JPDS Journal of the Philippine Dermatological Society

ORIGINAL ARTICLE

The economic burden of psoriasis: a cross-sectional study in a tertiary hospital in the Philippines

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ABSTRACT

INTRODUCTION Costs associated with chronic psoriasis impart a significant economic burden.

OBJECTIVES This study aims to determine the direct and indirect cost of psoriasis patients in a tertiary government hospital in Davao City.

METHODS Plaque-type psoriasis patients who were actively seeking care at the Southern Philippines Medical Center Department of Dermatology for at least 6 months prior to the study period were included. The participants reported on socioeconomic status, productivity loss and monetary funding through questionnaires. Work impairment was evaluated using the Work Productivity and Activity Impairment questionnaire and was used to compute the indirect cost. A 6-month retrospective review of the health information system and medical charts generated the healthcare resource utilization data as well as the medical data used to compute the direct cost.

RESULTS Among the 43 participants enrolled, 53% had a monthly household income of less than PHP8,000 (USD157) and 27% were unemployed. There was an overall work impairment of 65.4%, and 55% had experienced a change in employment status due to psoriasis. The mean 6-month direct cost of psoriasis was PHP22,672.28 ($445). The mean 6-month indirect cost was PHP 26,071.20 ($511) for employment status change and PHP 75,804.30 ($1,486) for work impairment. Government agencies provided financial aid for treatment but majority of the costs came from the participants' own pockets.

CONCLUSION The economic burden of psoriasis increased substantially due to the indirect cost, which in turn increased remarkably due to work impairment and employment status change.

KEYWORDS economic burden, psoriasis, absenteeism, presenteeism, cost of psoriasis

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Conflict of interest
None

Source of funding
None

Cite as
Zabala DAR, Guillano VP, Lugasan MBD. The economic burden of psoriasis: a cross-sectional study in a tertiary hospital in the Philippines. J Phil Dermatol Soc. 2022;31(1):26-32.

INTRODUCTION

Psoriasis is a chronic and relapsing inflammatory skin disease affected by genetic, immunologic and environmental factors.[1] According to the 2019 Philippine Dermatological Society - Health Information System (PDS-HIS) data, psoriasis is the 4th leading cause for consult among the 11 accredited dermatology training institutions in the Philippines.[2] According to the data from the Southern Philippines Medical Center (SPMC) Department of Dermatology, there were 123 newly diagnosed cases of psoriasis in 2018. Consultations for both old and new cases of psoriasis added up to 1,056 consults for the whole of 2018. This accounted for 6.28% of the total consults at the SPMC Department of Dermatology and 0.21% of the total consults for the whole outpatient department.

Psoriasis is prevalent among the working age group and negatively affects finances through reduced work outputs and increased absences from work.[3-6] The cost is termed 'productivity loss' from the patient perspective and 'productivity cost' from the societal perspective. In some studies, severe psoriasis is associated with a lower probability of employment and has been reported by some patients to be the sole or partial cause for unemployment.[7,8] Costs resulting from impaired productivity and employment status changes directly related to a specific illness are collectively known as the 'indirect cost' of illness.[9,10]

In contrast to indirect cost, the 'direct cost' of illness is the expense spent for medications, laboratory work-up and diagnostic procedures, physical rehabilitation, hospital admissions, consultations, and other health care services.10 Direct cost also includes non-healthcare resource expenditures such as those spent for transportation to and from the health provider.

The term 'cost of illness' may be used interchangeably with 'the burden of disease.'[10] Studies on the cost of illness provide data that are fundamental for planning and financing disease treatment and control programs.[11] They influence policymakers on how an illness should be prioritized in the distribution of healthcare resources.[11,12] They may also be used to evaluate the

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efficacy of health policies and programs and compare it to those from other countries.[10] Moreover, these studies are also used by the World Bank and the World Health Organization to estimate of the total burden of a particular disease to society.[13]

Several studies have already been conducted assessing the direct and indirect cost associated with psoriasis in other countries as well as their health care utilization profile; however, none from the Philippine setting has been published thus far. As psoriasis is consistently one of the top leading causes for consult among the training institutions in the Philippines,[2] the information gathered by this study may provide us with a better understanding of how psoriasis affects the productivity and finances of the patient and the society. Henceforth, this study will provide us with a partial insight into the economic burden of psoriasis in the Philippines.

METHODOLOGY

This was a cross-sectional study with retrospective review of medical data. This study used the prevalence-based approach of determining the cost of illness. This approach uses data from the total cost of care within a specific time frame and includes all patients with a specific diagnosis regardless of disease duration.[13-15]

The study procedures and the questionnaires used were all in accord with ethical standards and approved by a research ethics committee.

All psoriasis patients seen at the SPMC Department of Dermatology from July 2019 to January 2020 were screened for eligibility. The inclusion criteria were the following: [1] 18-64 years of age; [2] had an initial diagnosis of psoriasis at least six (6) months prior to enrollment; [3] had moderate to severe (PASI ≥10) plaque type psoriasis upon enrollment or within six (6) months prior; [4] had mild psoriasis (PASI <10) treated with phototherapy or any systemic therapy (e.g., methotrexate, biologic agents) upon or within six (6) months prior to enrollment; and [5] currently undergoing active treatment for psoriasis.

Patients excluded from this study were the following: [1] those with mild psoriasis who did not receive any systemic or phototherapy within the last six (6) months prior to the study; [2] with mental or psychiatric illnesses who could not answer the questionnaires; [3] had participated in an experimental study for the treatment of psoriasis within six (6) months prior to this study; [4] with serious or unstable medical conditions (e.g., Cushing's syndrome, AIDS, cancer stage 4); [5] with other types of cutaneous psoriasis other than plaque psoriasis at the time of enrollment (e.g., pustular, erythrodermic, guttate); and [6] pregnant women who were on maternal leave during the study period.

Three data collection forms were used in this study. The first form was for the patient's demographic and socioeconomic data (see Appendix 3). This also included the changes in employment status due to psoriasis (i.e., retired early, reduced work schedule, etc.) and the duration of this change. This was converted into monetary values to calculate the indirect cost using the following method by Schaefer et al.[7]: the local minimum wage which was PHP396.00[16] was divided by the standard eight (8) hours of work, then multiplied by the lost productive time since the change in employment status (up to a maximum of six (6) months).

The second form was the Work Productivity and Activity Impairment (WPAI) Form – Specific Health Problem questionnaire (see Appendix 4). This was composed of six (6) questions, namely: Q1 – currently employed; Q2 – hours missed due to specific problem; Q3 – hours missed for other reasons; Q4 – hours actually worked; Q5 – the degree (on a scale from 0 to 10) of the problem affecting productivity while at work; and, Q6 – the degree (on a scale from 0 to 100) of the problem affecting regular daily activities other than work such as household chores, shopping, etc.[17] Each score was multiplied by 100 to obtain the percentage values. The four (4) domains of absenteeism, presenteeism, overall work impairment, and activity impairment were obtained using the following formulas:[18]

Absenteeism (percent work time missed due to the problem) = Q2 / (Q2+Q4)

Presenteeism (percent impairment while working due to problem) = Q5/10

Overall Work Impairment = Q2 / (Q2+Q4) + [1- (Q2 / (Q2+Q4)) x (Q5/10)]

Activity Impairment = Q6/10.

By using the results from the WPAI, the indirect cost from work impairment was computed by using the mean absenteeism and presenteeism values, multiplying each of them by the minimum hourly wage to get the total lost wages per week, and multiplying by the number of work weeks in a 6-month period. This was based on the method by Gupta et al.[18]

The third form was the journal of expenses related to the diagnosis and treatment of psoriasis (see Appendix 5). This was patterned after the Filipino study on the direct medical costs of care of adult asthma patients done by Fabian et al.,[19] and the American study on psoriasis by Schaefer et al. using a 4-week patient-recall approach.[7] It included a list of all the services, diagnostics, and medications that the patient acquired during the last four (4) weeks along with the corresponding cost and the source of financial funds for each item.

To determine psoriasis-related health care resource utilization (HCRU), a review of the medical charts and the electronic health information system (HIS) was carried out. This included all outpatient and emergency room consults, hospital

admissions, laboratory and diagnostic procedures, phototherapy sessions, and medications prescribed within the last six (6) months, based on the methodology of Schaefer et al.[7] This also included the highest PASI and BSA scores in a 6-month period up until enrollment into the study.

Data collected from this study was encoded via Microsoft Excel. We used descriptive statistics such as mean and standard deviation to express continuous variables, and frequency and percent for categorical/nominal variables. ANOVA was used to analyze monthly income, work productivity and impairment, cost of treatment, cost of diagnosis, and cost of employment and work impairment among the three levels of severity. Chi-square Goodness of Fit test was used for categorical data such as monthly income range and employment status. All statistical tests were tested against an alpha of 0.05.

RESULTS

DEMOGRAPHIC AND CLINICAL PROFILE

This study enrolled 43 participants. Of these, 51.2% (n=22) were male and 48.8% (n=21) were female with a mean age of 46.07 (±13.96) years and mean illness duration of 8.7 (±7.32) years. The mean age upon the initial diagnosis of psoriasis was 36.37 (±13.8). The mean PASI score and body surface area (BSA) affected at the time of enrollment was 14.41 (±9.37) and 21.26% (±19.61%), respectively.

Socio-economic Profile, Productivity, and Changes in Employment Status

Seventy-two percent (72%, n=31) of the participants were currently employed and 42% (n=18) had a regular, full-time job. A monthly income of less than PHP 8,000.00 was seen in 53% (Table 1). For those who experienced a change in employment status due to psoriasis, it was mostly in the form of a reduced work schedule.

Among the participants who were employed, there was a 106% mean overall work impairment, which was related more to impairment while at work (presenteeism of 59%) rather than absence from work (absenteeism of 23%). Only participants who reported being employed full time, part time, or self-employed provided data for absenteeism, presenteeism, and overall work impairment. All participants provided data for activity impairment (Figure 1).

TREATMENT PATTERNS AND HEALTH CARE UTILIZATION PROFILE

There was a mean of 8.88 (±10.02) dermatology outpatient consults and 13.67 (±9.10) laboratory examinations in six (6) months. Only one (1) participant from the study group consulted at the emergency room and was subsequently admitted in the hospital (mean 0.02 ±0.15). Participants were prescribed with a mean of 1.80 (±0.79) types of medication for psoriasis. Topical

Table 1. Economic profile of patients (n = 43)

	PASI <10 (n=13)	PASI 10-20 (n=21)	PASI >20 (n=9)	Overall (n=43)
Employment Status (n, %)				
Full-time	6 (46%)	7 (33%)	**5 (56%)**	18 (42%)
Part-time	2 (15%)	9 (43%)	**2 (22%)**	13 (30%)
Housewife	3 (23%)	2 (10%)	**2 (22%)**	7 (16%)
Retired	0 (0%)	1 (5%)	**0 (0%)**	1 (2%)
Unemployed	2 (15%)	2 (10%)	**0 (0%)**	4 (9%)
Occupation (n, %)				
Government employee	1 (8%)	2 (10%)	**1 (11%)**	3 (7%)
Private employee	4 (31%)	6 (29%)	**2 (22%)**	10 (23%)
Own business	3 (23%)	8 (38%)	**3 (33%)**	11 (26%)
Monthly Income (n, %)				
> Php 100,000	0 (0%)	0 (0%)	3 (33%)	3 (7%)
Php 50,001-100,000	0 (0%)	0 (0%)	3 (33%)	3 (7%)
Php 30,001-50,000	1 (8%)	2 (10%)	3 (33%)	6 (14%)
Php 15,001-30,000	1 (8%)	0 (0%)	0 (0%)	1 (2%)
Php 8,000-15,000	2 (15%)	5 (24%)	0 (0%)	7 (16%)
< Php 8,000	9 (69%)	14 (67%)	0 (0%)	23 (53%)
Change in employment status due to psoriasis (n, %)				
Retired early	1 (8%)	0 (0%)	0 (0%)	1 (2%)
Unemployed	1 (8%)	0 (0%)	1 (11%)	2 (5%)
Disabled	0 (0%)	1 (5%)	0 (0%)	1 (2%)
Reduced work schedule	3 (23%)	9 (43%)	1 (11%)	13 (30%)
None	9 (69%)	11 (52%)	7 (78%)	27 (63%)
Duration since change in employment status in months (mean)	34.00 ± 20.49	37.13 ± 48.52	38.5 ± 33.5	36.52 ± 42.82

PASI - Psoriasis Area and Severity Index

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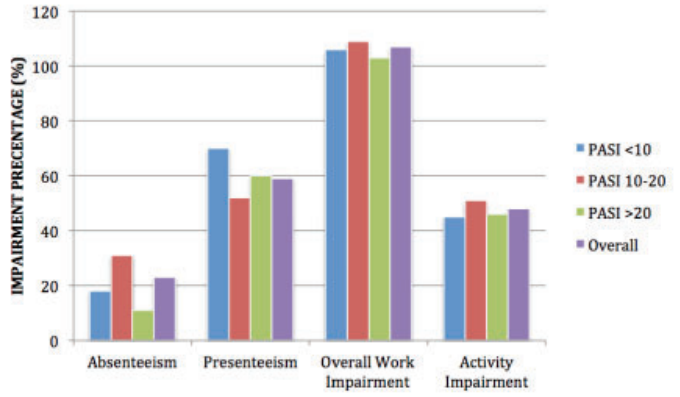

Figure 1. Work Productivity and Activity Impairment Scores (Mean)

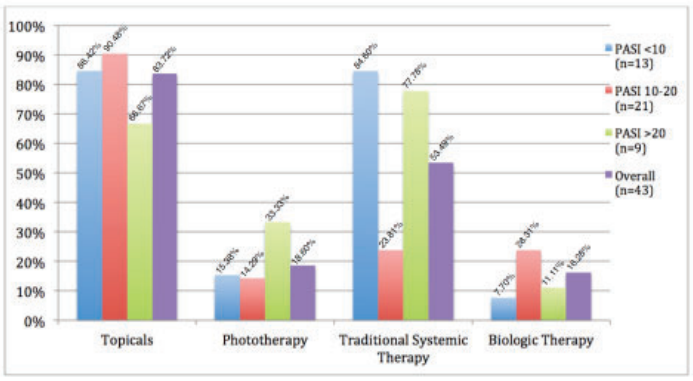

Figure 2. Treatment Modality Received During a 6-Month Period

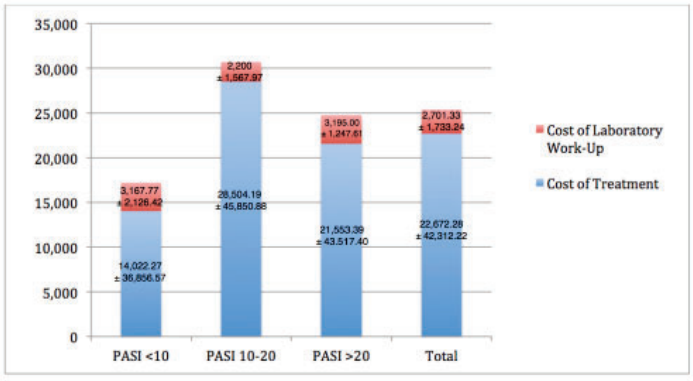

Figure 3. Cost of Treatment and Diagnostic Work-up (in PHP) of Psoriasis During a 6-Month Period

medications were the most used form of treatment among all PASI groups, and biologic therapy was the least used (Figure 2).

DIRECT COST OF PSORIASIS

The mean direct cost for treatment was PHP22,672.28 (±42,312.22) and the mean direct cost for diagnostic work-up was PHP2,701.33 (±1,733.24) (Figure 3). The highest reported cost for treatment was PHP136,216.00 in a participant undergoing biologic therapy.

INDIRECT COST OF PSORIASIS

According to patient-reported changes in employment status in a 6-month period due to psoriasis (i.e., decreased work schedule, early retirement, or unemployment), there was a mean indirect cost of PHP26,071.20 (±26,085.99), and this was highest for those with severe psoriasis at PHP30,383.10 (Figure 4). The results did not include data from those who had their own businesses since their work schedule was neither standard nor fixed.

The mean indirect cost brought about by work impairment for the past six (6) months was PHP75,804.30 (Figure 4). This was largely driven by presenteeism rather than absenteeism for all groups.

FUNDING SOURCE

The financial aid contributed by the different funding sources for the past four (4) weeks was mostly based on the participants' self-reported expenses, assisted by the review of medical records and electronic health information system (HIS). Only participants who chose to solicit from a specific funding source (e.g., Department of Social Welfare and Development) and met the criteria required were able to receive financial assistance. All of the participants had out of pocket expenses (Table 2).

DISCUSSION

In our study population, psoriasis was first diagnosed at a mean age of 36, close the WHO global report of 33.[20] This shows that psoriasis is commonly diagnosed in the working age group,

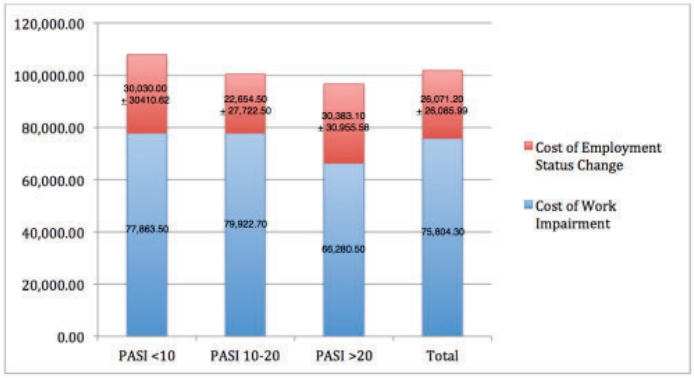

Figure 4. Mean Indirect Cost (in PHP) of Psoriasis in a 6-Month Period

Table 2. Source of Funds for the Direct Cost of Care During the Past Four (4) Weeks

Source of funds	Total cost from funding source (PHP)	Range of amounts charged to funding source	
		Minimum value (PHP)	Maximum value (PHP)
Out of Pocket	332,717.35	150.00	128,221.60
Philippine Health Insurance Corporation (PHIC)	0.00	-	-
Lingap / Malasakit	12,855.00	500.00	3,500.00
CMAP	4,415.00	995.00	3,500.00
Hospital Social Services	2,947.00	180.00	1,420.00
Philippine Charity Sweepstakes Office (PCSO)	50,000.00	10,000.00	30,000.00
Office of the Mayor/ Congress/ President	11,500.00	2,000.00	6,500.00
Department of Social Welfare and Development (DSWD)	18,500.00	1,500.00	17,000.00

which partially explains the work and productivity impairment brought about by this disease.[7,21-23]

Topical therapy was still the most used type of medication among all PASI groups, consistent with the study by Ng et al. which was conducted in the same tertiary hospital as this study.[24] Despite the availability and proven efficacy of biologic agents,[25-27] only 16.28% of our study population were using these. Other studies that looked into treatment preferences and patterns of psoriasis patients found that medication prices, out-of-pocket costs, and insurance approval were critical factors,[5,6] and that biologic agents were more commonly used among those with larger incomes or those who had full medical insurance coverage.[28] Treatment preferences among the participants and reasons for the scarce use of biologics were however outside the scope of this study.

The mean 6-month cost of treatment was PHP 22,672.28 ($445, with 1USD equivalent to PHP51 during the study period), or an annual cost of PHP45,344.56 ($889.11) when extrapolated to the number of work weeks per year.[18] The mean 6-month cost for diagnostics was PHP2,701.33 ($53) or an annual cost of PHP5,402.66 ($105.93). This shows that treatments rather than laboratory examinations contribute more to the medical expenses for chronic plaque psoriasis.

A European systematic review of literature on costs associated with the management of psoriasis and psoriatic arthritis across five (5) different countries found that there was a direct association between disease severity and treatment costs.[29] While a correlation between disease severity and treatment cost was not seen in this study (Figure 3), a direct association between biologic agent use and treatment cost was evident. The PASI 10-20 group used biologics the most (23.81%, n=21) and this group also had the highest mean cost of treatment at PHP 28,504.19 ±45,850.88 (Figure 3). The nonlinear relationship between disease severity and treatment cost in this study was mainly due to the use of the prevalence-based approach wherein the highest PASI score within 6 months prior to or upon enrollment was used creating the two (2) following scenarios: (1) the ongoing use of biologics for more than six (6) months brought about an improvement of disease and a low PASI score during the study period; and (2) participants enrolled upon consultation for disease flare after a long time of remission.

The indirect cost due to employment status changes among the participants was PHP 26,071.20 ($511) for half a year, or an annual cost of PHP 52,142.40 ($1,022.40). This is comparable to the results of an American study by Schaefer et al. wherein the indirect cost due to employment status change was $1,090.00.[7] On the other hand, the indirect cost from work impairment among the participants was higher at PHP 75,804.30 ($1,486.00), or an annual cost of PHP151,608.60 ($2,972.72). Since presenteeism rather than absenteeism contributed more to the indirect cost and even amounted to more than the direct cost of treatment, decreased productivity not only negatively affects the patients but the employers as well. This financial impact of presenteeism on employers was also found to be true for other studies that involved a variety of other more common medical conditions.[30-33]

In a Canadian study, an inverse relationship between the employment rate and the severity of psoriasis was demonstrated, and this could have partially explained their finding of a lower annual income in those with moderate and severe psoriasis as compared to those with mild psoriasis.[28] In an American study by Horn et al., more patients with severe psoriasis compared to mild psoriasis reported that their sole reason for not working was due to psoriasis.[8] Although no correlation between the status of employment and severity of psoriasis was found in this study, it is noted that psoriasis—no matter how mild—still affects productivity and overall work performance.

Various local government agencies and funding sources were able to assist the participants with the treatment expenses (Table 2). The participants could solicit financial aid from government agencies if they were able to meet specific criteria and submit the required documents. Nonetheless, the highest maximum value still came from the participants' own pockets. No insurance company was able to cover for the ongoing treatments of psoriasis. The Philippine Health Insurance Corporation (PHIC), for example, was able to cover for the cost of biopsy during the initial diagnosis of psoriasis but was not able to contribute towards any of its outpatient treatment expenses.

Hence, in our data, no funding came from the PHIC.

This study used the prevalence-based approach in determining the cost of illness because the goal was not only to establish the total cost of psoriasis but also to determine which area of ongoing care contributed to most of the cost. Since the prevalence of chronic diseases such as psoriasis is much larger than the incidence, this would also represent the population better. Moreover, this approach is usually used to petition health care policies and programs especially when policymakers have underestimated the burden of illness.[10,34]

LIMITATIONS AND RECOMMENDATIONS

This study only included participants between the ages of 18-64; thus, the direct cost of psoriasis only reflects those of the adult and working age group. Using the prevalence-based approach to determine the costs, only those who were treated at the outpatient department for at least six (6) months and were relatively actively seeking consult were included. These criteria excluded those who were newly diagnosed with psoriasis; hence, this excluded data such as the cost of biopsy and the amount shouldered by the PHIC for the biopsy. In addition, the prevalence approach cannot precisely compare and determine whether there is truly a direct relationship between the cost and the severity of psoriasis. For future studies, we recommend the following: [1] the inclusion all ages if a more detailed direct cost of disease is desired; [2] the use of a prospective design with the inclusion of mild psoriasis patients treated with topical therapy to determine the relationship between direct cost and disease severity; [3] and the use of a multicenter study to better represent the population of interest.

CONCLUSION

Psoriasis is a chronic disease that leads to multiple expenses attributed to frequent follow-ups, laboratory examinations and various treatment regimens. In the setting of a tertiary government hospital in the Philippines, the mean 6-month direct cost of psoriasis was PHP22,672.28 ($445.00). Additionally, an indirect cost of PHP26,071.20 ($511.00) from employment status change and PHP75,804.30 ($1,486.00) from work impairment further increased the economic burden. Moreover, the indirect cost incurred particularly from presenteeism not only negatively affects the patient but the employers as well.[30-33] Despite the availability of government agencies that provide financial aid, all the participants still had out-of-pocket expenses for treatment and only less than half of the participants were able receive financial aid.

In our setting wherein the burden of psoriasis is heavy, and most patients are expected to shoulder majority of the costs for treatment, perhaps financial assistance from the government should be made more widely available, accessible, and extensive so that personal finances would not limit treatment options. Since the total cost of illness increases remarkably due to the indirect cost, and the indirect cost increases significantly in proportion to the overall work impairment, adequate financial assistance for better treatment outcomes and better disease control should lead to enhanced work productivity, a healthy workforce, and a subsequent lower economic burden of psoriasis for the patients and the society.

ACKNOWLEDGMENTS

We would like to acknowledge Dr. Rea Dapiton for her valuable contribution in referring psoriasis patients for enrollment into the study as well as her constructive suggestions in writing this paper.

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