ABSTRACT

BACKGROUND: Recent data suggest that skin problems were the most common reason for patients visiting their GP in the UK. Healthcare professionals such as practice nurses and community pharmacists represent potential alternative sources of advice for patients with skin problems yet little is currently known about the diagnostic ability of these health professionals.

OBJECTIVES: The aim of the present study was to compare the ability of all three groups of primary care health professionals to recognise and recommend treatments for a number of different skin conditions.

METHODS: A website containing 10 dermatological vignettes was developed with each case containing a digital image of the skin problem and an associated case history. Participants were required to identify: 1) the condition; 2) the features supporting the diagnosis; 3) an appropriate first-line treatment option.

RESULTS: A total of 60 HCPs (20 pharmacists, GPs and practice nurses) took part in the study. The mean scores for pharmacists, nurses and GPs were 16.3, 15.6 and 19.9 respectively and this difference was significant, F (2, 55) = 5.83, p = 0.005. Post hoc Bonferroni testing revealed that the difference in mean scores between GPs and both nurses and pharmacists was significant (p < 0.05).

CONCLUSION: This study showed that the ability of GPs to recognise and manage skin conditions was superior to pharmacists and nurses and related to previous experience of the skin condition although further training in dermatology is likely to benefit all three groups.

Key words: diagnosis, skin conditions, primary health care professionals.
INTRODUCTION

The prevalence of skin diseases in the community is high and it is estimated that between one-third and one-quarter of the population experiences a skin problem at some time during their life\(^1\). Furthermore, a recent study suggested that nearly 24% of the UK population (roughly 13 million people) consulted their GP in 2006 about a skin problem, and skin conditions were the most common reason for patients consulting their GP with a new problem\(^2\). There is little information on the prevalence or range of skin diseases seen in community pharmacies, but it is likely to be high given that information from the Proprietary Association of Great Britain shows that nearly one fifth of all over-the-counter sales are for skin care products\(^3\). Nevertheless, a recent survey in England and Wales exploring pharmacists’ perceptions of the range of skin conditions they encountered, revealed that pharmacists considered dry skin, eczema/dermatitis and thrush to be the most common conditions for which patients sought their advice\(^4\).

There is some evidence to suggest that many patients with skin conditions manage their problem through self-care. One study in which a sample of 614 patients with skin problems were examined by a team of doctors and nurses, found that 31% of those with acne, judged moderate to severe, managed their condition through self-care compared to 12% who sought treatment from their GP\(^5\). A more recent consumer study corroborated the fact that a large number of patients with skin problems undertook self-care. The study found that in a sample of 1,500 people, 818 (54%) said they had experienced a skin problem in the last 12 months and 69% of skin problem episodes were managed through self-care. In addition, only 14% of patients with a skin problem sought professional advice, mainly from the GP or practice nurse\(^6\). This raises the important issue as to whether or not those patients electing to manage their problem through self-care had access to all the necessary advice and information to do so effectively.

Community pharmacists are accessible healthcare professionals on the high street, and in the UK have been promoted in the white paper *Pharmacy in England* as a place for ‘routinely promoting self-care’\(^7\). Given that a potentially large number of patients with skin problems manage their condition through self-care, an important role for the pharmacist when presented with such patients is to establish an suitable course of action. Therefore, if community pharmacists are to be considered a viable alternative source of advice to the GP or practice nurse for patients with skin problems, it is necessary to determine whether they possess sufficient dermatological knowledge to be able to offer appropriate advice to these patients.

The aim of the study was thus to determine the comparative diagnostic ability of each of the three healthcare professional groups in the recognition and management of a range of skin conditions.
MATERIALS AND METHODS

The study was conducted remotely at a specifically developed web-site (www.hpdiagnosticstudy.co.uk) that contained a series of 10 dermatological vignettes which were written by one of us (RT) with input from a consultant dermatologist (AL) and an academic pharmacist (MP). All vignettes were independently reviewed by a second consultant dermatologist, a general practitioner with special interest in dermatology, a specialist dermatology nurse and a pharmacist. All the vignettes had the same format which included a digital image of the skin condition and an associated case history.

SELECTION OF SKIN CONDITIONS

In a previous study the most frequent perceived requests for advice were for eczema, rashes/allergies in adults, fungal infections and warts/verrucae. Consequently, three scenarios that included different rashes in adults were developed. The first rash was melasma (strictly speaking a pigmentation disorder) which presented as an adverse drug reaction. The second was pityriasis rosea, which although relatively uncommon, involved a suspected allergic reaction to a detergent product and the final scenario, polymorphic eruption of pregnancy, was a suspected food-induced urticarial rash. Dishidrotic eczema (pompholyx) eczema was included since this is a common type of eczema affecting the hands and feet. For the other case studies, pitted keratolysis was included since it is the main differential for tinea pedis, whereas the remaining five conditions tinea corporis, plantar warts, molluscum contagiosum, basal cell papilloma (seborrheic wart) and scabies are all relatively common skin conditions.

Advice on whether or not ethical approval for the study would be necessary was sought from the local ethics committee but deemed unnecessary.

PARTICIPANTS

All pharmacists worked in community pharmacies and the nurses were practice-based. GPs and nurses were recruited through the local primary care research network whereas pharmacists were recruited through local pharmacy networks as well as by approaching colleagues. Those who agreed to participate were sent an electronic invitation to the study (via email with a link to the web site) and given 7 days to complete the 10 vignettes. Participants who had not completed after 7 days were sent a follow-up reminder e-mail. Participants who failed to complete after a second reminder were not allowed to continue and another health professional from that group was approached.

Upon registering with the site, participants provided demographic details on a standardized form which asked about any further post-registration training in dermatology. After finishing each vignette, participants were required to complete an evaluation feedback form (see Box 1). All participants received a £10 amazon voucher as a token payment for agreeing to undertake the study.
Box 1 – evaluation questions asked after each vignette

Q1. Have you encountered this skin condition in practice?
Yes □ No □ N/A □

If you have seen the condition before, did you feel the image was a good presentation of the condition?
Yes □ No □ N/A □

Q2. Did you make the diagnosis based on the clinical image alone?
Yes □ No □

Q3. How useful did you find the background details in the case history as an aid to the diagnosis?
1 □ 2 □ 3 □ 4 □ 5 □
(Not useful)          (Very useful)

Q4. How long did it take you to complete the case study?
Less than 5 minutes □ 5 – 10 minutes □ Over 10 minutes □

Q5. Did you agree with the following?
Diagnosis        Yes □ No □
Features supporting The diagnosis        Yes □ No □
First-line treatment        Yes □ No □
Have you any other comments?
........................................................................................................................................................................

For each vignette participants were required to answer the following questions.

1. What is the likely diagnosis?

2. What features in the case history support the diagnosis?

3. What would be an appropriate first-line treatment for the condition?

Each of the above three questions had the same format consisting of five possible answers. For the diagnostic question, three differentials were included along with the correct diagnosis and the option for ‘don’t know’. For the features supporting the diagnosis question, statements were taken from the background case material and participants were alerted that they should ‘tick all that apply’ if there was potentially more than one answer. The final question had the same format, i.e. three incorrect options, the correct answer and an option for ‘don’t know’.
A screen shot from the web site for the first question of the tinea corporis vignette is shown in figure 1.

**Figure 1** Screen shot from the website for the first question for the tinea corporis vignette

The primary outcome measure for the study was the summative dermatology score (SDS). This was a composite score based on answers to each of the above three questions for each vignette and had a maximum value of 30.

**STATISTICAL ANALYSIS**

A one-way analysis of covariance (ANCOVA) was used (since the groups were unmatched at baseline) to compare the SDSs and Bonferroni post hoc comparisons were used to determine whether or not differences between mean SDSs were significant. Potential covariates for the ANCOVA model were identified by computing Pearson r correlation coefficients between SDS and the variable of interest. Where there was a significant correlation, the variable was considered for inclusion as a covariate in the ANCOVA model after testing the homogeneity of regression slopes for the variable and the main independent variable, i.e. health professional status. Statistical analysis was performed using SPSS (version 19).

**RESULTS AND DISCUSSION**

A total of 60 participants, 20 from each of the three healthcare professions were recruited for the study and their demographics are shown in Table 1.

<table>
<thead>
<tr>
<th>Health Professional</th>
<th>Male</th>
<th>Female</th>
<th>Mean No. years qualified (SD)</th>
<th>No. undertaken any form of post-registration training in dermatology</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP</td>
<td>13</td>
<td>7</td>
<td>17.3 (9.5)</td>
<td>6</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>10</td>
<td>10</td>
<td>22.5 (13.6)</td>
<td>8</td>
</tr>
<tr>
<td>Nurse</td>
<td>0</td>
<td>20</td>
<td>24.3 (7.5)</td>
<td>1</td>
</tr>
</tbody>
</table>
Covariates used in the ANCOVA model

It was postulated that post-registration qualifications in dermatology, the number of years qualified, gender and previous exposure to the skin condition (i.e. that the participant had encountered the condition in practice) were potential covariates. The Pearson correlation coefficients, r, for the SDS and each of these variables are shown in Table 2 from which it can be seen that only gender and previous exposure to the condition showed a significant correlation. A preliminary analysis evaluating the homogeneity-of-regression (slopes) assumption indicated that the relationship between gender and previous exposure to the skin condition (data not shown) did not differ significantly as a function of the main independent variable, suggesting that these variables could be included as covariates in the ANCOVA model.

### Table 2 Correlation between summative dermatology score and potential covariates

<table>
<thead>
<tr>
<th>Variable*</th>
<th>Pearson r</th>
<th>p value (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-registration dermatology course</td>
<td>.21</td>
<td>.103</td>
</tr>
<tr>
<td>Years qualified</td>
<td>-.02</td>
<td>.87</td>
</tr>
<tr>
<td>Gender</td>
<td>-.50</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Seen condition before</td>
<td>.50</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

*Based on sample size, n = 60

Summative dermatology scores (SDS)

The mean SDS scores for each of the three groups are shown in Table 3. The difference between health professionals was significant, F (2, 55) = 5.83, p = 0.005. The covariate gender was also significantly related to SDS, F (1, 55) = 7.11, p = 0.01. Post hoc Bonferroni testing revealed that the difference in mean SDS scores between GPs and both pharmacists and nurses was significant (p < 0.05).

### Table 3 Mean summative dermatology score (SDS) for health professional groups

<table>
<thead>
<tr>
<th>Healthcare professional</th>
<th>Mean SDS</th>
<th>95% CI interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP</td>
<td>19.90*</td>
<td>18.1 - 21.7</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>16.30</td>
<td>14.60 – 18.0</td>
</tr>
<tr>
<td>Nurse</td>
<td>15.60</td>
<td>13.90 – 17.20</td>
</tr>
</tbody>
</table>

*difference significant (p = 0.005)

The association between SDS and gender remained after controlling for post registration training in dermatology and previous exposure to the skin problem (r = -.47, p < 0.01). The negative correlation was merely a function of coding system; i.e. males were coded as 0, females as 1. Reversal of the coding changed the sign but not the strength of the association.
We speculate that gender had a significant impact on SDS for two reasons. Firstly, the higher mean scores for male compared to female participants (20.20 vs 15.60, $t (58) = 4.32, p < 0.001$) and secondly, the mean SDS for GPs was higher and the sample contained a greater number of male GPs.

The SDS is a composite score based on answers to each of the three questions. The mean and standard deviations for the three questions and the three health professional groups are shown in Table 4.

Table 4 Mean scores (standard deviations) for the individual questions in the case studies

<table>
<thead>
<tr>
<th>Health Professional (n = 60)*</th>
<th>Question 1 Diagnostic score** mean (SD)</th>
<th>Question 2 Features score mean (SD)</th>
<th>Question 3 Treatment score mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP</td>
<td>9.05 (1.19)</td>
<td>4.65 (1.46)</td>
<td>7.7 (1.30)</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>6.40 (1.90)</td>
<td>2.90 (1.80)</td>
<td>5.15 (1.46)</td>
</tr>
<tr>
<td>Nurse</td>
<td>6.50 (2.26)</td>
<td>3.65 (1.57)</td>
<td>5.8 (1.61)</td>
</tr>
</tbody>
</table>

*Based on 20 participants per group
**Each of the three scores has a maximum value of 10

The number of participants in each health professional group correctly diagnosing each condition is shown in Figure 2. The results in figures 3 and 4 show the proportion of GPs and pharmacists who reported having seen the skin condition in practice compared to the proportion who correctly diagnosed the skin problem.

Figure 2 Comparison of diagnostic ability for each healthcare professional group
This is the first study to examine the comparative dermatological diagnostic abilities of primary care health professionals. Although based on a comparatively small sample, the results suggest that the ability to recognise and treat the included conditions was greater for GPs than either nurses or pharmacists. Nevertheless, diagnostic ability was comparable across the groups for conditions such as scabies, plantar wart and molluscum contagiosum as shown in figure 2. Although we included polymorphic eruption of pregnancy, melasma and pityriasis rosea to challenge the diagnostic skills of participants, at least 40 per cent of pharmacists were able to identify the first two conditions and 70 per cent correctly identified melasma. The diagnostic ability of practice nurses was similar to pharmacists in most cases as reflected by the similar mean SDS component scores as shown in Table 4.

Table 4 reveals that the mean scores for question 2 were lower for all groups compared to the mean diagnostic scores (question 1). This suggests a reasonable degree of confidence at recognising skin conditions but less confidence at identifying the supportive features. It has been suggested that dermatology can be learnt through a pattern recognition process that compares the current patient with previous examples in an effort to fit the current patient into a defined diagnostic category. Having encountered a skin condition in practice is likely to improve diagnostic accuracy. As illustrated in figure 3, diagnostic accuracy appears closely related to previous exposure to the skin condition despite the fact that GPs receive little training in dermatology during their time at medical school.

Figure 3 comparison of GPs diagnostic accuracy based on previous exposure to the skin conditions

![Graph showing diagnostic accuracy based on previous exposure to skin conditions](image)

Though many GPs had encountered a basal cell papilloma in practice, diagnostic accuracy was only 60 per cent and other research has observed that GPs experience difficulties in the recognition of skin lesions. In contrast to GPs as shown in figure 4, a smaller number of pharmacists had encountered many of the conditions in practice which undoubtedly accounted for a reduced diagnostic accuracy. It is thus conceivable that further training for both pharmacists and nurses in the recognition of skin conditions would be beneficial.
Several UK Government white papers have supported community pharmacists as a first port of call role for minor ailments\textsuperscript{10,11} and a wider role for nurses in healthcare provision\textsuperscript{12} to reduce the burden on GPs. Though not all skin problems are minor ailments, an important role for pharmacists is to be able to differentiate between those skin problems amenable to treatment in a pharmacy and those for which referral to the GP is warranted. The findings in figure 2 demonstrate that only 40 per cent of pharmacists correctly identified all skin conditions with the exception of the basal cell papilloma. These preliminary observations suggest that there is scope for further training in dermatology for pharmacists, particularly in diagnosis, before they can be considered as a suitable first port of call for patients presenting with these skin conditions.

Nevertheless, pharmacists in the UK have the opportunity to help support dermatology patients through the provision of advice and support on the appropriate use of topical treatments through the medicines use review process\textsuperscript{13}. This process involves a private dialogue between the pharmacist and a patient and provides an opportunity to identify and correct any problems experienced by the patient with their topical therapies. Any problems identified during such reviews can be managed either at the pharmacy or if necessary, fed back to the prescriber thus integrating the pharmacist with the primary care health team.

This study does have some recognised limitations. The small sample size precludes generalising the results to the wider profession and further work with a larger sample is required to verify these initial observations. We also recognise that participants were provided with prompts from the vignettes, whereas in practice, establishing the correct diagnosis requires the health professional to elicit a full patient history and the ability to perform this task will vary depending on their knowledge and training. Whether or not pharmacists and nurses possess the necessary skills to elicit an adequate history from patients is clearly important but was not
established in this study. However, as observed by Rutter et al.\textsuperscript{14} in a stimulated patient study in community pharmacies, pharmacists rarely asked questions related to history taking.

**CONCLUSION**

This study suggests that GPs have a greater ability to recognise and treat the skin conditions included than either pharmacists or practice nurses, and that this is probably related to previous exposure to the condition. Further work is required to determine the accuracy of these preliminary findings and, more importantly, to establish whether advice from pharmacists results in a satisfactory resolution of a patients’ skin problem without the need for further medical intervention.

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**REFERENCES**

