Prevalence, burden and determinants of low back pain: a survey of medical specialization trainees in Cameroon, sub-Saharan Africa

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Abstract

Background: Trainees in medical specialization are a vulnerable group for Low Back Pain (LBP). However, studies on this subject in sub-Saharan Africa are scarce.
Objective: The aim of this study was to investigate the epidemiological burden of low back pain in Cameroonian trainees in medical specialization.
Methods: From August 1st to 24th, 2023, we conducted a cross-sectional study in medical specializing trainees in Cameroon, using a self-administered online questionnaire. Factors associated with LBP are presented with the odds ratio (OR) and its 95% confidence interval.
Results: Three hundred and six participants (55.6% females, aged 31.14 (2.96) years) filled the questionnaire. LBP affected 110 (35.9%) and 218 (71.2%) respectively before and after the beginning of the specialization. Six (2.7%) were severe cases, and 53 (24.3%) reported adverse outcome on their training. The main determinants of LBP directly related the specialization as reported by trainees were insufficient ergonomic measures (103; 47.2%), prolonged standing (137; 62.8%) and heavy workload (69; 31.6%). In statistical analysis, we found a significant association with female gender (OR: 1.89 [1.14; 3.12]), history of low back pain prior to specialization (OR: 15.42 [6.02; 39.52]), and BMI ≥30kg/m² (OR: 3.48 [1.19; 10.17]).
Conclusion: The trend in prevalence of low back pain is considerable with specialization in Cameroon. The authorities responsible for medical specialization schools are urged to implement preventive measures to tackle this potentially detrimental burden for their trainees.

Key words: Cameroon, Low back pain, Medical specialization

Introduction

Low back pain is the most common symptom in rheumatology, irrespective of the world population considered. It is a condition that can be particularly troublesome in some cases, with considerable psychosocial and socio-economic negative impact over time. The burden of low back pain worldwide, according to Global Burden of Disease (GBD) data, is estimated at 619 million people affected in 2020, with a predicted increase to 843 million by 2050[1]. Prevalence increases with age, with a peak between 45 and 54 years of age (GBD, 2019), and a global burden of almost 64.9 million years of life disability due to the disease (GBD, 2017)[2,3]. In sub-Saharan Africa, global prevalence data are also alarming, with nearly 57% annual prevalence in 2018 in the general adult population, and 7,669 per 100,000 inhabitants according to Safiri *et al.* in Middle East and North Africa between 1990 and 2019[4,5]. The main determinants of low back pain are biomechanical, psychological, socioeconomic and lifestyle factors; psychosocial factors being among the most important in sub-Saharan Africa[6]. Studying the prevalence and impact of low back pain is particularly crucial among certain at-risk groups such as healthcare workers, whose adverse impact can have dramatic repercussions on their performance.

Healthcare workers, in particular trainees, are a vulnerable group for low back pain, as they are associated with a triple risk: a risk similar to that of the general population, conjugate with a risk linked to their health work, and an additional risk linked to their duties as trainees. Taha *et al*[7] in Saudi Arabia found a 94% prevalence of low-back pain among 300 medical students; while Vahdati *et al*[8] in Turkey found a prevalence of 56.8% among 125 residents, with 72.6% of

cases occurring after the beginning of residency. In sub-Saharan Africa, little is known about the prevalence and determinants of low back pain among trainee in medical specializations, despite the fact that this population represents the future generation of specialists who should contribute to improving the healthcare system in these regions. The present study took place in Cameroon, a microcosm of sub-Saharan Africa, with the aim of contributing to the epidemiology of low back pain in the sub-group of trainees in medical specialization in sub-Saharan Africa.

Materials and methods

Study design and setting: We conducted a cross-sectional study from August 1st to 24th, 2023, in the faculties and schools of specialized health training in Cameroon, namely: the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I (FMBS/UY1), the Faculty of Medicine and Pharmaceutical Sciences of the University of Douala (FMPS/UD), the Baptist Institute of Health Sciences of Mbingo (BIHS), and the Faculty of Health Sciences of the University of Buea (FHS/UB). FMBS/UY1 is the oldest of the institutions, with the largest number of open specialties and specialization learners (>95%). The specialization cycles are residency and internship. The average number of learners specializing in these schools is estimated at 600 for the 2022/2023 academic year. The number of years in specialization is four, with a compulsory year of core training for interns. The specialization offer includes clinical and non-clinical specialties. Clinical specialties can be grouped into medical, surgical and medico-surgical specialties. Medical specialties include internal medicine, cardiology, rheumatology, neurology, nephrology, endocrinology, dermatology, gastroenterology, pulmonology (respiratory medicine), medical oncology, psychiatry, paediatrics and radiotherapy (radiation oncology). Surgical specialties include general surgery, orthopaedic surgery, neurosurgery, maxillofacial surgery, urology and paediatric surgery. Medico-surgical specialties include anaesthesiology and intensive care, gynaecology and obstetrics, ophthalmology and otorhinolaryngology. Non-clinical specialties include laboratory medicine (pathology and clinical biology), radiology and public health.

Participants: These were all interns and residents registered for the 2022/2023 academic year at the above-mentioned institutions, and who had voluntarily agreed to take part in the study.

Sample size estimation: Considering their workload and availability, we calculated the sample size in order to obtain at least 50% of the estimated total sample, i.e. 300 participants.

Data collection: After obtaining ethical clearance from the FMBS/UY1 Institutional Ethics and Research Committee, we proceeded to collect data using a self-administered online questionnaire. Data collected included: sociodemographic data: gender, age, marital status; information on specialization: school attended, cycle followed (internship or residency), current level in specialization (from 1 to 4), specialty followed; personal history prior to entering specialization: history of spinal disorder, history of low back pain with or without radiculalgia, history of spinal surgery, tobacco consumption, alcohol consumption (on average more than one glass a day in women and more than two glasses a day in men); other personal information: regular carrying of heavy loads (>10kgs), average number of minutes of physical activity per week, current body mass index; clinical data since entry into specialization: any onset of low back pain with number of episodes (total, annual, and character increasing or not with the number of years in specialization), clinical characteristics of low back pain (acute (<6 weeks) or subacute/chronic (≥6 weeks), mechanical or inflammatory nature, irradiation (associated radicular pain), signs of severity (fever or infectious cause, need for use of World Health Organization (WHO) Level III analgesics (morphine and derivates), neurological deficit of the lower limbs or sphincters, weight loss, need for surgical intervention, fracture or tumour, need for hospitalization), treatments used in the majority of cases except in severe situations (therapeutic abstention, rest, physiotherapy, anti-inflammatories, and level I or II analgesics according to the WHO), potential triggers for the development of low-back pain and impact of low-back pain on specialization training.

Statistical analysis: The data collected were analyzed using SPSS software version 23. To present continuous variables we used their mean accompanied by the standard deviation, while categorical variables were presented with counts and percentages. Factors associated with low back pain were determined using Fisher's exact test, accompanied by the odds ratio and its 95% confidence interval. The threshold of statistical significance was 0.05.

Results

Characteristics of participants: Overall, 306 participants (170 women, 55.6%) agreed to take part in the study. The mean age was 31.14 (2.96) years, and the majority were in residency training (275; 89.9%), at FMBS/UY1 (296; 96.7%). Before admission to specialization, low back pain was reported in 110 (35.9%) participants, with 40 (13.1%) having chronic low back pain. Equally, before admission to specialization, few participants reported spinal abnormalities (10; 3.2%) or spinal surgery (2; 0.7%). We found significant alcohol consumption in 43 (14.1%), smoking in 11 (3.6%), regular carrying of heavy loads in 48 (15.7%), physical activity of at least 60 minutes per week in 99 (32.3%) and obesity (Body Mass Index ≥30kg/m²) in 38 (12.4%) participants (Table 1). Clinical specialties accounted for 259 (84.6%) participants, with

Table I: Characteristics of the sample

Variable	Values
N (%)	306 (100%)
Female, n (%)	170 (55.6)
Age (min-max)	24-43
Mean age (SD)	31.14 (2.96)
Marital status, n (%)	
Single	146 (47.7)
Married	146 (47.7)
Cohabitation	13 (4.2)
Divorced	1 (0.3)
Medical school, n (%)	
FMBS/UY1	296 (96.7)
FHS/UB	8 (2.6)
BIHS	1 (0.3)
FMPS/UD	1 (0.3)
Specialization cycle, n (%)	
Residency	275 (89.9)
Internship	31 (10.1)
Specialization level, n (%)	
1	75 (24.5)
2	88 (28.8)
3	59 (19.3)
4	84 (27.5)
Spinal disorder prior to specialization, n (%)	10 (3.2)
Lumbar lordosis or scoliosis	4 (1.3)
Spinal disk disease	3 (0.9)
Traumatic vertebral fracture	2 (0.6)
Lumbar congenital anatomical disorder	2 (0.6)
History of low back pain prior to specialization, n (%)	110 (35.9)
One or more episodes of acute low back pain	70 (22.9)
Chronic low back pain	40 (13.1)
Spinal surgery prior to specialization	2 (0.7)
Regular carrying of heavy loads, n (%)	48 (15.7)
Physical activity, minutes per week, n (%)	
0-30	130 (42.8)
30-60	76 (24.8)
60-120	52 (17)
>120	47 (15.4)
BMI (kg/m²), n (%)	
<18.5	10 (3.3)
18.5-24.9	153 (50)
25-29.9	105 (34.3)
30-34.9	28 (9.2)
35-39.9	7 (2.3)
≥40	3 (1)
Tobacco consumption, n (%)	11 (3.6)
Alcohol consumption, n (%)	43 (14.1)

BIHS: Baptist Institute of Health Sciences of Mbingo; BMI: Body Mass Index; FHS/UB: Faculty of Health Sciences of the University of Buea; FMBS/UY1: Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I; FMPS/UD: Faculty of Medicine and Pharmaceutical Sciences of the University of Douala; SD: Standard Deviation.

150 (49%) in medical specialties, of which cardiology (27; 8.8%), paediatrics (24; 7.8%) and medical oncology (19; 6.2%) were the most common, and 54 (17.6%) and 55 (17.9%) respectively in surgical and medico-surgical clinical specialties. Non-clinical specialties accounted for 47 (15.3%) participants, including 17 (5.5%) in laboratory medicine and 20 (6.5%) in radiology (Table 2).

Table 2: Prevalence of low back pain in various specialties

Specialties	Counts per specialties n (%)	Prevalence of low back pain
All specialties	306 (100)	218 (71.2)
Clinical specialties	259 (84.6)	224 (76.5)
Medical specialties	150 (49)	112 (74.6)
Cardiology	27 (8.8)	19 (70.4)
Paediatrics	24 (7.8)	17 (70.8)
Medical oncology	19 (6.2)	16 (84.2)
Gastroenterology	16 (5.2)	12 (75)
Internal medicine	13 (4.2)	10 (76.9)
Psychiatry	13 (4.2)	7 (53.8)
Rheumatology	8 (2.6)	7 (87.5)
Endocrinology	7 (2.3)	6 (85.7)
Neurology	7 (2.3)	5 (71.4)
Nephrology	5 (1.6)	4 (80)
Pulmonology	5 (1.6)	3 (60)
Dermatology	4 (1.3)	4 (100)
Radiation oncology	2 (0.7)	2 (100)
Surgical specialties	54 (17.6)	36 (66.6)
General surgery	18 (5.9)	13 (72.2)
Orthopaedic surgery	15 (4.9)	10 (66.6)
Urology	11 (3.6)	5 (45.4)
Paediatric surgery	4 (1.3)	3 (75)
Neurosurgery	3 (1)	2 (66.6)
Maxilla-facial surgery	3 (1)	3 (100)
Medico-surgical specialties	55 (17.9)	36 (65.4)
Obstetrics and gynaecology	22 (7.2)	12 (54.5)
Anaesthesiology and intensive care	15 (4.9)	13 (86.6)
Ophthalmology	9 (2.9)	6 (66.6)
Otorhinolaryngology	9 (2.9)	5 (55.5)
Non-clinical specialties	47 (15.3)	34 (72.3)
Laboratory medicine	17 (5.5)	34 (72.3)
Clinical biology	12 (3.9)	6 (50)
Pathology	5 (1.6)	3 (60)
Radiology	20 (6.5)	19 (95)
Public health	10 (3.3)	6 (60)

Prevalence, clinical features and burden of low back pain in specialization: Low back pain prevalence in specialization was reported in 218 (71.2%) trainees. By gender, the prevalence in women was 131 (77.1%) and 87 (64%) for men. By specialty, the frequency was 224 (76.5%) for clinical specialties and 34 (72.3%) for non-clinical specialties. Low frequencies were found in urology (5; 45.4%), clinical biology (6; 50%), psychiatry (7; 53.8%) and obstetric and gynaecology (12; 54.5%). High frequencies were found in radiology (19; 95%), dermatology (4/4) and radiotherapy (2/2) (Table 2). The total number of episodes up to the time of the study was at least 5 for the majority of participants (102; 46.8%), with two trends: 1 to 2 episodes per year (94; 43.1%), or at least 5 episodes per year (76; 34.8%). 77 (35.3%) participants reported an increase in frequency with the number of years spent in specialization. Episodes of acute low back pain were the most common (190; 87.1%), mechanical in schedule (183; 83.9%), and few of them declaring experimented signs of severity (6; 2.7%). The most commonly reported therapeutic modalities were therapeutic abstention (152; 69.7%), followed by WHO

Table 3: Characteristics of low back pain in specialization

Variable	N = 218 (100%)
Total number of episodes	
1	20 (9.2)
2	43 (19.7)
3	33 (15.1)
4	19 (8.7)
≥5	102 (46.8)
Average number of episodes per year	
1	50 (22.9)
2	44 (20.2)
3	28 (12.8)
4	15 (6.8)
≥5	76 (34.8)
Duration of low back pain (most of the cases)	
Acute episodes	190 (87.1)
Subacute/chronic episodes	25 (10.1)
Schedule (most of the cases)	
Mechanic	183 (83.9)
Inflammatory	31 (14.2)
Associated radicular pain	26 (11.9)
Signs of severity	6 (2.7)
Weight loss	5 (2.3)
Fever or infectious cause	1 (0.4)
Need for hospitalization	1 (0.4)
Neurological deficit (sphincter or lower limbs)	2 (0.9)
Use of morphine or derivates	1 (0.4)
Need for surgical intervention	1 (0.4)
Management (most of the cases)	
Therapeutic abstention	152 (69.7)
WHO Level 1 analgesics, muscle relaxants	39 (17.9)
Anti-inflammatory drugs	30 (13.7)
Rest	24 (11)
Who level II analgesics	21 (9.6)
Physiotherapy	15 (6.9)

Level I analgesics or muscle relaxants (39; 17.9%) and anti-inflammatory drugs (30; 13.7%) (Table 3). Fifty-three (24.3%) participants reported adverse effects of low back pain on their training. In general, these were absence from training courses (37; 69.8%), poor academic performance (14; 26.4%) and difficulties in taking care of patients (5; 9.4%) (Table 4).

Table 4: Impact of low back pain on the course of the specialization.

Variable	N=218 (100%)
Negative impact	53 (24.3)
Absence from training	37 (69.8)
Poor academic performance	14 (26.4)
Difficulties in providing care for patients	5 (9.4)
Failure to complete an academic year	2 (3.8)

Determinants of low back pain in in specialization: Specialized training was reported as having a negative impact by 129 (59.2%) respondents. Of the factors reported by trainees, those directly related to training were mostly: inadequate ergonomic measures during training and on-call (103; 47.2%),prolonged standing (137; 62.8%), numerous hours or heavy workload during training (69; 31.6%), and internship–related stress (62; 28.4%). Factors indirectly related to training as reported by learners were mostly: insufficient physical activity (102; 46.8%), regular bad postures (99; 45.4%) and pregnancy (64; 29.3%) (Table 5).In statistical analysis, we found the following factors to be associated with low back pain among specialization trainees: female gender (OR: 1.89 [1.14; 3.12]), history of low back pain prior to specialization (OR: 15.42 [6.02; 39.52]), and BMI ≥30kg/m² (OR: 3.48 [1.19; 10.17]) (Table 5).

Table 5: Determinants of low back pain according to the trainees

Variable	N= 218 (100%)
Factors directly related to the training	
Inadequate ergonomic measures during training and on-call	103 (47.2)
Prolonged standing	137 (62.8)
Numerous hours or heavy workload during training	69 (31.6)
Internship–related stress	62 (28.4)
Carrying heavy loads during training	24 (11)
Dissatisfaction with choice of specialty	4 (1.8)
Prolonged seated position	1 (0.4)
Factors not directly related to the training	
Insufficient physical activity	102 (46.8)
Regular bad postures	99 (45.4)
Pregnancy	64 (29.3)
Inadequate home ergonomics and comfort	47 (21.5)
Regular long-distance journeys	47 (21.5)
Personal psychosocial constraints	38 (17.4)
Depression	22 (10.1)
Trauma	12 (5.5)
Menstrual syndrome	2 (0.9)
Weight gain	1 (0.4)

Discussion

In the present study, we aimed to estimate the prevalence of Low Back Pain (LBP) and its impact on medical specialization trainees in Cameroon. It was a cross-sectional study using an online questionnaire. The main findings of our study are as follows: the prevalence of low back pain doubles with entry into specialization (35.9% before and 71.2% after entry into specialization). The majority of cases were of non-severe low-back pain, which can nevertheless have a significant impact on specialized medical training. We have also identified several determining factors, according to the learners and after statistical analysis, which should enable preventive action to be taken to counter this real burden in our context.

We surveyed a representative sample of doctors in specialization in Cameroon, whose socio-demographic characteristics are similar to those known about Cameroonian physicians in the literature, as reported in the study by Kanmounye *et al*[9]. In this sample, we found a prevalence of low back pain among medical specialization learners in Cameroon of around 71.2%, i.e. two-thirds of learners. This was generally a prototype of acute, mechanically scheduled low-back pain, with no red-flag. These values are similar to those of Vahdati *et al*[8] in Turkey, who found a prevalence of 72.6% among 125 specialization residents after the beginning of specialization. This prevalence is nevertheless higher than that generally found among healthcare personnel, notably in the study by Awosan *et al*[10] in Nigeria, involving 320 healthcare personnel, who found annual prevalence of 39.1% and 56.2% for the whole of their lives. It is also higher than that found in the general adult population in sub-Saharan Africa according to Louw *et al*[11] (32%). It is nevertheless lower than that reported among medical students, as highlighted by Taha *et al*[7] in Saudi Arabia, who found a prevalence of 94% among 300 students. All these data underline the fact that the prevalence of low back pain among medical specialization trainees is higher than that of the general population, and generally higher than that of non-teaching healthcare workers. This may be explained by a combination of risk, with firstly, the risk inherent in the general population; secondly, the

risk as healthcare workers; and thirdly, the risk associated with the learner's additional workload. These factors need to be taken into account when defining target levels for appropriate preventive action in this population.

A better understanding of the impact of low back pain is also needed among medical specialization trainees. In our sample, we found that despite the large number of episodes reported for all training courses, the therapeutic means generally employed were either therapeutic abstention (69.7%), or level I analgesics or muscle relaxants (17.9%), or anti-inflammatories (13.7%). This suggests that these are generally mild episodes, most often related to so-called common mechanical causes. Concerning the negative impact on medical training, this was reported in 24.3% of participants with low back pain, with consequences such as absenteeism from training, poor academic performance and difficulty in patient management. These data concur with those of Amelot *et al*[12] who reported on a study of 1,800 medical students, of the severe repercussions of low back pain on the student's work, sleep quality and personal life. Furthermore, in the general population, several authors have demonstrated the harmful psychosocial and professional consequences of low back pain[13,14]. All these points need to be taken into consideration when understanding the impact of low back pain on learner performance, and the value of implementing strategies to reduce the burden of this condition in order to optimize the performance of students suffering from it.

In order to efficiently address the health problem of low back pain in the sub-group of medical specialization trainees, it is vital to understand the determinants of this condition. Initially, we identified the factors precipitating low back pain in learners during their medical training. These were predominantly prolonged standing during training, stress during training, the amount of time and the high workload during training. In statistical analysis, we identified female gender, history of low back pain prior to entering specialization and obesity as additional significant factors. Several of these factors are already recognized in the literature. Data from GBD 2019 showed a higher frequency of low back pain in women[3]. Several studies[7,8,10,15,16]. also found prolonged standing (>4 hours), bad posture, repetitive movements of the lumbar region, carrying heavy loads and transferring patients, female gender, number of working hours per day (>8 hours), stress, and obesity as factors increasing the prevalence of low back pain. Regular physical activity, on the other hand, is frequently reported as a protective factor[8]. These data make it possible to define the key areas for action in order to develop preventive measures, such as promoting regular physical activity, detecting and implementing measures to fight and support obese learners, teaching and promoting good hygiene and ergonomic practices for the lumbar spine, limiting the carrying of heavy loads and time spent in prolonged sitting or standing positions, and encouraging the installation of ergonomic and comfort measures at training sites. The implementation of these measures must be combined with ergonomic measures outside medical training. Those responsible for specialized medical training should take this into consideration to reduce the burden of low back pain among their learners.

Certain limitations need to be taken into account when interpreting the data from our study. In particular, the quality of the information gathered and the limits of its detail, given the collection method used which could be subject to measurement bias.

Conclusion

The prevalence of low back pain doubles with entry into medical specialization in Cameroon. The authorities responsible for medical specialization training must take into account the several associated factors reported in order to tackle the burden of low back pain on their trainees.

Declaration

Ethical approval and consent to participate: The study was approved by the Institutional Ethics and Research Committee of the Faculty of Medicine and Biomedical Sciences, University of Yaoundé I, Cameroon (Reference n°92/UY1/FMSB/VDRC/DAASR/CSD/2022). All the participants read and signed a written informed consent before their inclusion in the study regarding the Helsinki declaration. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication: Not applicable.

Availability of data and materials: The datasets used for this study are available from the corresponding author on reasonable request.

Competing interest: The authors declare that they have no competing interests.

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