

CASE STUDY

Direct treatment cost of patients with psoriatic arthritis disease covered by the social health insurance at the National Hospital of Dermatology and Venereology from 2021 to 2022

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ABSTRACT

Objective: Estimate the direct medical costs of treating psoriatic arthritis (PsA), including in-patient and out-patient treatment costs.

Methods: The retrospective study follows a prevalence-based approach, collecting all patients with PsA undergoing treatment at the National Hospital of Dermatology and Venereology from July 1, 2021 to December 31, 2022. Data collected included demographic characteristics and costs covered by the social health insurance (SHI).

Results: Among the 74 patients included in the study, 64 patients received outpatient treatment, eight patients received both outpatient and inpatient treatment, and two patients received inpatient treatment only. The average monthly cost of outpatient treatment was 1.7 ± 2.2 million VND, with an average of 0.7 ± 0.3 outpatient visits per month. The average cost for an inpatient treatment session was 6.8 ± 6.2 million VND, with an average duration of 16.2 ± 20.9 days.

Conclusions: We have analyzed the economic burden of PsA from SHI perspective and shown medication costs accounted for the highest proportion of expenses in all cost categories.

Keywords: Direct medical costs, Health insurance, Psoriatic arthritis.

INTRODUCTION

Psoriatic arthritis (PsA) is a chronic, progressive, inflammatory condition that is characterized by manifestations of the joints and skin, often leading to significant disability and reduced quality of life for patients (1). A 2018 systematic review and meta-analysis found the prevalence of PsA was 133 (95% CI, 107–164) per 100,000 people (or 0.13%) in the general population (2). The economic burden of psoriatic arthritis

significantly impacts the healthcare system, patients, and society. Compared to other inflammatory diseases (rheumatoid arthritis and ankylosing spondylitis), psoriatic arthritis incurs the highest direct and indirect costs, primarily due to the presence of multiple complex conditions within the same patient (psoriasis and arthritis) (3,4). According to a systematic review published in 2014, the average annual total cost per patient for psoriatic arthritis ranges from €2,866 to €11,928 (5). The economic burden of



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psoriatic arthritis is assessed to increase with the disease severity.

In Vietnam, with an estimated prevalence of PsA ranging from 0.05 – 0.25% population, PsA poses a considerable burden on the healthcare as well as social health insurance systems (6). Due to PsA being a chronic disease that requires long-term management, most patients attend health insurance. The National Hospital of Dermatology and Venereology (NHDV) plays a crucial role in providing specialized care for patients with PsA, ensuring early diagnosis, effective treatment, and improved outcomes. Understanding the economic impact of PsA is essential for healthcare policymakers, insurance providers, and healthcare professionals to allocate resources efficiently and optimize patient care. Currently, there is no publication in Vietnam that evaluates the economic burden of PsA. For this reason, in order to provide scientific evidence regarding the healthcare economic of PsA in a limited-income country like Vietnam, our research aims to estimate the direct medical costs of PsA from the SHI perspective.

METHODS

Study design: A retrospective study following a prevalence-based approach was used to estimate direct treatment cost from the SHI perspective. The cost components included the cost of medical consultations, laboratory tests, imaging diagnostics, surgeries/procedures, and medication, and only cost covered by SHI calculated in this study. Patient co-payment costs, direct non-medical costs, indirect costs, and intangible costs were not estimated in this study.

Study site and time: The study was conducted from July 1, 2021 to December 31, 2022, at the National Hospital of Dermatology and Venereology.

Study population: The population of psoriasis arthritis (PsA) patients is covered by social health insurance (SHI).

Sample size and sampling method: The entire population of PsA patients covered by SHI for treatment from July 1, 2021 to December 31, 2022 was selected as the sample. The total number of patients included in our study was 74 patients.

Data collection: The eligibility criteria for participating in the study were patients recorded inpatient or outpatient treatment diagnosed with PsA with main ICD-10 codes M07.0, M07.00-M07.09, or L40.5 within the period from July 1, 2021 to December 31, 2022, at the National Hospital of Dermatology and Venereology patients and covered by SHI. We excluded patients with treatment records and incomplete payment records that lacked the required variables for data collection without the possibility of supplementing the missing information, and patients with hospital admissions for other diseases were also excluded from our study.

Study variables: The study variables are divided into three main groups, including (1) General information: age, gender, health insurance payment rate, treatment regimen usage; (2) Treatment timeline: number of outpatient visits per month, hospitalization day; (3) Components of direct treatment costs: bed-day cost, laboratory tests cost, imaging diagnostics cost, surgical procedures cost, medication cost (systemic medication and topical medication), consultation cost.

Data analysis: After collecting the data, it was compiled, cleaned, and analyzed using Microsoft Excel software. Descriptive statistics were used to summarize the data, including frequencies and percentages for categorical variables, and mean and standard deviation for continuous variables. The monthly outpatient treatment cost has been

calculated by dividing total cost for treatment days and then multiplying the days in a month.

Ethics approval: The study protocol was approved by the Ethics Committee of the Hanoi University of Public Health in Decision (No. 158/2023/YTCC-HD3). The study was approved by the Board of Directors of the National Hospital of Dermatology and Venereology.

RESULTS

General characteristics of the participants

Table 1 presents the characteristics of the participants. Among 74 patients, 64 patients received outpatient treatment only, 2 patients received inpatient treatment only, and 8 patients received both. The average age of the patients was 51.4 ± 14.7 years, with 62.2% being male. Regarding health insurance coverage, almost patients (97.3%) had 80% payment rate and

over, and only 2.7% had 40% payment rate due to hospitalized without any referral from the lower-level hospital. During the 1.5 years, patients received an average of approximately 7.7 outpatient treatments, (equivalent to 0.7 ± 0.3 visits per month). For inpatient treatment, 9 out of 10 patients were hospitalized once, while one patient was hospitalized 3 times. The duration of hospitalization ranged from 4 to 38 days, with an average of 16.2 ± 20.9 days per hospitalization.

The patient population is divided into three treatment regimen groups: standard of care (SoC) utilizing disease-modifying anti-rheumatic drugs - DMARDs, biologics, and ultraviolet B light therapy (UVB therapy), with the proportions 83.9%, 13.5%, and 2.7%, respectively. All patients receiving biologics and UVB therapy were outpatient treatment and monitored while hospitalized patients received SoC regimen.

Table 1. Characteristics of the patients

	Sum (n=74)	Outpatient (n=72)	Inpatient (n=10)
Gender (male), n (%)	46 (62.2%)	44 (61.1%)	6 (60%)
Age, mean $\pm$ SD	51.4 ± 14.7	51.5 ± 14.9	51.8 ± 13.0
Number of outpatient visits or hospitalizations, mean $\pm$SD¹	7.5 ± 5.9	7.7 ± 5.8	1.2 ± 0.6
Treatment day, mean $\pm$SD²	342.9 ± 168.4	350.1 ± 161.9	16.2 ± 20.9
SHI reimbursement rate, n(%)			
40%	2 (2.7%)	0 (0.0%)	2 (20.0%)
80%	39 (52.7%)	39 (54.2%)	4 (40.0%)
95%	7 (9.5%)	7 (9.7%)	0 (0.0%)
100%	26 (35.1%)	26 (36.1%)	4 (40.0%)
Treatment regimen, n(%)			
Biologic	10 (13.5%)	10 (13.9%)	0 (0.0%)
Standard of Care	62 (83.8%)	60 (83.3%)	10 (100.0%)
UVB	2 (2.7%)	2 (2.8%)	0 (0.0%)

SD: Standard Deviation

^{1,2}Throughout the research period (from 1st July 2021 to 31st December 2022)

Outpatient treatment cost

The total average monthly treatment cost reimbursed by SHI for PsA patients is 1.7 ± 2.2 million VND. Among them, medication expenses are the largest and constitute the bulk of the total cost, with the average cost for systemic medication and topical medication being equivalent (932,676 VND versus 875,895 VND).

The total treatment cost for the biologics patient group is the highest, with an average monthly cost of approximately 6.1 ± 7.8 million VND. In contrast, the SoC and UVB therapy groups have treatment costs of just over 1.0 million VND.

Although the biologics group (secukinumab, adalimumab) accounted for a small proportion of 13.5%, the cost of biologics accounted for a substantial 89.7% of the total cost for systemic

medications (Figure 1-a). Other medication groups represented only a small portion, including DMARDs (methotrexate), antihistamines (desloratadine, bilastine, chlorpheniramine, loratadine, rupatadine, fexofenadine), retinoids (acitretin), and antibiotics.

The other costs include medication for topical treatment, laboratory tests, and diagnostic imaging, with the SoC group being approximately twice as high as the biologics group. Figure 1b illustrates the cost breakdown of topical medications, combination preparations of vitamin D3 derivative and corticosteroids (calcipotriol + betamethasone) accounting for the highest proportion at approximately 67.0%. Following that, individual agents with calcipotriol account for 23.2% and corticosteroids account for 9.5%. The remaining costs are attributed to immunosuppressive drugs and other drugs.

Table 2. Average costs of outpatient treatment per month

Average costs/month $\pm$ SD (VND)

Cost category	Treatment option			
	Total population	Biologic	Standard of care	UVB
Medical consultations	25,562 $\pm$ 17,740	37,706 $\pm$ 18,679	23,535 $\pm$ 17,199	25,622 $\pm$ 5,505
Laboratory tests	47,263 $\pm$ 46,655	28,292 $\pm$ 10,451	49,008 $\pm$ 48,860	12,706 $\pm$ 17,969
Imaging diagnostics	33,537 $\pm$ 38,475	5,412 $\pm$ 2,307	37,556 $\pm$ 41,912	0.0
Systemic treatment medication	932,676 $\pm$ 2,360,982	5,765,213 $\pm$ 3,702,504	163,630 $\pm$ 138,652	0.0
Topical treatment medication	875,895 $\pm$ 407,891	419,941 $\pm$ 292,274	787,816 $\pm$ 317,156	1,000,413 $\pm$ 211,658
Total	1,708,462 $\pm$ 2,254,762	6,077,879 $\pm$ 3,793,596	1,003,255 $\pm$ 405,296	1,017,597 $\pm$ 186,847

The costs of inpatient treatment

The proportion of PsA patients receiving inpatient treatment is relatively low,

accounting for only 13.5%, and all inpatient-treated patients belong to the SoC regimen group.

The hospitalization average cost is 6.8 ± 6.2 million VND per time (Table 3). The medication expenditure including systemic medication and topical medication accounts for the highest cost with approximately 50% (about 3.5 million VND) (Table 3 and Figure 1). Among these medication costs, systemic treatment medication accounts for 1.9 million VND, and topical treatment medication accounts for 1.6 million VND (Table 3).

The cost for antibiotics shows a significant portion, accounting for about 50% of the total cost for systemic treatment medication and 65.9% of the total cost for topical treatment medication (Figure 1).

Table 3 illustrates the bed-day cost is also relatively high, amounting to 2.6 ± 2.3 million VND, corresponding to 16.2 days of hospitalization per treatment session.

Table 3. Components of costs in inpatient treatment

Mean $\pm$ SD (VND)

Cost category	Mean cost per hospitalization
Bed-day	2,598,204 $\pm$ 2,264,171
Medical consultations	27,090 $\pm$ 16,666
Laboratory tests	382,980 $\pm$ 271,602
Imaging diagnostics	229,589 $\pm$ 220,059
Surgery procedures	7,600 $\pm$ 26,327
Systemic treatment medication	1,902,507 $\pm$ 2,542,706
Topical treatment medication	1,635,542 $\pm$ 1,425,285
Total	6,783,512 $\pm$ 6,189,241

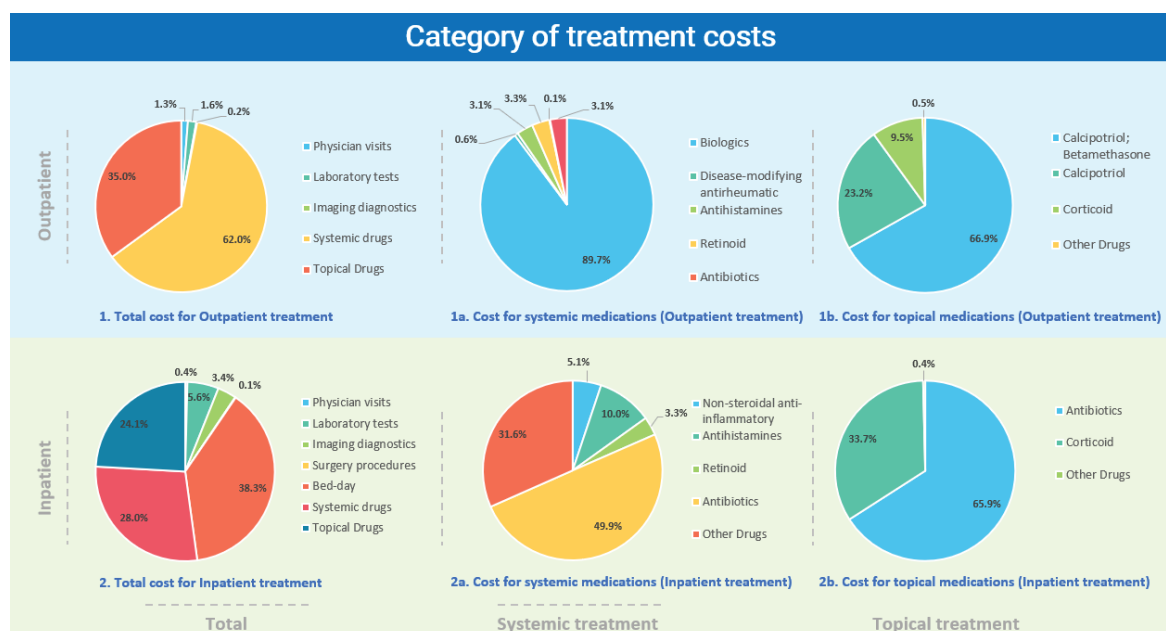


Figure 1. Treatment medication cost

DISCUSSION

This study provides insight into the direct treatment cost of PsA patients in the specialization national hospital in Vietnam. In this study, we estimated direct treatment cost in population with 74 PsA patients covered by SHI at the National Hospital of Dermatology and Venereology. The population with average age of 51.4 ± 14.7 years and a male proportion of 62.2%. Currently, to the best of our knowledge, there was no any publications on PsA patient population in Vietnam. However, when comparing to studies published in other Asian countries, the average age of the study subjects is relatively similar. A study conducted in South Korea in 2016 reported that average age of psoriatic arthritis patients was 42.2 ± 16.0 years and the male proportion was 45.5% (7). A study conducted in Thailand in 2016 also reported that among 125 patients diagnosed with psoriatic arthritis, the average age of this patient group was 46.3 ± 12.5 years, with a male proportion of 54.4% (8). Generally, based on the results of the studies, the common characteristic of PsA patients is an average age of around 50 ± 10 years, which is similar to the age range of the participants in our study. The gender ratio does not differ significantly between males and females, the male proportion in the studies falls within the range of $50 \pm 5\%$ (7,8). In our study, the male proportion of 62.2% is slightly higher than in other studies, although the difference is not substantial. The higher proportion of males may be attributed to a higher willingness to participate in treatment of males compared to the female group.

Among the 74 patients participating in the study, 35.1% were fully reimbursed by SHI, 9.5% received a reimbursement rate of 95.0%, 52.7% had an 80.0% reimbursement rate, and only 2.7% were reimbursed at a rate of 40.0% due to be hospitalized without any referral

from the lower-level hospital. According to the amended Health Insurance Law of 2014 (No: 46/2014/QH13), specific special patient groups are eligible for 100% and 95% health insurance coverage rates. The majority of working-age individuals are eligible for 80% health insurance coverage. If a cardholder seeks treatment at a national hospital (other than their registered insurance-covered hospital), the health insurance fund will cover 40% of the costs for inpatient treatment. It can be observed that the health insurance coverage rates in this study accurately reflect the current situation in Vietnam.

The PsA treatment cost

This study only relied on the costs covered by SHI to calculate direct costs, therefore it does not account for 100% of the direct treatment costs. With the aforementioned reimbursement rates (35.1% were fully reimbursed by SHI, 9.5% received a reimbursement rate of 95.0%, 52.7% had an 80.0% reimbursement rate, and only 2.7% were reimbursed at a rate of 40.0%), the estimated study will calculate 87.4% of the direct costs. This is also one of the limitations of the research, which will be further discussed in the subsequent section.

The findings of this present study shows that among the three groups of PsA patients treated with biologics, SoC, and UVB therapy, the treatment cost is highest in the biologics group, with an average cost of approximately 6.1 ± 7.8 million VND per month, while for the SoC and UVB groups, the cost is only over 1 million VND per month. This can be explained by the significantly higher prices of biologic drugs compared to the drugs in the SoC group, especially those used for systemic treatment. In the present study, two biologic drugs, secukinumab and adalimumab were both covered by the health insurance fund with a reimbursement rate of 50%, this corresponds to a reimbursement price of

3,910,000 VND/150mg and 5,756,608 VND/40mg, respectively. Secukinumab is administered at a dose of 150mg per week in the first month and 150mg per month from the second month onwards. Adalimumab is used at a dose of 40mg per injection, with an interval of two weeks between injections. On the other hand, in SoC regimen, the most commonly used drug is methotrexate, with a maximum dose of 25mg per week. The closest winning bid price for methotrexate is 2,190 VND per 2.5mg, equivalent to a treatment cost of approximately 95,000 VND per month.

Regarding topical treatments, the combination of corticosteroids and calcipotriol or the monotherapy of these two active ingredients is commonly used. These medications help reduce the symptoms of psoriasis on the skin. This finding is consistent with the earlier studies conducted by Nguyen Phuc Hung and Tran Thi Thoan (9,10). In addition, within the topical corticosteroid group, betamethasone is the most commonly used medication, which belongs to the group of potent corticosteroids, and clobetasol, on the other hand, is a super-potent corticosteroid. This distribution is also consistent with other studies worldwide. According to Bhuvana KB et al., in India, topical corticosteroids accounted for 42% of prescribed medications, predominantly consisting of super-potent corticosteroids (73%) and potent corticosteroids (14%) (11). Another study in the United States yielded similar results, with 79% of prescribed topical medications being corticosteroids, of which 58% were super-potent corticosteroids (12). Due to their strong pharmacological activity and effectiveness in treatment, doctors prioritize prescribing these medications, leading to a higher proportion of total costs associated with this drug group.

The advantage of this study is being the first one that estimates the cost of PsA treatment

encompassing both outpatient and inpatient treatment costs in Vietnam. The results can be applied in policymaking and served as a foundation for future health economic research. However, the study also has some limitations. Firstly, the cost estimation method in this study is based on the perspective of the payer, which is the health insurance agency, so the study only estimates direct healthcare costs covered by the SHI. Due to excluding the co-payment from patients and out-of-pocket payment for services that the SHI does not cover, study results can underestimate direct medical costs. In addition, almost all patients have a co-payment rate of 20% which is the primary reason under-estimate direct medical cost. Furthermore, The SHI reimbursement price only covers 4/7 of the healthcare services cost components based on Decree 85/2012/ND-CP. Additionally, within the scope of this study, the direct non-medical cost components (such as transportation, accommodation, and living expenses during the patient's treatment) and indirect cost components related to societal losses, such as lost productivity due to illness or premature death, were not estimated. Therefore, the scope of this study cannot provide comprehensive and entire cost estimates.

CONCLUSION

Among the 74 patients included in the study, 64 patients received outpatient treatment, eight patients received both outpatient and inpatient treatment, and two patients received inpatient treatment only. The average monthly cost of outpatient treatment was 1.7 ± 2.2 million VND, with an average of 0.7 ± 0.3 outpatient visit per month. The average cost for an inpatient treatment session was 6.8 ± 6.2 million VND, with an average duration of 16.2 ± 20.9 days. The group using biologic drugs had the highest treatment costs among

the three categorized treatment groups, with an average of approximately 6.1 ± 7.8 million VND per month, while the other two groups, consisting of the SoC and UVB therapy groups, had costs of just over 1.0 million VND per month. Medication costs accounted for the highest proportion of expenses in all cost categories. This study provided evidence about health economics, input for pharmaco-economic analysis, and health technology assessment study which is useful in general health policymaking.

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