Pott's disease: knowledge, attitudes and practices of general physicians in referral hospitals of Brazzaville

Lamini N'Soundhat NE[1,2], Ntiétanganzi MR[1], Nkouala-kidédé DC[1,2], Angalla RAL[1,2], Akoli EO[1], Omboumahou BEF[1], Salemo AP[1], Bileckot R[1,2]

[1]Department of Rheumatology, University Teaching Hospital of Brazzaville (Brazzaville, Congo)

[2]School of Health Sciences, Marien Ngouabi University (Brazzaville, Congo)

Corresponding author:
Dr. Lamini N'Soundhat NE, Department of Rheumatology, School of Health Sciences, Marien Ngouabi University
Email: nlamini@yahoo.fr

Abstract

Background: Pott's disease is the leading cause of infectious spondylodiscitis in Republic of Congo. It is usually diagnosed late, at the stage of neuro-orthopaedic complications.

Objective: To determine the level of knowledge, attitudes and practices about Pott's disease of general physicians working in referral hospitals in Brazzaville.

Methods: This was a knowledge, attitudes and practice study carried out over a period of 6 months in the referral hospitals of Brazzaville. It focused on general practitioners who agreed to participate in the study. The study variables were: The epidemiological, diagnostic and therapeutic aspects of Pott's disease.

Results: Out of a sample of 70 general physicians, the overall level of knowledge was good (71.6%). The areas of inadequacy concerned the disease itself, in terms of clinical, labs, imaging presentation and anti-tuberculosis drugs, which appeared to be unsatisfactory. The attitude of general physicians is to consider Pott's disease as a serious condition requiring urgent treatment. The level of practice of general physicians is average, and concerns essentially the search for comorbidities. The socio-epidemiological approach of contagious disease, with mandatory reporting, was not taken into consideration.

Conclusion: The knowledge, attitudes and practices of general physicians appear satisfactory overall, but need to be improved, especially about the clinical, labs, imaging and therapeutic aspects of Pott's disease**.**

Key words: Tuberculosis, Spine, General physicians

Introduction

A reemerging infectious disease since the advent of HIV/AIDS, tuberculosis is the world's second leading cause of death from infectious disease and is a global public health problem. The African continent is currently paying the heaviest price, accounting for 2/3 of cases worldwide[1-3]. In sub-Saharan Africa, osteoarticular involvement is the second most common extra-pleuropulmonary site of tuberculosis, and Spinal Tuberculosis (ST) is the most common[4,5]. Vertebral tuberculosis, dominated by Pott's disease or tuberculous spondylodiscitis, corresponds to the colonisation and development of Koch's Bacillus in the intervertebral disc and adjacent vertebral bodies[6,7]. It is a serious condition because of the possibility of neuro-orthopaedic complications, with a functional or even vital prognosis[8]. In the Republic of Congo, Pott's disease predominates in men (sex ratio 1.3), in middle age, with an average age of 46 ± 16 years. It is diagnosed late, most often at the stage of neurological complications present in 49.1% of cases, with an average delay of 6.6 ± 5 months[9]. The factors contributing to this delay in diagnosis are not all known, even though there is a national tuberculosis control program responsible for defining strategies for the diagnostic and therapeutic management of this condition[10]. Thus, the findings made in specialized hospitals raise many questions, including the level of knowledge, attitude and practice of doctors on the front line of our healthcare system, namely General Physicians (GPs). Hence this study, the aim of which was to determine the level of knowledge, attitude and practice of GPs regarding Pott's disease in the referral hospitals of Brazzaville.

Materials and methods

This was a knowledge, attitude and practice study. It was carried out in five referral hospitals in the city of Brazzaville, namely: Makélékélé Hospital, Mfilou Hospital, Talangaï Hospital, Bacongo Hospital and Pierre Mobengo Central Armed Forces Hospital (HCA) from 3rd

April to 3rd September 2021, or for a period of 6 months. The study population consisted of consenting GPs with at least 6 months' professional experience, working in the medical, surgical and emergency departments of the referral hospitals. A total of 70 GPs were interviewed, using a structured questionnaire consisting of a series of questions, presented in a predefined order, covering their level of knowledge, attitudes and practices in the event of Pott's disease. The knowledge assessed covered the definition and descriptive and analytical epidemiology of Pott's disease, as well as the clinical and morphological signs, diagnosis, treatment and evolution of Pott's disease. The attitude assessed concerned the GP's decision to treat the patient either in his or her own unit, to refer the patient systematically to the university hospital, to treat the patient as an outpatient, or to decide not to treat the patient at all. The level of practice assessed concerned the choice of first-line labs and imaging investigations; whether or not the recommendations of the national tuberculosis control program were used for diagnostic and therapeutic decisions, whether or not the disease was systematically reported, and whether or not the opinion of a rheumatologist was sought. A term weighting was defined to assess the level of each area: The level of knowledge was assessed by considering the weightings assigned to each question. Knowledge was judged to be "poor" if the total score was between 0 and 15 and "good" if it was between 16 and 31. Attitudinal questions were scored as follows: 1 point if no or only one correct answer; 2 points if at least 2 correct answers. Attitudes were classified as "insufficient" if the total points awarded were 1 and "sufficient" if the total was 2. The level of practice was assessed by considering the weighting assigned to each question. Practice was deemed "insufficient" if the total number of points was less than or equal to 3, and "sufficient" if the total number of points was greater than 3. To ensure that the questionnaire was accessible to every doctor, it was programmed on a data collection platform developed using EPI info software. The data was entered into the Cs Pro 7.2 software and configured with the Dropbox server. After collection, the data was exported to Excel 2013 for processing. Statistical analyses were performed using SPSS 25 software. Quantitative data were expressed as the mean with standard deviation. Qualitative data were expressed as percentages. Proportions were compared using the Pearson Chi-square test with a significance level of 5%. When the theoretical number of participants was less than 5, the Fisher Exact test was used. The study was conducted anonymously and confidentially, after obtaining research authorization from the national ethics committee[11].

Results

The study population consisted of 70 general physicians (Table 1). There were 43 (61.4%) men and 27 (38.6%) women, a sex ratio of 1.6. The average age of the doctors

was 33.91 ± 6.77 years, ranging from 26 to 55 years. Doctors aged under 40 years predominated (Figure 1). Thirty-five (50%) of GPs worked in the medical department, 24 (34.3%) in the surgical department and 11 (15.7%) in the emergency department. The GPs had been working for less than one year in 11 (15.7%) of cases, between 1 and 5 years in 35 (50%) of cases, between 5 and 10 years and more than 10 years in 12 (17.1%) of cases.
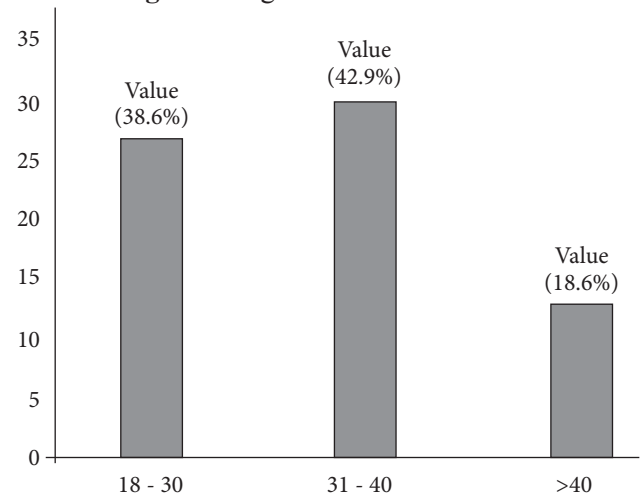
Figure 1: Age distribution of GPs

Table 1: Breakdown of GPs by place of practice

Variables	Headcount	(%)
Name of hospital (H*)		
CAH*	18	25.7
H. Talangai	16	22.9
H. Makelekele	13	18.6
H. Bacongo	11	15.7
H. Mfilou	12	17.1
Total	70	100

*H: Hospital; CAH: Central army hospital

Level of knowledge

All had heard of Pott's disease (100%). The source of knowledge was the course taken during initial doctoral training for 56 (80%) GPs and postgraduate hospital courses for 14% of GPs. The definition of Pott's disease was correct in 34 (48.6%) GPs and incorrect in 36 (51.4%). Pott's disease was considered by 44 (62.9%) of GPs as an infection that could affect all categories of people. However, for 23 (32.9%) GPs, it only affected middle-aged adults, and for five of them, it only occurred in immunocompromised subjects, three of whom were HIV-infected and the other two were affected by tobacco or alcohol. Only 35.7% of GPs classified Pott's disease as contagious. The causative germ, Koch's bacillus, was

known to 90% of GPs (Table 2). Man was recognized as the natural reservoir of Koch's bacillus (BK) by 37 (52.9%) GPs, while 33 (47.1%) were unaware of this. The mode of transmission of Koch's bacillus was known by 32 (45.7%) GPs and unknown by 38 (54.3%) GPs. Nine (12.9%) doctors out of the 70 surveyed knew that spinal pain was the main warning sign of Pott's disease. The main warning signs expressed by the doctors are shown in Table 3. The evolution of the spinal pain was described as chronic by 45 (64.3%) of doctors, sub-acute by 18 (25.7%) and acute by 7 (10%). The rhythm of the spinal pain was classified as inflammatory by 51.4% of GPs (36%), mixed by 29 (41.4%) and mechanical by 5 (7.1%) of GPs.

Table 2: GPs responses on the nature of the germ

Responsible germ	Headcount	(%)
Koch's bacillus	63	90.0
I don't know	3	4.3
BAAR*	2	2.9
Salmonella typhi	1	1.4
Staphylococcus aureus	1	1.4
Total	70	100.0

*BAAR: Alcohol-acid-resistant bacillus

Table 3: Knowledge of warning signs

General symptoms	Headcount	(%)
Fever	48	68.6
Weight loss	40	57.1
Asthenia	36	51.4
I don't know	23	32.9
Anorexia	16	22.9
Low back pain	9	12.9
Cough	6	8.6
Sweat	3	4.3

X-rays showed, disc impingement and erosion of the vertebral endplates were the two radiographic signs with which doctors were more familiar (Table 4). Only 32.9% of GPs were aware that the diagnosis of certainty was based on bacteriological and anatomopathological analysis of disco-vertebral biopsy samples, while 47 (67.1%) were unaware of this. The main complications of Pott's disease reported by doctors are shown in Table 5. Sterilization of the infection and treatment of the complications were the main aims of treatment expressed by GPs in 50% of cases (Table 6). The treatment of Pott's disease was considered by 31 (44.3%) GPs to be purely medical. Only 39 (55.7%) of GPs were able to specify the four basic molecules of anti-tuberculosis treatment, while 31 (44.3%) were able to specify only two or three molecules. For 15 (21.4%) of GPs, weight was considered when adjusting the dosage of anti-tuberculosis drugs, whereas 55 (78.6%) did not specify this. Concerning the duration of treatment for Pott's disease, only 26 (37.1%) GPs knew the minimum duration of 12 months, compared with 44 (62.9%) who did not. The overall level of knowledge was judged to be good in 54 (77.1%) of cases and poor in 16 (22.9%) of cases. There was no statistically significant difference depending on whether the GP practiced in a surgical, medical or emergency department (Chi-2=0.907; p=0.685).

Table 4: Knowledge of radiographic signs

Signs of orientation	Headcount	(%)
Spinal disc clamp	47	67.1
Erosion of vertebral plates	47	67.1
Fractured vertebrae	36	51.4
Mirror erosion	27	38.6
Vertebral marginal osteophytosis	25	35.7
Condensation of the vertebral plates	24	34.3
Spinal caries	9	12.9
Don't know	1	1.4

Table 5: Complications reported by GPs

Complications	Headcount	(%)
Spinal cord compression	47	67.1
Psoas abscess	14	20.0
Scoliosis	14	20.0
Don't know	13	18.6
Ponytail syndrome	12	17.1
Cyphosis	12	17.1
Gibbosity	10	14.3
Sepsis	5	7.1
Pressure sores	1	1.4
Thromboembolic disease	1	1.4
Recurrence	1	1.4

Table 6: Aim of treatment

Aim of the treatment	Headcount	(%)
Sterilizing the source of infection	35	50.0
Preventing and treating complications	35	50.0
Pain relief	24	34.3
Don't know	8	11.4
Restoring spinal function	1	1.4

Level of attitudes

The diagnosis of Pott's disease was considered an emergency by 51.4% of GPs. Thus 37 (52.9%) of GPs decided to admit the patient to their practice as soon as the diagnosis was suspected, 30% referred the patient to a general or specialist hospital and in 11 (15.7%) of cases, they decided to treat the patient on an outpatient basis. Overall, attitudes were judged to be good in 32 (45.7%) of cases and bad in 38 (54.3%) of cases. There was no statistically significant difference depending on whether the GP practiced in a surgical, medical or emergency department (Chi-2=1.800; p=0.467).

Level of practice

Medical imaging accounted for 52.9% of tests prescribed to confirm the diagnosis. Standard radiography was the first morphological examination prescribed in 47.1% of cases, followed by Magnetic Resonance Imaging (MRI) in 44.3% and CT in 8.6%. Half of the GPs (50%) did not provide compulsory notification of Pott's disease. HIV and diabetes were the main co-morbidities sought by the doctors. The different comorbidities sought by GPs during Pott's disease are presented in Table 7. In our series, 34 (48.6%) of GPs sought the advice of a rheumatologist, compared with 36 (51.4%) who managed the condition alone. Only 28 (40%) of GPs dispensed anti-tuberculosis drugs in accordance with the Directly Observed Treatment, Short-course (DOTS) strategy, with the remainder ignoring it (n=42). The overall level of practice was judged to be good in 37 (52.9%) of cases and poor in 33 (47.1%) of cases. There was no statistically significant difference depending on whether the GPs practiced in a surgery, medicine or emergency department (Chi-2=3.254; p=0.218).

Table 7: Comorbidities sought by GPs during Pott's disease

Comorbidités	Headcount	(%)
HIV	41	58.6
Diabetes	22	31.4
Don't know	22	31.4
Hepatitis	7	10.0
High blood pressure	4	5.7
Alcoholism	2	2.9
System disease	1	1.4
Multifocal tuberculosis	1	1.4
Smoking	1	1.4
Sickle cell disease	1	1.4
Obesity	1	1.4
Renal failure	1	1.4

Discussion

In sub-Saharan Africa, general medicine is the initial training profile for all doctors. Although it has not yet become a specialty like in the West, it is still practiced by a young population. The increasingly young medical population can be explained by the fact that they start university at around 18 years of age and finish medical school at around 25 years of age, as shown by the average age in our series and in Benin and Côte D'Ivoire[12,13]. Several authors from sub-Saharan Africa, as in our series, highlight a male predominance in medical settings[13,14]. This has also been observed in studies carried out in Iraq and Turkey[15,16]. This male predominance seems to be linked above all to the medical demography of developing countries, particularly in the Congo where male doctors are still in the majority, but also to the cultural element which favors the schooling of male children to the detriment of female children[17].

The main hospital environment for GPs was the medical ward. It accounted for 50% of postings. This is due to the profile of initial training in medical school, which favors medical skills over surgical skills, which remain difficult to access at the end of the university course, in particular because of the lack of technical, material and financial resources that surgery involves. In our series, half of the GPs have been practicing for less than 5 years, in departments where professional practice is

focused on solving cross-disciplinary problems, making it difficult to develop specific and specialized knowledge. Koné et al[13] in Mali found similar proportions. In their series, 58% of GPs surveyed had been practicing between 1 and 5 years. Adequate management of a condition such as Pott's disease depends above all on solid knowledge of the disease. In our series, the main source of knowledge acquired by GPs was their initial training at university. In the Congo, this knowledge is taught in the 4th year of medicine for diagnosis and in the 6th year for treatment, over a 7-year course[18]. In the absence of a solid program of continuing education during professional practice, much knowledge may be forgotten, which seems to be the case in our series. Although the overall level of knowledge seemed satisfactory, many specific aspects of Pott's disease were poorly understood.

This was the case for the definition of Pott's disease, which was not known by 51.4% of GPs. Pott's disease is not the only condition for which the definition is poorly known; Dia et al[19], in Dakar, made the same observation for arterial hypertension, where 56.5% of the GPs in their series did not know how to define it. This raises the question of the relevance of training program and, above all, calls into question the pedagogical approach of initial training, which aims to achieve objectives rather than to develop skills. According to Briggs et al[20], the inadequacy of training programs is the main cause of the low level of GPs knowledge observed in the workplace. One of the least well-known aspects of Pott's disease in our series was concerning the bacteria. Indeed, 10% of GPs were unaware of the bacteria involved, even though tuberculosis is endemic in our country and constitutes a major public health problem worldwide, particularly in sub-Saharan Africa where 2/3 of the world's cases occur[21]. Under these conditions, any GPs is supposed to be able to name *Koch's bacillus* as the bacteria responsible for Pott's disease. Ignorance is even greater when it comes to the notions of natural reservoir and mode of transmission, despite the existence of a national tuberculosis control program[10,22]. This raises the thorny question of how to disseminate this program to GPs in the workplace. In the hospital setting, the emphasis is most often on curative care, with little emphasis on preventive and promotional care, which probably explains the lack of dissemination of knowledge-appropriation tools such as the tuberculosis control program[10]. In our series, Pott's disease appears mainly to GPs as an adult disease, whereas it is not the case. It is common in children as well as in adults, and is the leading cause of spinal infection in paediatrics, with a clinical presentation identical to that of adults[23,24].

In addition to the epidemiological aspects, the clinical aspects of Pott's disease are not well known by GPs; only 12.9% were aware of the main warning sign of spinal pain, while the general signs, which are better known, may be a confounding factor and delay diagnosis[9]. Furthermore, GPs seem to perceive Pott's disease through its serious complications, particularly neurological deficits[25,26], making these the main warning sign of the disease[27-30]. This misperception may account for the long delay in diagnosis, but also for the major functional and painful sequelae reported during Pott's disease, particularly in the Congo.[9,27,31]. The low level of bacteriological expertise means that bacteriological and anatomopathological analysis is rarely used to confirm the diagnosis of Pott's disease with certainty. In this context, disco-vertebral biopsy appears to be uncommon, which may explain why few GPs in our series are aware of the importance of bacteriological arguments for diagnosis[32].

From a therapeutic standpoint, the lack of knowledge about anti-tuberculosis drugs and treatment strategies raises concerns about the ability of GPs to ensure adequate management of Pott's disease. The major risks are the development of forms resistant to the major anti-tuberculosis drugs, which is currently on the increase and is a veritable global scourge, as well as the risk of permanent functional loss, as observed most often in our series[27,31,33-35]. Analysis of GPs' attitudes and practices during Pott's disease reinforces our concerns about their ability to manage Pott's disease correctly. In a professional context with limited resources, hospitalization, whatever the stage of the disease, seems to be the most consistent attitude, a choice that almost 20% of GPs in our series did not make. However, the decision to hospitalize the patient seems to be linked above all to the existence of complications, particularly neurological complications, with 50% of GPs considering this situation to be urgent. Pott's disease develops slowly and insidiously and is not in itself an emergency. Hospitalization is justified by the need to establish the diagnosis with certainty as quickly as possible, especially as atypical forms are common, but also by the need to comply with dispensing rules, in particular the directly observed administration of anti-tuberculosis drugs (DOTS) and monitoring during the initiation phase of anti-tuberculosis treatment[10,28]. The search for associated pulmonary tuberculosis was not observed in the practices of general practitioners.

The main co-morbidities sought were HIV and diabetes, the main risk factors in sub-Saharan Africa for the onset of tuberculosis disease[9,36], which is good practice, but by omitting to look for pleuropulmonary tuberculosis, they are ignoring the contagious nature of tuberculosis disease and the airways as the only entry point for the bacteria into the human body. This explains why GPs in our series did not systematically report cases of Pott's disease and whether they were baciliferous.

In the absence of a clear national procedure and/or protocol in the event of diagnosis or presumption of Pott's disease, it would appear difficult to compensate for the shortcomings in GPs practices, especially as a resort to a specialist opinion is infrequent, as shown in our series, as is referral to a 3rd level hospital in the national health pyramid [37].

Conclusions

As the leading cause of infectious spondylodiscitis in sub-Saharan Africa, Pott's disease is a major public health problem. General physicians are in the front line in the fight against this disease. Our study shows that the level of knowledge, attitudes and practices are satisfactory overall, but need to be strengthened, considering the points of weakness when each area is analyzed specifically. These shortcomings raise the thorny issue of the quality of initial training and the need to develop in-service training for healthcare professionals, as well as to popularize and update the national guide for the management of tuberculosis, including Pott's disease.

References

1. Amadou ALH, Abdoulaye O, Amadou O, Biraïma A. Epidemiological, clinical and evolutionary profile of patients with tuberculosis at the Regional Hospital of Maradi, Republic of the Niger. *PAMJ.* 2019; **33** :120. doi:10.11604/pamj.2019.33.120.17715.

2. Mjida M, Cherif J, Ben Salahb N, Toujani S, Ouahchi Y, *et al*. Tuberculosis epidemiology. *Rev Pneumol Clin*. 2015; **71** (2-3): 67-72.

3. Boulahbal F, Chaulet P. Tuberculosis in Africa: epidemiology and control measures. *Med Trop*. 2004; **64**:224-228.

4. Diop MM, Touré K, Bousso S, Moustapha Diop, *et al*. Extrapulmonary tuberculosis prevalence and clinical forms in Thies Health Service. *RAFMI*. 2017; **4**(2):6-9.

5. Diomandé M, Bamba A, Traoré A, Kpami YNC, Coulibaly Y, Coulibaly AK, *et al.* Epidemiology of rheumatologic diseases in Abidjan (Côte d'Ivoire). *RAFMI*. 2020; **7**(1-2): 22-30.

6. Kayembe JM, Tshiasuma P, Mupepe D. La spondylodiscite tuberculeuse aux cliniques universitaires de Kinshasa : quelques observations. *Ann Afr Med*. 2009; **3**(1):377-381.

7. Auregan G. les indicateurs épidémiologiques de la tuberculose. *Cahiers Santé*. 1997; **7**:97-102.

8. Eti E, Daboiko JC, Brou KF, Ouali B, Ouattara B, Kouakou NM. Tuberculose vertébrale. Notre expérience à partir d'une étude de 147 cas dans le service de rhumatologie du chu de cocody (abidjan, côte-d'ivoire). *Méd d'Afr noire*. 2010; **57**:288-292.

9. Lamini N'soundhat NE, Moyikoua R, Moussounda Mpika GS, Ntsiba H, Bileckot R. Diagnosis of Pott's disease in the rheum atologydepartm ent ofthe University Teaching Hospital of Brazzaville. *Health Sci. Dis.* 2019; **20**(Suppl 1): 53-57.

10. Ministère de la Santé, des affaires sociales et de la famille, République du Congo (PNLT), Guide de prise en charge de la tuberculose, 2ème édition 2008.

11. Comité d'éthique de la recherche en sciences de la santé, République du Congo. Avis éthique sur le projet intitulé « connaissances, attitudes et pratiques des médecins généraliste sur le mal de pott dans les hôpitaux de références de Brazzaville. N°346/MESRSIT/IRSSA-CERSSA.

12. Kodjoh N., Wadagni AC., Kpossou AR., Sake alassan K., Vignon R, Azon - Kouanou A., Houinato D. connaissances, attitude et pratique des médecins généralistes dans la prise en charge des malades atteints d'hépatite C en République du Benin. *Ben Medic*. 2010; **45-46** :57-62.

13. Koné Z, Daix ATJ, Samaké K, *et al*. HIV co-infection: knowledge and attitudes of healthcare workers at pneumophtisiology department in Abidjan. *Rev Int Sc Méd Abj*. 2019; **21**(2):103-107.

14. Traoré AM, Dabo G, Sy D, Sylla D, Ngo Mandeng MM. Evaluation of the practice of isoniazid primary chemoprophylaxis in Bamako and Kati. Mali. Bull Med Owendo. *Année.* 2019; **17**(47):22-27.

15. Hashim D, Al Kubaisy W, Al Dulayme A. Knowledge, attitudes and practices survey among health care workers and tuberculosis patients in Iraq. *La Revue de santé de la Méditerranée Orientale*. 2003; **9**:718-731.

16. Canan Ed, Tanrikulu Ac, Acemoglu HA. Multicentre study of doctors' approaches to the diagnosis and treatment of tuberculosis in Turkey. *J Infect Dev Ctries.* 2009; **3**:357-364.

17. Demba JJ, Bernard MC et Mbazogue-Owono L. L'éducation dans un contexte d'inégalités et de violences : l'Afrique francophone subsaharienne à l'étude. Centre de recherche et d'intervention sur la réussite scolaire Québec 2020 (Livres en ligne du CRIRES) :160-7. [consulté en ligne le 12 janvier 2024] disponible à l'URL: https ://lel.crires.ulaval.ca/oeuvre/leducation-dans-un-contextedinegalites-et-de-violences-lafrique-francophone-subsaharienne-0.

18. Faculty of Health Sciences. Marien Ngouabi University (Congo). Human Medicine LMD programme 2015, p :27.

19. Dia MM., Hakim R, Diao M. Enquête sur la prise en charge par les praticiens de l'hypertension artérielle systémique de l'adule au Sénégal. Congrès, SO.CAR. B.2009

20. Briggs AM, Slater H, Smith AJ, Parkin-Smith GF, Matkins K, Chua J. Low back pain related beliefs and likely pratrice behaviours among final-year cross-discipline health students. *Eur J Pain.* 2003; **17**(5):766-775.

21. World Health Organization. global tuberculosis control 2016: epidémiology, stratégy, and financing. geneva 2014: who/htm/tb/2016; 162p.

22. Ekono Bitchong CF, Mendouga Mendouga P, Azoumbou Mefant T, *et al.* Connaissance, attitudes et perceptions sur la tuberculose chez le personnel paramédical dans une ville d'Afrique subsaharienne. *Rev Mal Respir*. 2020; **36**(Suppl):A263. doi:10.1016/j.rmr.2018.10.613.

23. Mabiala Babela JR, Makosso E, Nzingoula S, Senga P. Radiological profile in 92 children suffering from Pott's disease. *Bull Soc Pathol Exot*. 2005; **98**(1):14–17.

24. Lamini N'Soundhat N.E., Nkouala-Kidédé D.C, Mohondiabéka O.L.A, Akoli Ekoya O, Omboumahou Bakalé F.E, Salémo A.P, Ntsiba H. Rheumatological diseases in children. *Ann. Univ*. 2018; **18**(1):28-33.

25. Temesgen C and Demissie M: Knowledge and practice of tuberculosis infection control among health professionals in Northwest Ethiopia; 2011. *BMC Health Services Res*. 2014; **14**:59.

26. Shrestha A, Bhattarai D, Thapa B, Basel P, Wagle RR. Health care workers' knowledge, attitudes and practices on tuberculosis infection control, Nepal. BMC Infect *Dis*. 2017; **17**:724.

27. Ntsiba H, Makosso E, Moyikoua A. Le mal de Pott en milieu Rhumatologique Congolais. Analyse d'une série de 140 cas. *J Afr Imag Méd.* 2004; **7**:456-461.

28. Lamini N'soundhat NE, Moyikoua R, Moussounda Mpika GS, Ntsiba H. Unusual morphological aspects of pott's disease. *J Afr Imag Méd.* 2019; **11**(3):344-347.

29. Andrei I, Moafo M, Dewailly J, Laueriere C, Cortet B, Duquesnoy B, *et al*. La Tuberculose Vertébrale: Un Retour En France Confirmé. *Rev Rhum*. 2008; **75**(10-11):967.

30. Gbane- Kone M, Ouali B, Coulibaly Ak, Diomande M, Yao JC, Eti E, Kouakou NM. Cervical spine in Pott's disease: Epidemiological, clinical and radiological aspects concerning 26 cases. *Mali Méd*. 2015; **30**(2): 15-18.

31. Lamini N'Soundhat EN, Banzouzi Ndamba B, Mantele ADD, Ntsiba H, Bileckot R. Douleur residuelle et qualité de vie au cours du Mal de Pott. 25eme congrès Francaise de rhumatologie, Paris, France. *Revue du rhumatisme* [Ed Fr]. 2012; **2012**:A144.

32. Moyikoua RF, Lamini N'Soundhat NE, Kinata Bambino SC, *et al*. CT-guided disco vertebral biopsy at Brazzaville experience: a report of 27 cases. *Health Sci Dis*. 2021; **22** (12):34-37.

33. Coulibaly AK, Gbane M, Ouattara B, Diomandé M. Le mal de Pott à Mycobacterium Tuberculosis résistant à la rifampicine : Etude d'une série de 14 cas colligés au CHU de Cocody. *Rev Mar Rhum*. 2021; **55**:40-45.

34. Seung KJ, Keshavjee S, Rich ML. Multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis. *Cold Spring Harb Perspect Med*. 2015; **5**(9): a017863.

35. Bopaka RG, Okemba Okombi FH, Bemba ELP. Challenges in the management of multidrug-resistant tuberculosis in Brazzaville. *Health Sci Dis*. 2020; **21**(6):12-16.

36. Diomandé M, Coulibaly Y, Goua JJ, *et al*. Pott's disease in Abidjan: experience of the department of rheumatology of university teaching hospital of Cocody: about 420 cases. *La Tunisie Medicale*. 2023; **101**(01):19 – 25.

37. Ministère de la santé et de la population. République du Congo. Plan national de développement sanitaire 2018-2022 (2018) [Consulté en ligne le 3 décembre 2023] disponible à l'URL : https://sante.gouv.cg/plan-national-de-developpement-sanitaire-2018-2022-pnds-2018-2022/