The prevalence of hand pain in Ibadan – implications for the carpal tunnel syndrome

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Summary

Hand pain or brachialgia paraesthetica nocturna (BPN) is a series of symptoms described as "waking up at night due to unpleasant sensations in the fingers" (Dekrom et al, 1992). Usually, these symptoms form the first rungs up the ladder leading up to the carpal tunnel syndrome (CTS) (Skandalakis et al, 1992), and thus are used as part of the diagnostic criteria for the disorder.

We describe the results of a questionnaire survey of 422 patients attending two major hospitals in Ibadan, Nigeria for complaints unrelated to hand pathology. Questions related to the bio-data (including type of occupation), general health status, past medical and/or surgical history, and finally hand symptoms of the patients. For a patient to be positive for BPN, the hand symptoms had to correspond to the cutaneous distribution of the median nerve.

Positive cases formed 12.75% of all interviewees in one hospital and 19.59% of respondents in the other, with females forming the bulk of those affected. This figure is somewhat higher than the ones previously reported. From earlier work on the predictive value of BPN for the carpal tunnel syndrome we conservatively estimate that between 20% and 38% of individuals in our study group will suffer from CTS.

The relationship of heavy hand-use to BPN was a negative one as most sufferers of BPN were light hand-users. However, individual occupations requiring highly repetitive flexion-extension wrist movements recorded many BPN cases.

No BPN case was confirmed when the patients presented in hospital, indicating that more awareness of the symptoms and signs of this disorder needs to be created among doctors and the general public. Also, we believe that more investigations, particularly among the general population, are needed to be able to define the prevalence of this condition more accurately.

Key words: ***Hand pain, Distribution, Carpal Tunnel Syndrome, Epidemiology.***

Résumé

La douleur à la main ou brachialgie para-esthétique nocturne (BPN) est des séries de symptômes décrit comme «réveil dans la nuit due a des sensations inconfortables aux doigts» (DeKrom et al, 1992. Habituellement, ces symptômes constituent les critères important pourrant conduire au syndrome du tunnel carpelle (CTS) (Skandalakis et al, 1992), et par conséquent font pardi des critères diagnostiques du mal.

Nous décrivons le résultat d'une enquête meree sur 422 patients visitant deux hôpitaux majeurs à Ibadan, Nigeria pour des plaintes non reliées à la pathologie des mains. Des questions liées aux données biographiques, état général de santé, l'historique médicale et chirurgicale et finalement symptômes des mains du patient. Pour qu'un patient soit positif pour la BPN, les symptômes de la main doivent correspondent à la distribution cutanées des nerfs médians.

Les cas positifs constituent les 12.75% de tous les personne interviewèes dans un hôpital et 19.59% des respondants dans l'autre, avec les femelles constituant le lot des affectes. Cette figure est encaque sorte plus élevée que celle obtenues precedement. Des travaux précédents sur la valeur prédictive du BPN pour la CTS nous conservativement estimons qu'entre 20% et 38% des individus dans notre group d'étude souffrirons du CTS.

La relation entre l'usage difficile de la main et BPN et ait négative comme la majorité des souffrants du BPN étaient utilisateurs – facile de la main. Ce pendant des occupations personnelles demandant grandement la flexion-extension répétitive du poignet ont enregistres beaucoup de cas de BPN.

Aucun cas de BPN n'était confirme quand les patients se pressentaient à l'hôpital, ceci indique que la conscientisation des symptômes et de signes du mal drivent être crées parmi la population, sont nécessaires pour définir la prévalence de cette condition plus précisément.

Introduction

Nocturnal hand pain (brachialgia paraesthetica nocturna, BPN) is the most common feature of carpal tunnel syndrome (CTS). It is described as "waking up at night due to unpleasant sensations in the fingers"[1]. These unpleasant sensations include tingling, numbness, pain or 'burning pain' also known as causalgia2,3,4,5. Some authors6 refer to BPN as 'normal numbness' because it is most severe during sleep at night. Usually, these symptoms form the first rungs up the ladder leading up to CTS3, and thus are used as part of the exclusion criteria for the disorders.

Carpal tunnel syndrome and BPN are associated with certain risk factors. These can be classified into non-occupational and occupational factors[7]. The non-occupational factors may further be described as either local or systemic. Local factors include tenosynovitis, lipoma, calcium deposit, ganglion, previous wrist fractures and neuroma of the median nerve at the wrist[8,9]. Systemic factors include diabetes mellitus, hypertension, blood dyscrasias, cancer, collagen vascular diseases, acromegaly, rheumatism, leprosy, mumps and pregnancy3,9. Personal attributes such as age, sex, height and weight also strongly influence the development of CTS[1,2,6]. Occupation-related risk factors include repetitive (high-frequency) flexion-extension wrist movements, use of vibratory hand tools and repeated hand-exertion[7,10,11].

Considering the varied nature of the possible risk factors producing BPN, it is surprising that investigation into the distribution of the condition appears to be limited to the work place. Only a few notable studies[1,12] have addressed the incidence of BPN in the general population.

Occupationally, Nigerians are heavy hand users, although the spectrum of hand use is extremely varied. The factors involved in the genesis of BPN in this population are little understood. The purpose of this study is therefore to investigate the distribution of nocturnal hand pain along with some of its determinants amongst Nigerians residing in a typical urban south-western part of the country.

Materials and Methods

Four hundred and twenty-two (422) individuals were recruited into this survey, which was carried out by administering a semi-structured questionnaire on them. The researcher sat with the respondent and went over the questionnaire item by item, asking the questions and filling in the responses. The interviewees were patients attending hospital for complaints unrelated to BPN. They were recruited from two sites: the Ring Road State Hospital (RRSH) a secondary levelhealth care center and the University College hospital (UCH), Nigeria's oldest tertiary health institution. Both institutions are located in Ibadan, a city of about 2 million people[13].

**Correspondence*

One hundred and fifty-six patients were interviewed at RRSH while 266 were interviewed at UCH. All patients excluding children that were found in the tgeneral outpatient clinics of these hospitals within the survey period (June to August 1998) were interviewed.

The questionnaire consisted of 3 main sections dealing with: a) patient's biodata, b) past medical and surgical history and c) specific hand symptoms.

The presence of a confounding variable such as sex has the potential of giving misleading overall rates, when a significant difference exists between males and females in the parameter being studied. This informed our choice of analyzing data from the two hospitals separately, a practice similar to that of Kirkwood (1988)[14] and DeKrom et al (1991)[1]. Table 2 shows a simplified age-sex adjusted frequency distribution of our sample. In it, the fraction of each gender with BPN in each hospital is (by a complex computation) multiplied by the total number of males/females (i.e. row 5 multiplied by row 6, giving row 7). This gives the adjusted fraction, which is then added for each hospital (row 8). The total adjusted fraction for each hospital is then divided by the total sample (420), resulting in the age-sex-adjusted frequency for each hospital.

To eliminate any misunderstanding regarding the exact palmar distribution of symptoms, a diagram depicting the cutaneous distribution of the median nerve (see appendix) was shown to the interviewees.

Results

The UCH sample comprised 63% of the study population while the RRSH sample constituted 37%. Females formed majority of interviewees in this study, constituting about 57% of respondents with the males making up 43% (Table 1). The male to female ratio in the entire sample was 1:1.3.

Table 1 Age and sex composition of respondents

	Males n(%)	Females n(%)	Total n(%)	Mean age (M:F)	SD (M:F)
UCH	123(46)	143(54)	266(100)	36.6:35.6	0.58:.01
RRSH	58(37)	98(63)	156(100)	41.6:44.1	1.92:0.63
Total	184(42.9)	241(57.1)	422(100)		

P<0.05

The mean age of females in the UCH sample was 36.1 years (SD 1.11) with their male counterparts being a year older on the average (SD 1.59). The female mean age at RRSH was 44.6 years (SD 1.65) with a younger average male age of 42.1 9SD2.28, Figures 1a & 1b).

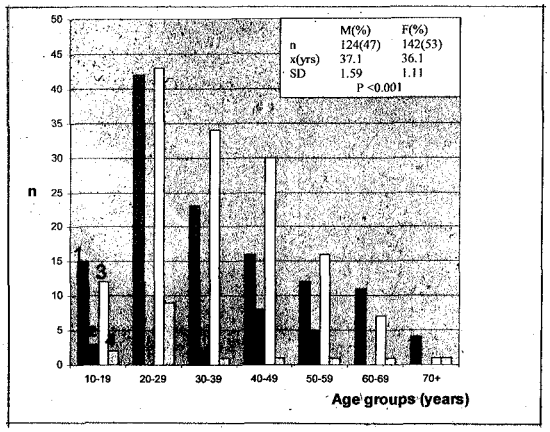

Fig. 1a *Age and sex distribution of respondents (UCH).*

The overall frequency for BPN in the UCH sample was 12.75% (95% Confidence interval, CI: 8.74%-16.76%, Table 2). For males alone this value was 6.77% (CI: 3.75%-9.79%). The female BPN frequency was slightly lower than their male counterparts in this group (6.02%; CI: 3.16-8.87%). In the entire RRSH sample, BPN frequency was 19.59% (CI: 13.36% - 25.82%). The male versus female values were 5.13% (CI: 1.67%-8.59%) to 17.95% (CI: 11.93%-23.97%).

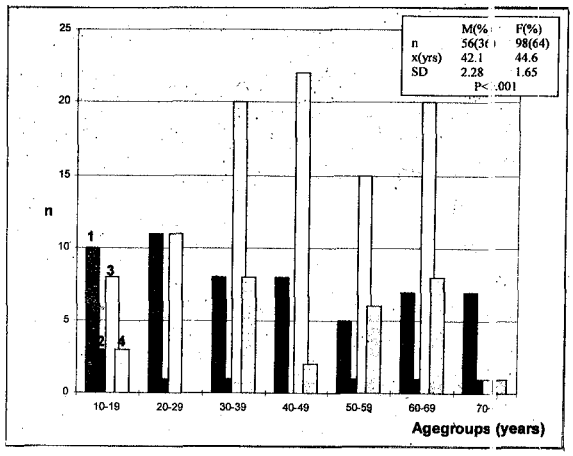

Fig. 1b *Age and sex distribution of respondents (RRSH)*

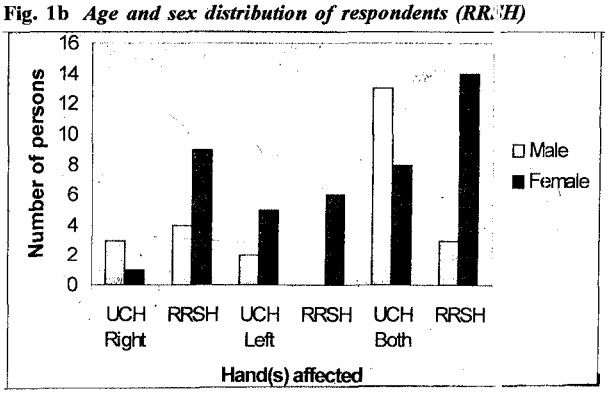

Fig. 2 *How BPN is distributed between the hands in males and females*

The various types of occupations observed in the survey were regrouped into two broad categories based on the degree of hand-use required on the job. The light hand-users were in the overall majority (84.6%). The frequency of BPN among heavy hand users was similar for both study locations (2.3%; CI: 0.50%-4.10% and 2.6%; CI: 0.1%-5.1% for UCH and RRSH respectively). Among light hand-users, the BPN frequency was higher than their heavy hand-using counterparts (UCH: 10.5%; CI: 6.82% - 14.18% RRSH 21.2%; CI: 14.79%-21.61%).

Table 2 Simplified age-sex adjustment of BPN distribuiton*

	UCH		RRSH	
	Males	Females	Males	Females
Persons interviewed	123	143	56	98
BPN	18	16	8	28
Fraction with BPN	0.146	0.112	0.143	0.286
Total gender number (UCH + RRSH)	179	241	179	241
Adjusted fraction (roughly = Fraction multiplied by gender Total)	27	27	24	59
Total adjusted Fraction (M + F)	54		82	
Adjusted Frequency = Total adjusted fraction ÷ Total interviewed(%)	12.75%		19.59%	

**The ages of two RRSH respondents could not be ascertained*

To obtain an assessment of the relationship between general health status and BPN, interviewees were asked the question "Have you been admitted in hospital in the last one year?" The frequency of nocturnal hand pain in hospitalized UCH respondents was a mere 0.8% (CI: 0.3%-1.9%) compared to 12% (CI: 8.1% - 15.9) among those not hospitalized. In the RRSH group, hand pain among recently hospitalised patients showed a frequency of 1.3% (CI: 0.5% - 3.1%). The frequency was higher (22.4%, CI: 15.9%-28.9%) among those without recent hospital admissions.

An investigation of the frequency of hand pain as a function of the affected limb (Figure 2) shows that BPN is a bilateral phenomenon in most cases occurring in 7.9% (CI: 4.7%-11.1%) of the UCH sample and 10.9% (CI: 6.0% - 15.8%) of the RRSH sample. This was followed by the left hand in the UCH sample (2.6%; CI: 0;7%-4.5%) and the right hand in the RRSH group (8.3%; CI: 5.0%-11.6%).

Table 3 Frequency of symptoms (severity in BPN)

Frequency of pain per week	Severity	UCH	RRSH	UCH+RRSH
<once	mild	10	7	17
once		5	11	16
occasional		1	0	1
not sure		2	1	3
twice	moderate	5	6	11
thrice	severe	1	3	4
>thrice		10	8	18
Total		34	36	70

X^2, p=0.497 df = 12

When symptomatic individuals were asked how often they were woken up by hand pain, a measure of its severity (Table 3), majority of patients (52.9%) woke up infrequently or not at all, meaning that their symptoms were milk. About a third of symptomatic patients suffered severe symptoms, waking up thrice a week or more. Those that woke up with nocturnal hand pain twice a week (moderate severity) formed about 16% of patients with BPN. DeKrom et al (1992)[1] used a twice-nightly occurrence of BPN as the exclusion criterion for their study.

How did BPN sufferers attempt to get relief from the condition? Most patients (50.3%) either poured warm or cold water on their hands. Others rubbed their hands together (21.1%), while still others shook the affected hand(s) vigorously (16.9%). Similar proportions of cases either combined all of the above methods or ignored the pain, while very few affected people (2.8%) used analgesics.

About 1 in 5 affected respondents (19.7%) complained about their hand symptoms to a physician. In none of these was the carpal tunnel syndrome diagnosed. Most of them (78.6%) had their symptoms unexplained to them. They were simply reassured. On the other hand, three patients (21.4%) were told that their symptoms were due to hypertension.

When probed for the presence of diseases, which are known to be associated with the carpal tunnel syndrome (CTS), less than one-quarter of symptomatic patients (15.5%) acknowledged suffering from such with more than three-quarters (85.5%) saying that they did not have any such disease.

Discussion

Very little is known about the carpal tunnel syndrome in this environment. (Oyedele et al, 1998)[15]. The most important reason for studying BPN in our view is ultimately to be able to determine the frequency of the carpal tunnel syndrome (CTS) in this environment. In their work, DeKrom et al conservatively put the value of BPN as a predictor of CTS to be 38% for the general population[1]. From their own work, Atroshi et al (1999)[12] put this value at 20%. If we apply these figures to this study, then between 84 and 160 of our 422 interviewees will develop carpal tunnel syndrome. Further investigations in this regard might be to perform nerve conduction or other confirmatory diagnostic tests on patients with BPN.

There was a basic difference in the age-sex distribution of respondents at the two locations used for this study (UCH and RRSH) (Figures 1a and 1b). This fact is useful in the that carpal tunnel syndrome (CTS) is highly associated with middle age (Entin, 1968[9]; Armstrong and Chaffin, 1979[6]; More, 1992[10]). Thus the distribution of CTS in the two groups may be influenced by this difference.

The BPN frequency in this study is comparable to those described previously[1,12], with a tendency to be higher. Reflecting sex differences, one worker found a male to female frequency of 0.6%: 5.8%[1], indicating a female preponderance. Our findings show that BPN is a disorder of young females and middle-aged males in the UCH group but a disorder of older females in the RRSH group. Most of the previously published work however favours BPN preponderance in older females [1,6,9,10,16,17,18].

Concerning the role of occupation in BPN distribution, the fact that the light hand-users dominated both of our study groups calls into question the premise that heavy hand use is prevalent in this environment. A predominant light use of hands is supported by a previous study of one population (Dekrome et al 1990)[2]. Another group of workers (Konz and Mital, 1990)[19] observed that CTS (and thus BPN) is mostly not related to patients' occupation.

Given that recent hospitalization of respondents may be indicative of their general health status, it is striking that despite BPN, the majority of affected interviewees were not hospitalized. This may indicate that BPN is not a prominent cause of hospital attendance and admission in Ibadan. The significant difference in the RRSH group between sufferers who were admitted in hospital and those not admitted may point to the tendency of RRSH, being a secondary health care center, to attract patients suffering from a wode variety of illnesses unrelated to BPN, and requiring hospital admission.

The hand morbidity pattern clearly shows that in both groups, bimanual involvement was more common than single hand involvement. This agrees with a previous work[1] where both hands were affected in almost 70% of the sample.

The preponderance of the mild severity of BPN in this study has two main implications. First, it will tend to keep reporting of the ailment low and secondly, it will remain an unfamiliar terrain for health care givers, a point emphasized presently. On the other hand, all the patients that were woken up most frequently had bilateral disease. This is to be expected as, the more discomfort they feel, the more frequently they will tend to wake up at night.

Our observations as to how patients sought relief from BPN agree with previous findings, where relief from the hand symptoms was found to be by "hanging, shaking, massaging, or exercising the hand" (Entin, 1968, Feldcamp et al 1995)[9,20]. The use of water to obtain relief from ailments may be associated with the local belief, customs and religion of the people. Given the famed predisposition to self-medication in our environment, it is surprising that not more than 15% of our series used this method to relieve their symptoms.

The diagnoses made by the attending physicians to the patients with BPN may reflect a poor physician awareness, and low index of suspicion to the modes of presentation of BPN and carpal tunnel syndrome (CTS) was made, the patient was not aware of it, reflecting a poor level of doctor-patient communication. This inference is further strengthened by the fact that BPN symptoms were unexplained to the patient in the vast majority of cases who presented in hospital.

The fact that the majority of respondents did not have medical conditions, which are known to be associated with hand pain may signify a lack of presdisposing systemic or local diseases to BPN in this environment. While this points to the need for further studies,

it may also show the need to give priority to the study of occupational factors as a cause of BPN and CTS in the south-west area of Nigeria.

Conclusion

The symptoms of median neuropathy appear to be more prevalence in this environment than we have hitherto recognized. They may be higher in some subsets of our population than previously described in other countries. In spite of this, knowledge about the disease, and attitude to it remains vague. People who suffer from this condition will continue to endure it, perhaps unjustifiably so unless physicians are sensitized to recognizing its symptoms and signs. Further research will be needed to define the distribution of BPN more accurately, particularly in persons at risk.

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