service (NMS) of complex health care intervention in community pharmacy. *Res Social Adm Pharm*. 2015 Dec 29. [Epub ahead of print]
21. Department of Health 2008, Pharmacy in England: building on strengths - delivering the future (white paper). Available on-line at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/228858/7341.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228858/7341.pdf) [Accessed September 2016]