

Prevalence of neuropathic pain in patients with common low back pain with radiculalgia in sub Saharan Africa: a bicentric cross-sectional study of about 409 patients

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Abstract

Background: Neuropathic Pain (NP) is defined as pain caused by injury or disease of the somatosensory nervous system.

Objective: To study the frequency of neuropathic pain among patients with common low back pain with radiculalgia in sub-Saharan Africa.

Methods: This was a bicentric cross-sectional study carried from February 2015 to 30th July 2015 in the first center and from February 2017 to 30th July 2017 in the second center. The study lasted six months in each study site. All patients with a common low back pain with radiculalgia were included. Those without radiculalgia and those without the common character, were not included. The common character was based on the absence of biological inflammation (normal haemogram and sedimentation rate, negative C-Reactive-Protein). DN4 questionnaire was used for the diagnosis of neuropathic pain.

Results: Four hundred and nine patients with common low back pain with radiculalgia were included. There were 278 females (67; 97%) and 131 males (32; 03%), for a sex ratio of 0.47. The average age was 51.75 ± 13.84 years with extremes of 16 and 88 years. One hundred and seventy-five patients (42.8%) had NP. Statistical analysis showed a statistically significant association between NP and age over 60 years and clinical radicular syndrome.

Conclusions: Our study found a high frequency of neuropathic pain during common low back pain with radiculalgia in sub-Saharan Africa patients. Age over 60 years and poorly systematized radiculalgia were associated to NP.

Key words: Neuropathic pain, Low back pain, DN4, Africa

Introduction

Neuropathic Pain (NP) is defined as pain caused by injury or disease of the

somatosensory nervous system¹. Many diagnostic tools have been developed, one of the most widely used for clinical and epidemiological studies is the DN4 questionnaire (Neuropathic pain in 4 questions)². The overall prevalence of chronic pain with neuropathic features is between 7% and 10%^{3,4}. In UK, the prevalence of chronic NP is between 8.2% and 8.9% among two population studies⁵. In sub-Saharan Africa, a population-based study in Benin reported a 6.3% prevalence of NP⁶. Low Back Pain (LBP) is a cause of NP and the presence of radiculalgia appears to be statistically associated with NP^{7,8}. Many studies on NP in general and particularly during low back pain with radiculalgia have been performed worldwide^{3,4,7-10}. In sub-Saharan Africa, we found two studies, carried out respectively by Ouédraogo *et al*¹¹ in Ouagadougou (Burkina Faso) and Doualla *et al*¹² in Douala (Cameroon) that evaluated the frequency of neuropathic pain during LBP and low back pain with radiculalgia; they reported frequencies of 49.5% and 28.1% respectively. In order to minimize the biases related to the environment of the series, we conducted a new study in hospitals in Burkina Faso and Ivory Coast. The objective of this bicentric study was to evaluate the frequency of NP during common low back pain with radiculalgia.

Materials and methods

A bicentric cross-sectional study was performed from February 2015 to 30th July 2015 in Abidjan (Ivory Coast) and from February 2017 to 30th July 2017 in Ouagadougou (Burkina Faso). The rheumatology wards of the Cocody Teaching Hospital in Abidjan (26 beds) and the Bogodogo Teaching Hospital in Ouagadougou (33 beds) were the study frameworks. The study population consisted of consecutive patients presenting with common low back pain and radiculalgia during the study period. Full blood count ESR CRP and lumbar spine X-rays were performed in all patients.

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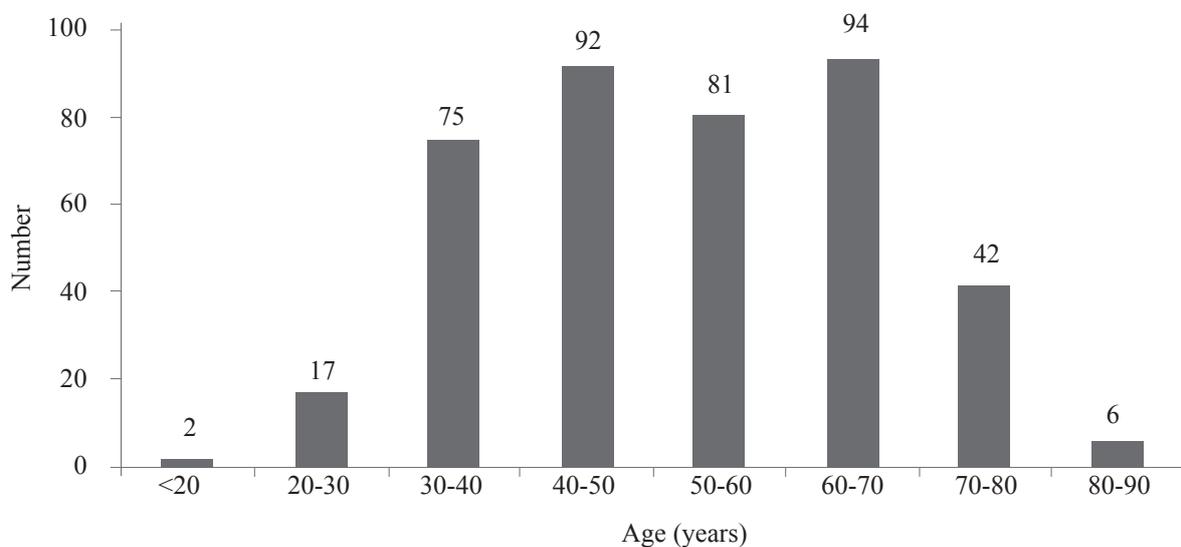
Lumbar CT and MRI were not routinely performed. Patients presenting with low back pain and pelvic, crural or sciatic irradiation were included in our study. The diagnosis of Neuropathic Pain (NP) was made in patients with at least four items on the DN4 questionnaire². LBP or LBP with radiculalgia associated with a traumatic, infectious, rheumatic or tumour aetiology was excluded. Pain intensity was assessed on a Visual Analogue Scale (VAS) rated at 10. Data were collected through questions asked by a rheumatologist to the patient, alone or with the assistance of a companion who provided translation if necessary. A physical examination was also performed by the same rheumatologist. In addition to the DN4 items, the questionnaire included socio-demographic data (age, gender, occupation, weight, height and Body Mass Index (BMI)), clinical data (history of low back pain, duration of current episode, circumstances of onset, pain intensity, type of low back pain, type of radiculalgia, spinal and root examination data), and para-clinical data. Patients were informed and freely consented to take part in the study. The results were analyzed using the Epi info 3.5.1 software. The Chi-square test was used to perform comparisons of variables. Any probability value (p) less than 0.05 was considered statistically significant.

Results

Characteristics of the study population

Four hundred and nine patients with common low back with radicular pain were included. There were 278 females (67.97%) and 131 males (32.03%), for a sex ratio of 0.47. The average age was 51.75 ± 13.84 years with extreme ages 16 and 88 years. Two frequency peaks were observed between 40 and 50 years and then between 60 and 70 years. Figure 1 shows the distribution of patients by age group. According to occupation, housewives, traders and office workers were most represented, respectively 120 (29.34%), 110 (26.90%) and 76 (18.60%). The average BMI was 26.86 ± 4.83 kg/m² with extremes of 17.15 and 44.14 kg/m². Two hundred and forty-four patients (61.6%) were overweight (BMI ≥ 25 kg/m²). The lumbar history, mode of symptom onset, age of onset and type of radiculalgia were summarized in Table 1. Spinal stiffness was observed in 396 patients (96.8%) and clinical radicular syndrome in 249 patients (60.9%). CT and MRI scans were performed on 132 (32.3%) and 11 (2.7%) patients respectively (Table 2).

Figure 1: Distribution of patients by age



Frequency and factors associated with neuropathic pain

One hundred and seventy-five patients had NP, a frequency of 42.8%. The mean number of DN4 items per patient was 4.23 ± 0.4 with extremes of 4 and 6 items

(Table 3). Statistical analysis showed a statistically significant association between NP and age over 60 years and between NP and clinical radicular syndrome. The association between NP and patient's socio-demographic and clinical variables is summarized in Table 4. Facet joint osteoarthritis and disc protrusion were statistically associated with NP as shown in Table 5.

Table 1: Patient history and functional signs

	Features	No.	(%)
Background (n=409)	Chronic low back pain	312	76.3
	No previous history	87	21.3
	Spinal anaesthesia	5	1.2
	Lumbar surgery	3	0.7
	Lumbar trauma	2	0.5
Start mode (n=344)	Progressive	289	84
	Brutal	55	16
Age of pain (n=409)	Acute	39	9.53
	Sub-acute	62	15.16
	Chronic	308	75.31
Type of radiculalgia (n=409)	L5 nerve root sciatica	122	29.83
	Poorly systematized sciatica	120	29.34
	S1 nerve root sciatica	104	25.43
	Poorly systematized cruralgia	40	9.78
	L4 Cruralgia	23	5.62
Intensity of pain (VAS) (n=361)	7-10	294	81.5
	4-6	64	17.7
	1-3	03	0.8

Table 2: Frequency of radiological lesions in patients*

	No.	(%)
Discarthrosis	355	86.8
Lumbar osteoarthritis	287	70.2
Facet Joint Osteoarthritis (FJOA)	132	32.3
Disc protrusion	59	14.4
Herniated disc	46	11.2
Spondylolisthesis by FJOA	44	10.8
Scoliosis	38	9.3
Hyperlordosis	35	8.6
Isthmic lysis without listhesis	21	5.1
Spondylolisthesis by isthmic lysis	16	3.9
Lumbarization of the 1st sacral vertebra	10	2.4
Osteoporotic vertebral collapse	6	1.5
Transverse mega-apophysis of L5	05	1.2
Sacralization of 5th lumbar vertebra	02	0.5

*a patient could have multiple radiographic lesions

Table 3: Frequency of DN4 patient items*

	No.	(%)
Burn	316	77.3
Tingling	214	52.3
Electric shocks	129	31.5
Numbness	125	30.6
Picks	124	30.3
Itching	85	20.8
Hypoesthesia with tact	62	15.2
Hypoesthesia with stinging	46	11.2
Painful cold	35	8.6
Painful rubbing	24	5.9

*a patient could have had several items.

Table 4: Socio-demographic, clinical factors and neuropathic pain.

	NP+		NP-		P
	No.	(%)	No.	(%)	
Female gender	124	44.6	154	55.4	0.14
Age > 60 years old	64	51.6	60	48.4	0.00
Housewife	53	44.2	67	55.8	0.34
Overweight	109	44.7	135	55.3	0.18
History of chronic low back pain	132	42.9	176	57.1	0.48
Sciatica	154	44.5	192	55.5	0.05
Severe pain	135	45.9	159	54.1	0.05
Lumbar stiffness	174	43.9	222	56.1	0.00
Poorly systematized radiculalgia	127	51	122	49	0.00

NP+ = Presence of neuropathic pain ; NP- = no neuropathic pain ; No. = number

Table 5: Radiological lesions and neuropathic pain

	NP+		NP-		P
	No.	(%)	No.	(%)	
Discarthrosis	156	43.9	199	56.1	0.11
Lumbar osteoarthritis	138	48.1	149	51.9	0.00
Facet Joint Osteoarthritis (FJOa)	72	54.5	60	45.5	0.00
Disc protrusion	34	57.6	25	42.4	0.00
Herniated disc	24	52.2	22	47.8	0.08
Spondylolisthesis by FJOa	24	54.5	20	45.5	0.05
Scoliosis	19	50	19	50	0.17
Lumbar hyperlordosis	16	45.7	19	54.3	0.35
Isthmic lysis	07	33.3	14	66.7	0.19
Lumbarization of 1st sacral vertebra	06	60	04	40	0.14
Spondylolisthesis by isthmic lysis	05	31.3	11	68.7	0.17
Osteoporotic compaction	04	66.7	02	33.3	0.13
Transverse mega-apophysis of 5th lumbar vertebra	03	60	02	40	0.23

NP+: Presence of neuropathic pain; NP- = no neuropathic pain; No. = number

Discussion

Frequency of NP was 42.8% in patients with common low back with radicular pain. Age over 60 years, spinal stiffness and radiculopathy were statistically associated with NP. In terms of imaging, lumbar osteoarthritis, disc protrusion and facet joint osteoarthritis were also significantly associated with neuropathic pain.

Any interpretation of these results must take into account the limitations and biases of our study. As CT and MRI scans were not performed in all patients, other types of disc or degenerative lesions (herniated disc, disc protrusion, facet joint osteoarthritis) or inflammatory lesions (spondylodiscitis) may have been overlooked in our study. Absence of biological inflammatory syndrome in CRP and sedimentation rate might have minimized these cases.

The average age of the patients was 51.75 ± 13.84 years. This is comparable to the data in the literature¹²⁻¹⁴. Our series were dominated by housewives and shopkeepers. Although low back pain affects 70% of the working-age population, the predominance of housewives and shopkeepers may be due to a selection bias with regard to the proportion of this socio-professional category in African populations¹⁵. The household activities of housewives and the predominantly informal nature of trade in our context could also explain these results.

NP frequency was 42.8%. This frequency is higher than the 28.1% reported by Douala *et al*¹² in Cameroon. However, it is comparable to the results previously reported in Burkina Faso by Bouhassira *et al*⁹ and Kaki *et al*¹³ in Saudi Arabia, which were 49.5% and 54.7% respectively. According to two meta-analyses published in 2017, NP frequency varies between 19% and 80% during LBP and LBP with radiculalgia^{4,7}. This significant variation in the frequency of NP in common LBP and LBP with radiculalgia could be explained by the diversity of study methods, the heterogeneity of the study populations, and especially the multitude of languages in which the DN4 questionnaire is translated and administered.

Age over 60 years seems to predispose to the presence of NP during common low back pain with radiculalgia ($p < 0.01$). Adoukonou *et al*⁶ also reported that elderliness was associated with neuropathic pain. In our series, the history of chronic low back pain was not statistically associated with NP ($p = 0.48$). Some studies have shown that both acute and chronic low back pain are not associated with NP^{4,7}. Radiculopathy was statistically associated with NP ($p < 0.01$). This could be explained by the fact that radiculopathy is the expression of nerve root pain. Facet joint osteoarthritis and disc protrusion were statistically associated with NP ($p < 0.01$). In low back pain with radiculalgia, functional alterations of the nerve roots may result from compression due to significant spinal canal stenosis¹⁶. Ductal narrowing by disc protrusion, intraspinal osteophytes, and hypertrophy of ligamentum flavum frequently associated with facet joint osteoarthritis could explain this association. Our

study did not find a significant association between disc herniation and NP ($p = 0.08$). Symptomatic disc herniation is generally associated with a biochemical inflammatory phenomenon and therefore rather responsible for pain due to excess nociception; also, the natural evolution of a disc herniation is the improvement of clinical symptoms but also a decrease in volume, or even disappearance of the hernia in more than half of the cases¹⁶. Only 20% to 40% of radiological disc herniations are symptomatic according to the literature^{16,17}. The excess weight found in our study (61.6%) and frequently associated with low back pain and low back pain with radicular pain does not seem to be statistically related to the occurrence of NP.

Conclusions

This study found a high frequency of NP in common LBP with radicular pain. Burning sensation, electric shocks and tingling were the most common neuropathic features found. A statistically significant association was found between NP and age over 60 years, physical radicular syndrome, facet joints osteoarthritis and disc protrusion. The wide variety of languages spoken by patients and the difficulties in translating the DN4 questionnaire into these languages may have influenced our results. A validation study of the DN4 questionnaire in our national languages may allow a more accurate assessment of NP in the context of low back pain with radicular pain.

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