The Direct Medical Cost of Autoimmune Bullous Dermatoses Treatment in a Hospital Environment in Ouagadougou, Burkina Faso

Ouédraogo NA MD[1,2], **Kiendrébéogo JA** MD[1], **Sica K** PD[2], **Ouédraogo MS** MD[1,2], **Traoré F** MD[4], **Tapsoba GP** MD[1,2], **Somé NNK** MD[1,3], **Barro TF** MD[1,5], **Niamba P** MD[1,2], **Traoré A** MD[6]

[1]Training and Research Unit in Health Sciences, Joseph Ki-Zerbo University, Ouagadougou, Burkina Faso
[2]Dermatology & Venereology Department, Yalgado Ouédraogo University Hospital, Ouagadougou (CHUYO), B. Faso
[3]Dermatology Unit of Boulmiougou District Hospital, Ouagadougou, Burkina Faso
[4]Training and Research Unit in Heath Science, University of Ouahigouya, Burkina Faso
[5]Dermatology and Venereology Department of Tengandogo university Hospital, Ouagadougou, Burkina Faso
[6]Retired

Corresponding author: Nomtondo A Ouédraogo
Email address: nomtondo2000@yahoo.fr; **Phone number**: +22678166265

ABSTRACT

Background: Autoimmune bullous dermatoses (ABD) are rare skin conditions, that frequently cause hospitalization in dermatology and venereology departments. Their management induces significant costs for the patient and his/her family. An estimate of these costs would allow patients suffering from ABD to better plan the financial management of their disease.

Methods: Our study aims to evaluate the direct medical cost of ABD treatment for patient's perspective. This was a partial economic assessment, of the direct medical costs borne by inpatients and outpatients between 1st January 2016 and 31st December 2018 in CHUYO of Ouagadougou. For the calculation of direct medical costs, we added the cost of drugs and consumables, hospitalization and consultation fees, and paraclinical investigations (histological, biological, and immunological investigation).

Results: Seventy-eight patients had ABD, with a frequency of 1.29%, 53 complete files were reviewed for the study. The average cost of inpatient treatment for ABD ranged from $160 (dermatitis herpetiformis) to $252 (pemphigus foliaceus), with a minimum of $103 and a maximum of $612. These two extremes were observed for bullous pemphigoid. The average direct outpatient medical cost ranged from $156 to $307. Drugs accounted for 49.2% of inpatient expenditure and 66% of outpatient expenditure.

Conclusion: ABD requires long-term medical treatment and this generates expensive direct medical costs, sometimes exorbitant for patients, particularly in a context where prepayment mechanisms are poorly developed. The adoption of policies that promote financial access to comprehensive and quality care for people with ABD is necessary.

Keywords: Pemphigus, bullous pemphigoid, direct medical cost, Burkina Faso

Coût Direct Médical du Traitement des Dermatoses Bulleuses Auto-immunes en Milieu Hospitalier à Ouagadougou, Burkina Faso

ABSTRAIT

Contexte: Les dermatoses bulleuses auto-immunes (DBAI) sont un groupe hétérogène d'affections chroniques rares, mais constituant des motifs d'hospitalisation relativement fréquents dans les services de dermatologie-vénérologie. Leur prise en charge induit des coûts non négligeables pour la personne malade et son entourage. Une estimation de ces coûts permettrait aux patients souffrant de DBAI de mieux planifier des dépenses liées à la maladie.

Méthodes: Le but de notre étude était d'évaluer le coût direct médical des DBAI du point de vue du patient. Nous avons mené une évaluation de type micro-costing des coûts directs médicaux supportés par les patients hospitalisés entre le 1er janvier 2016 et le 31 décembre 2018 au CHU YO de Ouagadougou. Pour le calcul des coûts directs médicaux, nous avons additionné le coût des médicaments et consommables, des frais d'hospitalisation, de

consultation, et des examens paracliniques.

Résultats: Soixante-dix-huit patients avaient une DBAI, soit une fréquence de 1,29 % et 53 dossiers complets retenus. Les coûts moyens de la prise en charge en hospitalisation des DBAI variaient entre $160 (dermatite herpétiforme) et $252 (pemphigus foliacé), avec un minimum de $103 et un maximum de $612. Ces deux extrêmes étant observés pour la pemphigoïde bulleuse. Le coût moyen direct médical en ambulatoire variait de $156 à $307. Les médicaments constituaient 49,2% des dépenses effectuées en hospitalisation et 66% en traitement ambulatoire.

Conclusion : Les DBAI nécessitent un traitement médical au long cours et ceci engendre des coûts directs médicaux onéreux, parfois catastrophiques pour les patients, en particulier dans un contexte où les mécanismes de prépaiement sont peu développés. L'adoption de politiques favorisant un accès financier des personnes souffrant de DBAI à des soins complets est nécessaire.

Mots clés : Pemphigus, pemphigoïde bulleuse, coût direct médical, Burkina Faso

Introduction

Autoimmune bullous dermatoses **(**ABD) are rare skin conditions, but a frequent cause of hospitalization in dermatology and venereology departments. These conditions accounted for 16.64% of hospital admissions at the Yalgado Ouédraogo University Hospital (CHU-YO) of Ouagadougou and 11% at the Ibn Sina University Hospital of Rabat, Morocco.[1,2,3] Their management entails significant costs for the patient and his family. Korsaga et al. reported in 2012 that 42.8% of patients with ABD did not comply with their treatment due to financial difficulties.[4] Having an idea of the direct medical cost would allow the patient to better plan the budget allocated to his treatment for better compliance. The aim of our study, therefore, is to evaluate the direct medical cost of ABD treatment for patients' perspective.

Methods

The study focused on patients diagnosed with ABD and managed in the dermatology and venereology department of the Yalgado Ouédraogo University Hospital (CHUYO) from January 1st, 2016 to December 31st, 2018.

This was a partial economic assessment, specifically a micro-costing of the direct medical costs borne by inpatients and outpatients. Data were recorded on a form documenting patients' clinical and hospitalization details and price lists of health facilities attended by patients.[5-8]

Laboratory investigation prices were given by the laboratory facilities attended by the patients. Drugs unit costs were obtained from price lists of the hospital pharmacy of CHU YO, and the public prices of the four private drug wholesalers supplying private pharmacies in Burkina Faso. As for hospitalization costs, the price lists applied at the CHUYO were used for assessment. Interviews with some patients made it possible to complete the missing data during the follow-up visits. Direct medical costs borne by patients during their hospitalization include the cost of accommodation, drugs, fluids, and consumables, and the cost of paraclinical investigations (histological, biological, and immunological investigation).

Direct medical cost during hospitalization was calculated as follow[5-11]:

DMC hospi = (IRC x LS) + CMC hospi + CEC hospi

DMC hospi = Direct medical cost during hospitalization
IRC = Inpatient room charge
LS = Length of stay in hospital
CMC hospi = Cost of drugs and medical consumables used during hospitalization
CEC hospi = Cost of paraclinical investigations carried out during the hospital stay

For the assessment of hospitalization cost, we considered the cost of accommodation, the cost of drugs (local treatment (dermocorticoïd like betamethasone cream, antiseptic, in situ antibiotic, vaseline, eosin), general treatment (specific treatment like corticosteroid (prednisone), or immuno-suppressors (azathioprine) or dapsone) and symptomatic treatment, adjuvant treatment), and the cost of paraclinical investigations.

Direct medical cost for outpatients (Ambu) was assessed as follows:

CDM Ambu = CC Ambu + CMC Ambu + CEC Ambu
CDM Ambu = Direct medical cost for outpatients
CC Ambu = Cost of outpatients' consultations
CMC Ambu = Cost of drugs and medical consumables used in outpatient treatment
CEC Ambu = Cost of paraclinical investigations carried out on an outpatient basis

The average direct medical cost and the daily direct medical cost of inpatient care were assessed, respectively, by dividing the total CDM hospi by the total number of patients and by dividing the average direct medical cost by the average length of hospital stay. In addition, total and average costs were calculated for outpatients on a monthly, quarterly, half-yearly, and annual basis.

Data were analyzed using EPI Info version 7.2.2.6 and Excel 2010. Categorical variables were described using numbers and/or frequencies, while quantitative variables were presented as totals and/or means with standard deviations (95% confidence intervals) and extreme values.

The confidentiality of data and patient anonymity were secured throughout the study.

Results

Out of 6,046 patients received in the department during the 3-year study period, 78 cases of ABD were recorded, representing a frequency of 1.29%. Fifty-three (53) cases were included in the study. The remaining cases had incomplete data that couldn't be used. We reported 23 cases of bullous pemphigoid, 24 cases of pemphigus including 12 pemphigus vulgaris and 11 foliaceous, and 6 dermatitis herpetiformis. Out of the 53 patients, 28 were male, giving a sex ratio of 1:1.12.
The average age of the patients was 50 years with extremes of 4 and 90 years. The average age of men was 54 years and 45 years for women. By pathology, the mean age of patients with pemphigus was 49 years, 62 years for bullous pemphigoid, and 13 years for dermatitis herpetiformis. Thirty-three (33) patients lived in urban areas and the other 20 were in rural areas. Thirty-five (35) patients were farmers, artisans, or housewives. The other socio-professional categories represented were shopkeepers, civil servants, and students. The data are shown in Table I. The average length of hospitalization for ABD was 35.32 days (standard deviation = 20.13 days) with extremes of 7 and 96 days.

The total cost of accommodation during hospitalization for the 53 patients was $1664 with an average of $31 (SD =17) with extremes of $8 and $76.

In-situ treatment included antiseptics, In-situ antibiotics, emollients, and dermocorticoids. The

Table I: Socio-demographic Characteristics of Patients

Designation	Values
Sex n=53	
Female	28
Male	25
Mean age by pathology	years (standard deviation)
Mean age	50 years (4-90 years)
Pemphigus vulgaris	49 years (± 21 years)
Pemphigus foliaceus	49 years (± 15 years)
Bullous pemphigoïd	62 years (± 15 years)
Dermatitis herpetiformis	13 years (± 9 years)
Residency n=53	
Urban	33
Rural	20
Profession n=53	
Civil servant	3
Artisans	4
Health workers	2
Housewives	18
Farmers	13
Shopkeepers	6
Students	6
Children not attending school	1
Length of stay of different ABD in hospital	Length average (days)
Pemphigus vulgaris	31.18± 14.45
Pemphigus foliaceus	43.67± 18.67
Bullous Pemphigoïd	36.78± 23.26
Dermatitis herpetiformis	22.71± 13.19

Table II. Estimated costs of inpatient stay and outpatient

Type of ABD	**Estimated costs of inpatient**	**Estimated cost of outpatient**			
		Monthly average cost	Quarterly average cost	Average cost per six month	Annual average cost
		Cost of Hospital stay			
Pemphigus vulgaris	31 ±17	-	-	-	-
Pemphigus foliaceus	35±15	-	-	-	-
Bullous Pemphigoïd	31±18	-	-	-	-
Dermatitis herpetiformis	26±19	-	-	-	-
	Cost of local treatment (antiseptics, in-situ antibiotics, emollients, dermocorticoids)				
Pemphigus vulgaris	41±25	-	-	-	-
Pemphigus foliaceus	54±24	-	-	-	-
Bullous Pemphigoïd	54±38	-	-	-	-
Dermatitis herpetiformis	44±21	-	-	-	-
		Cost of general steroid treatment			
Pemphigus vulgaris	22±14	12± 8	35± 24	71± 49	78± 33
Pemphigus foliaceus	35±23	13± 6	44± 16	101± 33	133± 0
Bullous Pemphigoïd	22±17	8± 3	37± 11	73± 24	149± 46
		Cost of dapsone treatment			
Dermatitis herpetiformis	20±0	7± 6	20± 0	40± 0	80± 0
	Cost of adjuvant treatment (calcium and potassium supplementation and gastric bandage)				
Pemphigus vulgaris	13±2	8± 3	24± 8	47± 16	72± 8
Pemphigus foliaceus	21±18	8± 3 297	29± 11	65± 23	79± 0
Bullous Pemphigoïd	17±8	5± 3	25± 6	48± 11	91± 26
Dermatitis herpetiformis	1±0.5	8± 3	24± 8	47± 16	72± 8
	Cost of other drugs (antibiotics, dewormers, antihistaminics, analgesics)				
Pemphigus vulgaris	32±34	-	-	-	-
Pemphigus foliaceus	22±19	-	-	-	-
Bullous Pemphigoïd	22±31	-	-	-	-
Dermatitis herpetiformis	22±8	-	-	-	-
		Cost of fluids and consumables			
Pemphigus vulgaris	6±3	-	-	-	-
Pemphigus foliaceus	3±0.5	-	-	-	-
Bullous Pemphigoïd	6±3	-	-	-	-
Dermatitis herpetiformis	1±0.2	-	-	-	-
		Cost of all drugs (next page)			

			Cost of all drugs		
Pemphigus vulgaris	114±64	20± 7	59± 24	118± 51	150± 39
Pemphigus foliaceus	134±54	21± 11	69± 27	82± 51	212± 0
Bullous Pemphigoïd	122±75	19± 13	62± 16	83± 32	240± 77
Dermatitis herpetiformis	88±27	7± 6	20± 0	40± 0	80± 0
	Cost of paraclinical investigations (histological, biological, and immunological)				
Pemphigus vulgaris	95±62	2± 1	7± 3	14± 4	19± 6
Pemphigus foliaceus	83±45	5± 3	8± 4	17± 13	30± 0
Bullous Pemphigoïd	82±45	4± 4	8± 7	15± 9	27± 19
Dermatitis herpetiformis	46±19	2± 0.7	6± 2	16± 0	31± 0
			Cost of overall care		
Pemphigus vulgaris	240±109	28± 11	77± 34	155± 65	214± 35
Pemphigus foliaceus	252±91	27± 12	88± 29	125± 61	287± 0
Bullous Pemphigoïd	235±125	29± 13	83± 17	159± 30	307± 73
Dermatitis herpetiformis	161±42	15± 5	39± 14	81± 0	156± 0

Table III: Estimated direct medical costs of total management (inpatient + outpatient treatment) of the different types of ABD

Type of ABD	Average cost of one month in hospital with monthly outpatient follow-up	Average cost of one month in hospital with quarterly outpatient follow-up	Average cost of a month's in hospital with six-monthly outpatient follow-up	Average cost of one month in hospital with annual outpatient follow-up
Pemphigus vulgaris	259	309	387	445
Pemphigus foliaceus	200	261	298	381
Bullous Pemphigoïd	212	274	351	498
Dermatitis herpetiformis	227	251	293	368

total cost of In-situ treatment for the 53 patients was $2657, with an average of $50 (SD = 31) and extremes of $5 and $154.

The cost of general specific treatment (steroid and immunotherapy) for the 53 patients was $1298. For a hospital stay of 35.32 days, the average cost of the specific general treatment of ABD was $25 (SD = 17) with extremes of $5 and $86.

Adjuvant treatment including calcium and potassium supplementation and gastric dressing cost $794 for the 53 patients and the average cost per patient was $17 (SD = 11) with extremes of $6 and $76 for 35.32 days. Other drugs used during hospitalization (general antibiotics, dewormers, antihistaminics, analgesics) cost $1273 an average of $33 per patient (SD = 26) with extremes of $3 and $117.

The cost of fluids and consumables used during hospitalization for the 53 patients was $250, out of which $117 (47%) accounted for pads and strips used to dress post-bulbar erosions. The average cost of fluids and consumables was $16 per patient (SD = 13) with extremes of $1 and $48.

The total cost of all drugs used during hospitalization for the 53 patients was $6273, which is an average cost per patient of $118 (SD = 65) with extremes of $26 and $285.

The cost of paraclinical investigations carried out during hospitalization for the 53 patients was $4238, an average of $80 per patient (standard deviation = 48) with extremes of $20 and $250.

The total cost of inpatient treatment for the 53 patients was $12,176, with an average of $230 (SD = 110) per patient and extremes of $103 and $612. The average daily cost of inpatient care was $8 for

pemphigus vulgaris, $6/day for pemphigus foliaceus, $6/day for bullous pemphigoid, $7/day for dermatitis herpetiformis.

The average cost of inpatient care ranged from $160 (dermatitis herpetiformis) to $252 (pemphigus foliaceus), with a minimum of $103 and a maximum of $612, both extremes being observed for bullous pemphigoid. Medication was the largest expenditure item, accounting for almost half (49.2%) of the expenditure incurred. Table II gives details of the different cost components and their parameters according to the type of ABD.

In terms of evolution, four (4) patients died during hospitalization, a death rate of 7.54%; five (5) patients were referred to a health facility closer to their residence, and nine (9) patients were lost to follow-up after discharge. Thus, 35 patients were effectively reviewed and followed up as outpatients after their discharge from the hospital, with an average of 2 consultations per month. The number of patients seen as outpatients was 25 patients three months after hospital discharge with a cumulative average of four consultations. Only 19 patients returned six months later, with a cumulative average of eight consultations, and 10 one year later, with a cumulative average of 14 consultations.

The average annual direct medical costs of outpatient follow-up ranged from $156 (dermatitis herpetiformis) to $307 (bullous pemphigoid). Drugs accounted for 66% of this cost. Table II also shows the monthly, quarterly, half-yearly, and annual outpatient management data and their parameters according to the type of ABD.

The estimated direct medical costs of the treatment of ABD for one month of hospitalization with monthly, quarterly, half-yearly, and yearly outpatient follow-ups respectively are reported in table III.

The cost of the general treatment of dermatitis herpetiformis with dapsone was an average cost for monthly outpatient follow-up of $7, quarterly $20, semi-annually $40, and annually $80.

Discussion

The frequency of ABD (1.29%) at the CHU YO is higher than those reported in previous studies; Korsaga reported a frequency of 0.84% in 2016, and Traoré found in 2008 in Ouagadougou, 38 cases of two ABD over 60 months. Our results are similar to the study by Sidibé in Mali who reported 45 cases of ABD over 18 months. [4,12,13]

The literature reports higher mean ages for both pemphigus (60 years) and bullous pemphigoid (around 70 years).[14,15] Zeba reported a mean age of 70.67 years for bullous pemphigoid in Tunis (Tunisia).[16] Ammar in Tunis also reported in their study of 47 cases a higher mean age of 67.2 years.[17] However, our findings are in line with those of the West African series; Cissé in Bamako and Diallo in Dakar reported respectively 42.9 and 47.62 years as the mean ages of patients with pemphigus.[18,19]

The presence of housewives and farmers in large numbers may be linked to their purchasing power, making them choose to seek treatment in a more affordable public hospital compared to a private clinic. The presence of patients from rural areas induces indirect costs (transport, opportunity costs) which were not taken into account in this study.

The average length of hospitalization for pemphigus varied according to geographic spread; 21 days in Casablanca and 60 days in Marrakech, while our study noted 31 days for pemphigus vulgaris and 43 days for foliaceous.[20,21]

Due to the various types of economic assessment used in each study, the comparison is not obvious enough. The cost of drugs represents more than half of the cost of treatment for the patient, due to the use of pharmaceutical specialties and the absence of nominative delivery of drugs at the CHUYO. For a Burkinabe population out of which 43.7% live with less than a dollar a day, below the national poverty line, we believe that these charges are a burden for households and constitute exorbitant health expenses for them.[22,23] Ouédraogo in Ouagadougou in 2014 reported 131 US$ for the treatment of ABD at the patient's expense. However, the cost of corticosteroid therapy, adjuvant treatment, and the paramedical investigation was taken into consideration by the 2014 study, while we also considered accommodation and in-situ treatment. [24]

The cost of drugs used during patients' hospitalization reached an average of 118 US$ and

represented 51.52% of the total cost of inpatient care. The cost of drugs was dominated by in situ treatment. This is explained by the importance of in-situ treatment of skin erosions secondary to bullous lesions.

The average cost of outpatient management of each type of ABD was calculated on a monthly, quarterly, six-monthly, and annual follow-up basis. Monthly costs ranged from $12 to $30 and annual costs ranged from $150 to $306. This can be explained by the decrease in corticosteroid doses during the follow-up of ABD, and thus in the adjuvant treatment and the frequency of medical appointments.

It was found that the cost of inpatient care was the most burdensome for the patient. This can be explained by the emergency condition and the fact that expenses are concentrated over a given period. Patients personally bear the full cost of their condition because of the absence of public health insurance system that fully or partially covers the expenses for this type of disease in our country. Also, the high cost of drugs makes it very difficult for patients to access them. These costs are very high for the majority of patients who are housewives and farmers, hence the need to find ways to minimize these costs. These expenses demand a lot of sacrifice from patients and can lead to exorbitant health expenses. Indeed, 43.70% of the Burkinabe population lives below the poverty line in a country where the current minimum wage is equal to $51.[23,24]

The cost of bullous pemphigoid treatment is higher than that of the other ABD because of the older age of the patients (60), who have sometimes comorbidities that could influence the disease outcome.

Despite the constraint of the retrospective nature of our study, with a possible underestimation of costs due to the non-computerization of medical records, our results could help in guiding patients, caregivers, and decision-makers.

Conclusion

In the absence of pre-payment mechanisms for care, direct medical costs are high, even exorbitant for some patients. Consequently, it is not uncommon to observe that several patients have poor treatment compliance or discontinuation. Such situations would worsen the disease and subsequently increase its economic burden. Indeed, in addition to the direct medical costs, which are only the tip of the iceberg, the indirect costs (loss of production and productivity) and the intangible costs (pain, complications, psychological impact) of ABD are probably higher. The establishment of financial mechanisms to cover these non-communicable diseases would be beneficial.

Disclosure: Nil
Funding: None

REFERENCES

1. Bassolé AM. Epidemiological, Clinical, Therapeutic, and Evolutionary Profile of Dermatoses at the Banfora CHR. Dissertation of DES of Dermatology-Venerology, University Ouaga 1 Pr Joseph Ki Zerbo; 2016. Ouagadougou
2. Barro-Traore F, Traoré A, Niamba P. Autoimmune Bullous Dermatoses in the Dermatology-Venerology Department of the CHU-YO (Burkina Faso). Les nouvelles dermatologiques 2001, 20 (1): 367-70
3. Lamchahab F, Beqqal K, Guerrouj B, Khoudri I, Senouci K, Hassan B Ourhroui M, [Bilan d'hospitalisation du Service de Dermatologie-Vénérologie du CHU Ibn Sina Rabat Maroc]; Pan Afr Med J. 2010 ; 7-17.
4. Korsaga-Some N, Andonba JB, Atadokpede F, Tapsoba P, Ouedraogo M, Ilboudo L, Diallo A, Barro/Traore F, Niamba P, Traore A, Determinants of Therapeutic Compliance among Patients with DBAI in the Dermatology-Venerology Department of the CHU-YO of Ouagadougou in Burkina Faso. Journal of the Clinical Biology Society of Benin, 2016; 24:21-6.
5. Arrow KJ. Uncertainty and the Welfare Economics of Medical Care, the American Economic Review, 1963, 53 (5):941-973
6. Brousselle A. Champagne F, Contandriopoulos AP, Hartz Z. Evaluation: Concept and Methods. Université de Montreal, Montreal, Canada, 2009.
7. Canadian Agency of Drug and Technologies Health (CADTH), Guidelines for the Economics, Evaluation of Health Technologies, Canada, 3rd Edition, 2006.

8. World Health Organization, Health economics: Principles of Economic Evaluation for Tropical Disease Control Programme Managers. WHO. July 2003 [Online]. http://www.who.it/malaria/Publications/atoz/economics-fr_lg.Pdf . Accessed 07 December 2018.
9. Zambelongo M. Evaluation of the Direct Cost of the Care of HIV-1 Infected Children under Antiretroviral Treatment in the Department of Pediatrics of the University Hospital SOURÔ SANOU: a case of the burkinabe trial. Thesis for the doctorate in medicine. Université Ouaga 1 pr Joseph Ki Zerbo; 2013.
10. Didier C. [Le Calcul Economique en Santé - Méthodes et Analyses Critiques]; Editions de l'Ecole Nationale de la Santé Publique, 2004.
11. Brazier J, Roberts J, Daverill M. The Estimation of a Preference-based Measure of Health from the SF. 36. J. Health Econ, 21 (2): 271-292
12. Traoré F, Epidemiological, Clinical and Evolutionary Profile of Patients Hospitalized in the Dermatology and Venereology Department of the CHU Yalgado Ouédraogo from 2003 to 2007. Thesis for the State Doctorate in Medicine.Université Ouaga 1 pr Joseph Ki Zerbo; 2008. 122 pages. Ouagadougou
13. Sidibe A, Epidemiological Study and Management of Autoimmune Pemphigus at the CNAM in Bamako, Mali; Thesis for the State Doctorate in Medicine, University of Bamako; 2008. 76 pages.
14. Khumalo N, Kirtschig G, Middleton P, Hollis S, Wojnarowska F, Murrell DF. The Cochrane Collaboration. Interventions for Bullous Pemphigoid (review). The Cochrane Library 2008, Issue 3.
15. Ahmed AR, Spigelman Z, Cavacini LA, Posner MR. Treatment of Pemphigus Vulgaris with Rituximab and Intravenous Immune globulin. N Engl J Med. 2006, 355 (17):1772-9.
16. Zeba S. Bullous pemphigoid: About 67 cases in the Dermatology Department of Charles Nicolle hospital in Tunis from 2002 to 2012. Dissertation of Dermatology Venerology. Université Ouaga I Pr Joseph Ki-Zerbo; 2012: 71
17. Triki Ben Ammar S, Mokhtar I, Fazaa B, Kharfi M, Kamoun Mohamed R. Profile of Bullous Pemphigoid. 47 cases reported. Tunisie médicale: 2000 (78); 584-588.
18. Cisse I. Pemphigus autoimmune in Mali about 15 observations at the Institut Marchoux. The University of Bamako. Thesis of medicine, Mali 1992; 3
19. Diallo M, Diatta B, Diop A, Ndiaye M, Ndiaye MT, Seck B, Deh A, Diop K, Niang S. Epidemiological and Clinical Aspects of Pemphigus in Senegal from 2004 to 2014; Our Dermatology online 2017 (8): 5-9
20. Lahlou F. Chiheb S. Epidemiological and Clinical Profile of Pemphigus in the Dermatology and Venereology Department of CHU Ibn Rochd, Casablanca. Science Direct, 2018 (145) 2018: A69
21. 37. El Alami, Hocar O. Epidemiological Profile of Pemphigus in the Dermatology and Venereology Department of CHU Mohamed VI of Marrakech, 2017 (144): 154
22. World Bank: Poverty, Percentage of Population living on less than $1 a day; 2014 [Online]http://perspective.usherbrooke.ca/bilan/servlet/BMTendanceStatPays?langue=fr&codePays=BFA&codeStat=SI.POV.DDAY&codeStat2=x) accessed 16 Aug 2019.
23. Guaranteed Minimum Interpersonal Wage (SMIG) in Burkina Faso 2018, [Online] http://www.Burkinapmepmi.com/spip.php?article736, accessed 04 Jan. 2019.
24. Ouedraogo H. Compliance with Long-term Corticotherapy in the Management of Autoimmune Bullous Dermatoses in the Dermatology Department of CHU-YO; Doctoral thesis in pharmacy, University of Ouagadougou; 2014. Thesis 277; 86 pages.