

Original Research Article

Clinical and economic burden of psoriasis: a retrospective study of the cost implications among cohorts in Abuja, Nigeria

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ABSTRACT

Background: Psoriasis is a common chronic cutaneous inflammatory disorder of the skin which presents as sharply demarcated scaly erythematous papules or plaques. The level of its clinical severity at presentation largely determines the cost implications and economic burden on the patient. The study aimed to determine the direct cost of treating various clinical severity of psoriasis and its economic consequences to our healthcare system.

Methods: This is a retrospective study that was conducted between May 2016 and October 2019 at the Dermatology Unit of University of Abuja Teaching Hospital. Data was retrieved from patient's folder into a designed proforma, noting their biodata, clinical level of severity using psoriasis area severity index (PASI) score, amount of money spent on drugs, laboratory test, nursing time and consultation fees.

Results: Out of 82 psoriasis patients seen during the study period, 66 fulfilled the inclusion criteria. About 51.5% of them had severe psoriasis with a mean PASI score 33.2. The annual cost of treating mild, moderate and severe psoriasis was N198,900.00, N261,633.00 and N323,708.00 respectively. This accounted for 1.77% of the national annual healthcare spending within the years under review.

Conclusions: The cost of treating psoriasis and its economic burden is largely determined by the level of its clinical severity.

Keywords: Psoriasis, Level of severity, Cost of treatment, Economic burden, PASI

INTRODUCTION

Psoriasis is a chronic inflammatory, painful, disfiguring non-communicable disease.¹ The reported worldwide prevalence ranges from 0.09% to 11.43%, though it is observed to be rare in Africans and North America Indians.²⁻⁴ Earlier survey in Nigeria had put its prevalence at 0.1% to 0.5% but recent studies have shown an increase in frequency 0.6% to 1.5% among patients seen in outpatients department in different parts of Nigeria.⁵⁻⁹ This makes psoriasis a serious global problem with a suffering population of over 100 million people.¹⁰

The cause of psoriasis is unknown. However, genetic predisposition and environmental triggers have been

implicated. Individuals that have human leukocyte antigens (HLA CW 6, HLA-BW17, B13, B27) are more prone to developing psoriasis. Currently, it is thought to arise from genetically induced immune dysregulation (innate and adaptive immunity) leading to production of large number of cytokines such as tumour necrosis factor- α , interferon- α , IL-12, IL-17 and off late, IL-23.¹¹⁻¹⁴

The immune dysregulation is probably thought to be provoked by external stimuli such as sunburn, mild trauma, stress, infections, systemic drugs, smoking and alcohol.¹⁵⁻¹⁷ Its clinical presentation can be unpredictable as it runs a relapsing and a remitting course. Psoriasis affects the skin and sometimes its appendages. The nail affectation ranges from 4.2% to 69% in those diagnosed

with psoriasis. While 1.3% to 34.7% may have their joints affected thereby presenting with seronegative inflammatory arthritis.¹⁸⁻²⁰

Psoriasis eruption may be localized or generalized with papules, plaques that are erythematous, sharply demarcated, scaly or indurated. The severity of eruptions may vary. The severity is defined by the extent of the body surface area involved, the lesion characteristics, or the impact of disease on the quality of life.

Persons suffering from psoriasis have been reported to have increased risk of associated comorbidities such as cardiovascular disease and other non-communicable diseases.²¹ These non-communicable diseases include: hypertension, obesity, diabetes mellitus, dyslipidemia, as well as physical, emotional and social isolation thereby leading to anxiety and depression.^{22,23} Thus, there is a role for multidisciplinary approach to management.

Treatment of psoriasis is life-long; aimed at controlling inflammation. This can be achieved either by topical, systemic therapies, biologics, phototherapy or photochemotherapy. This lifelong therapy involves the cost of mental wellbeing and the economic burden associated with multidisciplinary attention required in their treatment.^{24,25}

The cost of treating psoriasis is significant for both the patient and the healthcare system. The annual cost of treating psoriasis in the United States of America (USA) was estimated at \$135 billion or \$25,796 per person per year in 2013 with patients out of pocket cost accounting for 55% of the total direct cost of the disease.²⁶ Survey data from USA indicates that psoriasis patients pay on the average \$2,528 out of pocket each year on psoriasis care, 34% of which, is on prescription and over the counter (OTC) medicines.^{26,27}

In Switzerland, out of pocket expenses for ambulatory care per patient in 2005 ranged from CHF 600-1100 for mild psoriasis to CHF 2400-9900 per year for severe psoriasis.^{27,28} The total cost of treating psoriasis in Nigeria is unknown. The need to define the Nigerian economic burden of psoriasis is imperative. This is because; it will provide the basis for research advocacy, educational efforts and affordability with respect to changing health insurance policies of government. Thus, this study aims to analyse the direct cost implication of treating various clinical severity of psoriasis and its economic consequences to our health care system.

METHODS

This retrospective study was conducted in the dermatology unit of the outpatient department of internal medicine, University of Abuja Teaching Hospital, Gwagwalada between May 2016 to October 2019. The dermatology unit of the hospital receives referrals regularly from four contiguous states (Nasarawa, Kogi,

Niger, Kaduna) and from within Abuja. Averagely, sixty-five (65) new patients are seen in the unit on a monthly basis.

A proforma was designed to capture patients who were diagnosed with psoriasis clinically and by histology. Their clinical type, occupation, residential address, duration of the disease, family history of psoriasis, body surface area of eruption, psoriasis area severity index (PASI), alcohol and smoking history were documented. PASI score ≤ 10 was regarded as mild; PASI >10 ; ≤ 20 was regarded as moderate and PASI >20 was regarded as severe. Subjects who had attended the clinic on three consecutive months with evidence of their laboratory tests results which include: full blood count, fasting blood sugar, uric acid, electrocardiography and echocardiogram, HIV, HBV and HCV were retrieved.

The treatment offered whether topical, topical plus systemic; topical, systemic plus Ultraviolet B (UVB) phototherapy were all noted. Only patients with complete data were included in the study. Direct cost of treatment used in the analysis was based on: consultation fees, nursing care fees, cost of drugs purchased, laboratory test costs, procedural costs, and cost of phototherapy.

The annual treatment pattern was determined by assessment of the total drug consumption over a period of one year by computing the direct cost from the patient's files and third-party payer (national health insurance scheme) where applicable. Estimates were made on how much they spent in the first, second and third monthly visits and extrapolated for the remaining months of the year for those that did not relapse. Cost of prescribed drugs were generated by averaging the cost price of drugs gotten from various price list of pharmaceutical outfits within and around Gwagwalada and other major sites in Abuja. All costs are expressed in naira and dollar equivalent where necessary.

Data generated were keyed into IBM SPSS version 23 (Chicago) and analysed using descriptive statistics such as frequencies and percentages, while continuous variables were presented as mean, standard deviation, and median. Analysis of variance (ANOVA) and independent t-test were used to analyze relationship between treatment protocols and cost of treatment and p value less than 0.05 was regarded as statistically significant.

The study was approved by University of Abuja Teaching Hospital, Gwagwalada ethical committee and declaration of Helsinki protocols was followed. Oral and or written consent was obtained from all participants at the first visit and subsequent visits.

RESULTS

Out of 82 psoriasis patients seen in the dermatology unit of University of Abuja Teaching Hospital, Gwagwalada FCT Abuja between May 2016 and October 2019; 66

(80.5%) were used for analysis. Their mean age (SD) was 41.6±1.7 years.

Table 1: Psoriasis patient’s profile.

Variables	Frequency	%
Sex: male/female	42/24	63.6/36.4
Mean age (years) ±SE of mean	41.6±1.7	
Minimum-maximum age (years)	15-69	
Median age (years) (IQR)	38.0 (26)	
Occupation		
Public/civil servant	38	57.6
Self-employed/businessman /private	13	19.7
Students/unemployed (5/3)	8	12.1
Retired public/ civil servant	7	10.6
Educational status		
Basic/primary	4	6.1
Secondary	19	28.8
Tertiary	43	65.2
Mean duration of eruption (years) ±SE of mean	4.1± 0.6	
Median age (years) (minimum-maximum)	2.0 (0.13-25)	
Duration of eruption (years)		
≤1	22	33.3
>1 or <5	23	34.9
≥5	21	31.8
Co-morbidities		
HIV	5/66	7.6
HCV	4/66	6.1
HBV	1/66	1.5
Psoriatic arthritis	5/66	7.6
Severity of psoriasis		
Mild	17	25.8
Moderate	15	22.7
Severe	34	51.5

Source: researchers.

The mean cost of treating psoriasis depends on the severity of the disease. For patients who had mild, moderate and severe psoriasis, their mean cost of treatment in the first month was N52,600.00, N61,400.00 and N71,997.06; p=0.003 respectively. There was a reduction in cost of treatment at second visit but a slight increase at the third month. The cost of treating mild, moderate and severe psoriasis was significantly different. Cost of treating psoriasis was significantly related to the severity of the disease at the time of presentation. Our result reveals that the economic burden of psoriasis was more on severe psoriasis patients (Table 2).

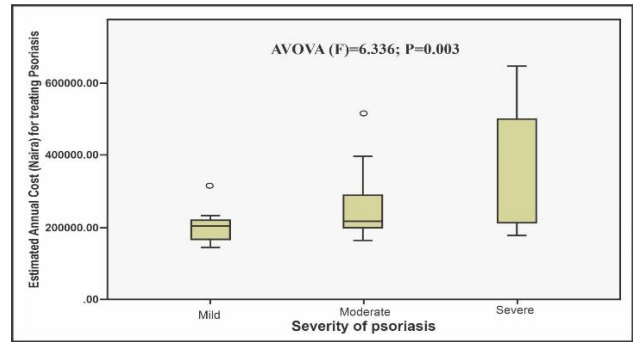


Figure 1: Total annual cost vs severity of psoriasis.

Mean pharmaceutical and clinical cost for treating psoriasis irrespective of the severity for the first 3 months was of N64592.42, N35792.42 and N33898.48 respectively. Of this total, cost of investigation was N37,800.00. About 58.5% was spent on investigations while about 26% was spent on drugs (Table 2).

The cost of treating psoriasis at the first visit was statistically higher than the second month (N64592.42 vs N 35792.42; p<0.0001). However, the cost of treating psoriasis at the second month was comparable with the cost at the third month (N35792.42 vs N33898.48; p=0.510). The cost of treating psoriasis was significantly higher among patients on UVB treatment than those on UVB naive (N104,975.00 vs N55,618.52; p<0.0001) on monthly basis and (N530,025.00 vs N221,352.93; p<0.0001).

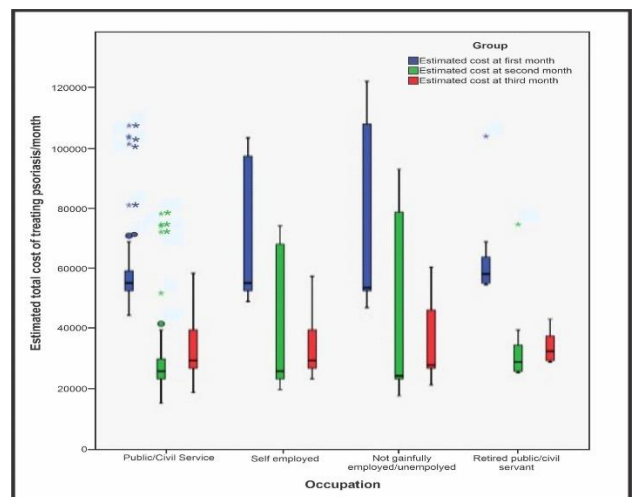


Figure 2: Estimated cost of treating psoriasis vs patient’s occupation.

Figure 2 depicts the relationship between estimated cost of treating psoriasis and patient’s occupation. Those who were gainfully employed by the government spent less on treatment. This is because of their access to national health insurance scheme - NHIS (in terms of out of pocket spending) when compared to those who are self-employed and unemployed who are not covered under NHIS.

Table 2: Estimated cost of treating various degrees of severity among psoriasis patients in the first three months from presentation.

Variables	Estimated pharmaceutical and clinical cost of treating psoriasis			ANOVA (F)	P value
	Mild (n=17)	Moderate (n=15)	Severe (n=34)		
Mean PASI	3.2	12.5	33.2	-	-
1 st month: mean	52,600.00	61,400.00	71,997.06	6.303	0.003
Median	53,100.00	55,600.00	55,600.00		
Range	(45,100-69,100)	(47,600- 103,100)	(49,600-121,600)		
Std error of mean	1376.00	3664.76	4111.19		
% of total sum	21.0	21.6	57.4		
2 nd month: mean	23,800.00	32,600.00	43,197.06	6.303	0.003
Median	24,300.00	26,800.00	26,800.00		
Range	(16,300-40,300)	(18, 800-74,300)	(20,800-92,800)		
SE of mean	1376.00	3664.76	4111.19		
% of total sum	17.1	20.7	62.2		
3 rd month: mean	27,300.00	37,233.00	35,726.47	5.826	0.005
Median	27,800.00	30,300.00	30,300.00		
Range	(19,800-43,800)	(22,300-57, 800)	(24,300-60,800)		
SE of mean	1376.00	3117.11	1625.08		
% of total sum	20.7	25.0	54.3		
Annual cost (mean)	198,900.00	261, 633.33	323, 708.00	3.663	0.003
Median	202, 400.00	219, 900.00	219, 900.00		
Range	146,400-314,400	163,900-516,900	177,900-646,400		
SE of mean	9632.02	23882.79	25970.69		
% of total sum	18.5	21.4	60.1		

Source: researchers.

Table 3: Comparison of mean, median and range estimated total cost of treating psoriasis at the 1st, 2nd and 3rd months.

Variables	Estimated total cost of treating psoriasis/month (N)	Estimated total cost of treatment of psoriasis at the second month (N)	Estimated total cost of treatment of psoriasis at the third month (N)
Mean±SE	64592.42±2497.61	35792.42±2497.61	33898.48±1234.61
Median	55600.00	26800.00	30300.00
IQR	14125.00	14125.00	14500.00
Range (min-max)	45100-121600	16300-92800	19800-60800
1 st and 2 nd months	t=8.169; p<0.0001**		
2 nd and 3 rd months	t=0.661; p=0.510*		

**Differences in mean statistically significant at p<0.05; *differences not statistically significant p>0.05.

Table 4: Treatment cost of psoriatic arthritis.

Variables	Psoriatic arthritis		Independent t test	P value
	Yes (n=5)	No (n=61)		
1st month: mean (N)	68,600.00	64,263.93	0.457	0.650
Median (N)	59,266.67	55,421.43		
(Min- Max) (N)	(53,100-121,100)	(45,100- 121,600)		
2nd month: mean (N)	39,800.00	35,463.93	0.457	0.650
Median (N)	30,466.67	26,621.43		
Min-Max (N)	(16,300-83,300)	(16,300-92,800)		
3rd month: mean (N)	39,700.00	33,422.95	1.354	0.181
Median (N)	37,300.00	30,121.43		
Min-Max (N)	(27,800-58,800)	(19,800-60,800)		

Table 5: Cost of treatment of psoriasis among patients on UVB and those not on UVB treatment.

Period	Cost of treatment of psoriasis among patients on UVB (N)	Cost of treatment of psoriasis among patients on UVB naive (N)	Mean difference (N)	t test	P value
Monthly	104,975.00	55,618.52	49,356.48	23.202	<0.0001**
Annually	530,025.00	221,352.93	308,699.07	20.145	<0.0001**

**Mean difference statistically significant (p<0.05).

DISCUSSION

Psoriasis patients presented late to the hospital in our locale. The mean duration of eruption was 4.1±0.6 years and more than 60% of them had the disease up to a year before presenting to a dermatologist. Our result revealed that 51.5% of our study population had severe psoriasis with a mean PASI score of 33.2. This study reports that the more severe the psoriasis, the higher the cost of treatment which is similar to the findings of Feldeman et al.²⁹ The annual cost of treating mild, moderate and severe psoriasis was N198,900 (\$652.0), N261,633 (\$857.8) and N323,708.8 (\$1,061.3) respectively. Meanwhile, in Europe, the annual cost of treating moderate plaque psoriasis in Italy was put at €5,226.04, whereas the cost of severe psoriasis was €11,434.40.³⁰ Finlay et al and Berger et al reported the annual cost of treatment in Germany as ranging from €4,985.00 - €6,709.00, with a mean PASI score of 18.2.³⁰⁻³³ A similar study in the United States of America (USA) in 2013 showed that individual patients spent about \$25,796 per person per year.²⁶

The huge difference in the annual cost of treating psoriasis in these countries and our study may be due to the biologics which are quite expensive and often used. None of the patients in this study received biologics or topical calcineurin inhibitors as a form of treatment. Comparing the cost of treatment with the average income in Nigeria, the outcome agrees with recent studies that have demonstrated psoriasis to have a significant impact, cost implications on the patients, family members and or caregivers.^{34,35}

The economic implication of this assertion is that in Abuja where the average income of a graduate employed in a federal institution at level 08 with annual earnings of N980,000 (\$3,213) to N1,153,000 (\$3,780) would be expected to spend about 28% of their annual income on treatment of severe psoriasis.³⁶ If the patient has mild psoriasis, that patient will be spending 17% of their annual income on treatment. The situation will be more challenging for those who are retirees, self-employed without a steady income, students or the unemployed. Recent studies have associated psoriasis with unemployment.³⁴ However, only 12.1% of subjects in our study were unemployed.

The major contributor in the direct cost of treating psoriasis patients in the Italian study was due to hospitalization (44%), followed by laboratory test (28%)

and cost of topical (5%) and systemic therapies (14%).³⁰ These were not comparable with our findings which had more laboratory (58.5%) than drugs (26%) cost and no hospitalization during the first or subsequent visits. Patients with psoriatic arthritis had additional cost of treatment when compared with those without; the difference was not statistically significant (P=0.650), although the number of patients with psoriatic arthritis was quite few.

The Nigerian projected population in 2019 stood at about 200,000,000 (yet to be verified by the national census) and the prevalence of psoriasis in Nigeria considering various studies ranges from 0.6 to 1.5% among individuals attending dermatology outpatients in different parts of Nigeria.^{38,7-9} The total cost of treating psoriasis in Nigeria is estimated at 5 billion naira annually. Annual cost of the burden was calculated as consumer price index (CPI) multiplied by the estimated number of people living with psoriasis in Nigeria. This amount to 1.77% of the total national health budget in the year 2016 (annual health budget was N282.14 billion).³⁸ Not much has changed in terms of health allocations in 2017, 2018 and 2019 bearing in mind the mark-up on inflation even when the budget has been increased. This shows that psoriasis is comparable to other non-communicable diseases in its effect on healthcare financing. Not only is this burden borne by the patients but also by the family members, healthcare givers and the healthcare system at large. It therefore means that a well-coordinated and deliberate plan needs to be put in place to alleviate the cost and economic burden of treating psoriasis.

Limitations

This study could not capture the indirect and intangible costs in the course of their treatment, this is because, there was no laid out protocol that accurately stipulated where the patients came from, their cost of feeding and accommodation if not living within Gwagwalada and cost of snacks while waiting to be attended to in the hospital. Adding the indirect and intangible cost would have increased their total economic burden reasonably. Therefore, the researchers suggest that there should be a multi-centered study across the country in order to determine the true cost implication of treating psoriasis.

CONCLUSION

In conclusion, psoriasis is a chronic inflammatory lifelong disease that cast a huge cost and burden not only

to the individuals suffering from the disease but the healthcare system. Early presentation with mild variant would go a long way in reducing the economic health burden.

Recommendations

We recommend the activation of the national health act of 2014 to be the panacea. This act creates a basic healthcare provision fund (BHPF) to provide Nigerians with access to basic healthcare services. Fifty (50) percent of the fund is to be allocated to the national health insurance scheme (NHIS) to provide health coverage for pregnant women, children under age of five, the elderly and persons who are physically challenged. The remaining 50% is to be used to provide essential vaccines and consumables for eligible primary healthcare centers (PHC), maintenance of facilities, equipment and development of human resources for PHC with a goal of extending PHC to Nigerians in hard to reach rural communities. The fund is derived from 1% consolidated revenue fund (CRF), donor contributors as well as contributions from states and local governments. This means that an additional 35-40 billion naira from the CRF can be added into the health care financing which will in turn help in solving the healthcare needs of our people including those living with psoriasis.

We observed that the cost of treating psoriasis was almost doubled when the disease progressed from mild to severe. It means that our PHCs if well equipped with trained and well-motivated personnel at this level of healthcare can bridge the gap by identifying and managing mild psoriasis. This would translate to reduction in the costs of treating psoriasis and the economic burden associated with it.

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Ethical approval: The study was approved by the institutional ethics committee

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