

Step wise approach of gout in the rheumatology ward of Point-G University Teaching Hospital of Bamako, Mali

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Abstract

Background: Worldwide, the numbers of gout cases are increasing due to behaviour changes and socio economic factors. Although this can be a global health problem according to data reported from industrialized countries, there are limited reports on the disease burden in low and middle income countries like Mali where no data are available. Hence the study was conducted to determine the prevalence and risk factors of gout among Malian patients in a hospital setting.

Methods: This was a descriptive study conducted in the Rheumatology ward of Point-G University Teaching Hospital among out patients visited from January 1st 2009 to February 28th 2010. Using World Health Organization (WHO) step wise approach, a total of 1,143 patients visited, of whom 100 fulfilled the American College of Rheumatology (ACR 1977) criteria of gout. Patients recruited were aged 18 years and above if they provided consent. They were also followed according to the multi parametric step wise approach (step1, step2 and step3).

Results: The prevalence of gout was 17.3%. Patients' mean (range) age was 57 years (24-75). Women were more affected than men (sex ratio of 1.2) with menopausal women the most affected group (91%). Obesity, high blood pressure, diuretics intake, and kidney failure were observed in 83%, 76%, 64% and 37%, respectively. Clinical manifestations of gout were located in joints (100%), in skin (4 cases of tophus), and kidneys (1 case of nephrolithiasis). Monoarthritis was predominant (36%), especially in the knee (92%). In addition, 95% of patients had hyperuricemia. The main comorbidities were dominated by osteoarthritis, kidney failure, diabetes, and rheumatoid arthritis with 68%, 37%, 13% and 6%, respectively.

Conclusion: The prevalence of gout in our patient was high and overweight/obesity, high blood pressure, diuretics intake and kidney failure were frequent. High prevalence was reported among menopausal women. Although our study

was limited, it provided for the first time data on the prevalence of gout and its potential risk factors in Mali. There is a suggestion for further investigation of the disease risk factors.

Key words: Gout, Step wise approach, Epidemiology, Mali

Introduction

Gout prevalence had increased significantly in Europe and United States (1% of total population)¹. Similar trend was also seen in emerging countries such as China, Taiwan, and some regions of Oceania (Australia and New Zealand)² as well as in sub Saharan Africa³. However, easy diagnosis and improved management are lacking. Thus, recommendations on the diagnosis, accurate and prompt management of gout cases have been suggested by European league against Rheumatism (EULAR) in 2005^{4,5} and American College of Rheumatology (ACR) in 2012^{6,7}. In developed countries of Europe, the use of these recommendations is limited to only four countries^{4,5}.

In Africa, implementation is limited because of high direct and indirect cost of these recommendations. Thus, the World Health Organization (WHO) recommends the step wise approach for the surveillance of emerging non-communicable diseases⁸. Step wise approach surveillance of risk factors for non-communicable diseases has been set by intergroup team of WHO in strategic plan of world surveillance settled to observe the tendency of non-communicable diseases in the countries. It is an integrated approach of surveillance, prevention and case management of non-communicable diseases (gout, high blood pressure, diabetes, etc ...). This approach is hierarchical, flexible depending on the needs and the existing systems. It is sequential process that starts with data collection on population health behaviour using a questionnaire. This needs to be

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completed by physical examinations, blood samples collection and paraclinical exam.

In Africa, this method had been used to assess risk factors of diabetes (Mali) and high blood pressure (Togo, Benin, Cote d'Ivoire, Cameroon and Congo Brazzaville)⁹. The aim of this epidemiological approach was to allow countries to use a compiled data for decision making on planning, public health priorities and prevention strategies generation to allow the reduction of risk factors in order to decrease the epidemic of non-communicable diseases. However, these studies conducted in Africa on non-communicable diseases did not take into account gout, which is also an emerging tropical epidemic. In addition, the main risk factors of gout are similar to that of other non-communicable diseases such as gender, age, iatrogenic causes and food rich of carbon hydrates, alcoholism, high blood pressure, obesity, kidney failure and family gout^{3,10,11}. The objective of our study was to assess the prevalence and risk factors of gout among Malian patients in a hospital setting using the WHO stepwise approach.

Materials and Methods

Study site: This study was conducted in the Rheumatology ward of Point-G University Teaching Hospital of Bamako (Mali). This is the only ward offering rheumatologic care in Mali, and was opened on July 17th 2005 with outpatient visit. Inpatient services have been possible since March 19th 2006 with 12 beds. In 2013, the number of outpatient and inpatient visits was 1983 and 75, respectively.

Study design: Patients were recruited prospectively from 1st January 2009 to 28th February 2010. Using WHO Stepwise approach applied to gout and adapted to Malian context, a questionnaire was administered to all participants who consented prior the assessment conducted by one single physician who also performed the three steps of the stepwise approach as described below.

The first step (Step 1) was related to socio demographic information, behaviours, questions on physical activities, nursing hygiene and history (arthritis of the participant or ascendant, renal colic).

The second step (Step 2) consisted of collecting the following physical parameters: measurement of height (cm), weight (kg), blood pressure (mm/Hg), and complete physical exam looking for arthritis tophus and renal colic. Height was measured from wall rod in all participants without shoes or head scarf and weight by spring scale placed on stable surface. These measures were used to determine Body Mass Index (BMI) according to WHO criteria. Blood pressure was measured using standard

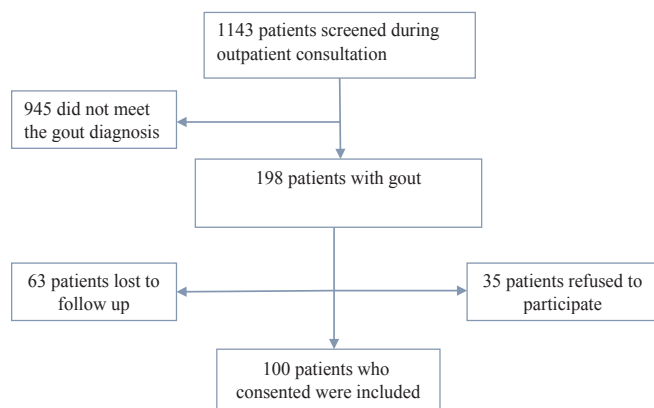
sphygmomanometer while the patient was lying and subsequently when standing. High blood pressure was based on WHO criteria (systolic blood pressure ≥ 140 mm Hg and /or diastolic blood pressure ≥ 90 mm Hg).

The third Step (Step 3) consisted of para clinical investigation such as biology, joint liquid, radiography and ultrasound which were feasible in Malian setting. The following biological tests were performed: uricemia, creatinin, fasting blood glucose, blood cells count, Erythrocyte Sedimentation Rate (ESR) and C Reactive Protein (CRP). Hyperuricemia was defined as uricemia level extending 360 $\mu\text{mol/L}$ for woman and 420 $\mu\text{mol/L}$ for man. The normal value of clearance (Cockroft-Gault) was between 60 and 120 ml/mn. Kidney failure was defined as low creatinine clearance (< 60 ml/mn). Diabetes mellitus was defined according to WHO criteria: permanent state of hyperglycemia with fasting blood glucose ≥ 1.26 mg/L (7 mmol/L) twice and/or a random glucose ≥ 2 g/L (11mmol/L). Normal cholesterolemia was between 3.6-6.8 mmol/L. The CRP ≥ 6 mg/L was defined as positive and normal ESR was defined according to Westergren method in adults (Males less than 50 years : < 15 mm/h, Males more than 50 years: < 20 mm/h. Females less than 50 years: 20 mm/h, Females more than 50 years : 30 mm/h). Joint puncture was performed to analyse the synovial liquid (research of sodium urate crystals, cytology and culture). As research of sodium urate crystals was not possible in Mali, culture had confirmed the diagnosis in case of severity. The presence of germs in addition to other arguments suggested an infection of gout. Radiography of damaged joints (asymmetric tumours, under cortical cysts, pseudo-osteoarthritis) and face chest (research of infectious foci) was performed. Pelvis ultrasound was done to identify nephrolithiasis. Accurate treatment was administered to each clinical case. The annual cost of gout management was estimated. Gout was defined according to criteria described by the American College of Rheumatology (ACR)¹². Data were entered and analysed using SPSS software version 12.0 and only descriptive statistics were conducted.

Results

A total of 1,143 patients were screened in the first step and 198 patients met the inclusion criteria of gout (17.3%), from whom 163 consented. After baseline visit, 63 patients were lost to follow-up and the remaining 100 completed the study (Figure 1).

Figure 1: Study flow chart



Socio-demographic characteristics of the 100 patients followed are described in Table 1. The most frequent clinical feature was mono-arthritis (36%) and the most location reached was the knees with 92%. Tophus was observed in 4% of which olecranon region of elbow was more affected. Only one patient had renal colic (Table 1). Biological characteristics of gout are recapitulated in Table 2.

Table 1: Socio-demographic and clinical characteristics of gout among patients

Characteristics	Number	Frequency (%)
Demography		
Female	55	55
Male	45	45
Post-menopausal female	50	50
Mean (SD)	100	57.32 (10)
Clinical features		
Arthritis	97	97
Tophus	4	4
Renal colic	1	1
Type of arthritis		
Monoarthritis	36	36
Oligoarthritis	30	30
Polyarthritis		
Arthritis	27	27
Location		
Knee	92	92
Ankle	45	45
Metatarsophalangeal Joint of Hallux (podagra)	22	22
Wrist	20	20
Elbow	14	14
Shoulder	6	6
Hip	1	1
Tophus location		
Olecranon region of elbow	3	3
Wrist	1	3
Intertarsal joints	1	1

Table 2: Biological features, risk factors and associated pathologies among patients

Characteristics	Number	Frequency (%)	
Biology	Hyperuricemia	95	95
	Anaemia	37	37
	Decrease creatinine clearance	37	37
	Accelerated erythrocyte sedimentation rate	40	40
	Positive C-Reactive protein	42	42
	Infected joint fluid	1	1
	Unquantified intake of red meat	100	100
	Unquantified intake of milk	95	95
	Unquantified intake of eggs	79	79
	Unquantified intake of chocolate	17	17
Risk factors	Overweight/obesity	83	83
	Alcohol intake	5	5
	Diuretic uptake	64	64
	Low-dose acetylsalicylic acid	22	22
	Pyrazinamid and Ethambytol	6	6
	High blood pressure	76	76
Associated pathologies	Diabetes	13	13
	Kidney failure	37	37
	Osteoarthritis	68	68
	Rheumatoid arthritis	6	1
	Septic arthritis	1	1
	HIV type 1	1	1

Hyperuricemia was observed in 95% of patients with a mean (SD) of 526 (130). Decreased creatinine clearance was observed in 37%. Anaemia was observed in 37% and accelerated ESR in 40% of patients. Positive CRP was observed in 42% with a mean (SD) of 22 (53) mg/L. Joint fluid analysis was performed in 12 patients revealed one case of *Acinetobacter calcavar iwofi*. HIV type 1 was found in one patient. Risk factors assessed in all the patients were mostly food habits, overweight/obesity, and diuretics uptake (Table 2). Comorbidity was dominated by high blood pressure (76%), osteoarthritis (68%), kidney failure (37%), diabetes (13%), rheumatoid arthritis (6%) (Table 2). Patients were treated with colchicine (41%) with a mean dose of 1.29 mg per day [1-2 mg], non-steroid anti-inflammatory drug (76%) for treatment of acute crisis and the allopurinol (64%) with a mean dose of 326.5 mg per day [100- 600 mg] as Urate-Lowering Therapy (ULT). All the patients were advised to eat poor purines food. In 99% of patients, clinical improvement was observed after 2 months.

However, a case of skin reaction was seen in a patient on allopurinol. Thus, he received ascorbic acid (500 mg per day) treatment as alternative. The mean annual cost (drugs and analysis) of gout management was estimated to be US\$330.83.

Discussion

This present study examining the prevalence and risk factors of gout was the first epidemiological descriptive study of gout in Mali. The screening of the patients in hospital could be the limit of the extrapolation of the study findings to the general population.

The reported prevalence of gout in our study was higher than that reported (4.9%) in the same hospital in 2006¹³. This suggested an increased prevalence of the disease. As the Department of Rheumatology was opened only in 2006, this increase may be explained by the increase in rheumatology activities enhanced by qualified personnel in rheumatology in Mali from 2006 to 2010. The same explanation could be evoked in Togo where the prevalence reported in 2000 was lower (1.9%)¹⁴. Our observation of 3% of gout before 40 years old is in accordance with previous findings of the scarcity in childhood¹⁵. The mean (SD) age of our gout patients was 57.3 (10) years and only 3% had less than 40 years. Also, 50 of the 55 women recruited were in menopause. These supported findings that gout is more frequent in elderly and menopausal women¹⁵. However, our results of higher prevalence of gout in females (55%) was different from that reported by the same author suggesting higher prevalence in male¹⁵. The high prevalence of gout in menopausal women can be explained by the protective uricosuric effect of estrogen during childbearing age^{16,17}. Study conducted in Taiwan suggested that alcoholism in men, and menopause before 60 years were associated with gout, while kidney failure and diuretic uptake were important risk factors after 60 years¹⁸.

The consumption of alcohol was low (5%) in our study. However, alcoholism was found in 79% of the gout patients in South Africa, and 83% in Togo³ suggesting that alcoholism may contribute to the occurrence of gout, probably due to hyperuricemia associated with high alcohol consumption as reported by other authors¹⁶. The same authors reported that the consumption of animal proteins is an important contributor to gout. This corroborated our study where 100% of our patients ate red meat. Overweight/obesity was observed in 83% of the patients, and this was more frequent among women (56.4%). This can be explained by factors such as high urbanization, physical inactivity, feeding habits, and social cultural handicap (obesity as criteria of opulence) as suggested elsewhere^{3,19,20}. The prevalence of high blood pressure observed in our study (76%) was similar to that reported by Seyni¹³ in 2006 in Mali with 76.7%. This was higher than that observed in Togo with 26.3% in 2000¹⁴. The increase in frequency of high blood pressure observed in gout patients is supported by the several hypotheses among which the decrease in kidney perfusion leading to the reabsorption of uric acid, and the ischemia due to arteropathy which also lead to cell destruction, DNA and ARN releasing, and ATP degradation. Thus, an increase in the synthesis of uric acid is observed^{21,22}. As hyperuricemia

can be suggested to cause high blood pressure and vice versa, the study was not able to demonstrate the temporal relationship between the two conditions. The uptake of diuretic found in 91.9% of our patients with high blood pressure is also in conformity with the literature. This can be explained by the decrease of urinary excretion of uric acid²¹.

In general, the clinical description of gout in our study was similar to that reported from other countries of sub-Saharan Africa and developed countries^{3,14}. However, monoarticular topography in the knee (92%) followed by ankle (45%) was predominant in our study compared to other authors reporting hallux monoarticular localization as the most common^{14,24}. As suggested by previous authors¹⁷, our study found that polyarticular localization was more common in elderly women and subjects with diuretic uptake. Similar to other African series³, our study found only 4% of tophus and 1% of nephrolithiasis. This scarcity has been described as very specific to gout in tropical areas³.

As described elsewhere²⁵, the risk of gout increases with the duration and the rate of hyperuricemia. This is supported by our findings that 95% of patients had hyperuricemia with a mean of 526.40 $\mu\text{mol/l}$. High mean uricemia in gout patients was also reported in an earlier study in Mali¹³ and in Togo¹⁴. However, other authors suggested that only 10% of subjects with hyperuricemia develop gout due to non-identified factors²⁶. Although 37% of our patients had kidney failure, the design of our study is not able to demonstrate the relationship between kidney failure and hyperuricemia as established earlier with blur temporal relationship^{25,27}.

The association of gout, obesity and high blood pressure is very strong in sub Saharan Africa¹⁴. According to the literature, coexistence between gout and rheumatoid arthritis is rare^{28,29}. This corroborates our study with 6% (6 cases). However, the authors reported that 10% of patients with rheumatoid arthritis should develop hyperuricemia and 30% of patients with tophi gout should also have low titer of rheumatoid factors. In addition to the scarcity of the coexistence between the two conditions, true coexistence criteria is difficult to assess as suggested by Wallace *et al*³⁰. Criteria for true coexistence of rheumatoid arthritis and gout should include seropositive, erosive rheumatoid arthritis with histologic confirmation of nodules, with or without extra articular manifestations; acute gouty attacks with documented deposits of monosodium urate crystals in either synovial fluid or tophi; and responsiveness to treatment with colchicine.

For the treatment of gout, new recommendations were suggested by the ACR in 2012^{6,7}. However, as our study was conducted prior to these recommendations, classic treatment of gut was used. It consisted of poor regimen in purines, colchicine, non-steroid anti-inflammatory drug, and allopurinol. Ascorbic acid was used as alternative to allopurinol in case of intolerance as suggested earlier²⁶.

Conclusion

The prevalence of gout in our patients was high; overweight/obesity, high blood pressure, diuretics, and kidney failure were frequent. High prevalence was

reported among menopausal women. The pharmacologic treatment associated with poor regimen in purines improves the patients. Although our study was limited, it provided for the first time data on the prevalence of gout and its potential risk factors in Mali. There is a suggestion for further investigation of the disease risk factors.

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