PREVALENCE AND AETIOLOGICAL PROFILES OF FACIAL NERVE PARALYSIS: A FIVE-YEAR REVIEW OF TERTIARY HEALTH INSTITUTIONS IN KANO STATE, NORTHWESTERN NIGERIA

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ABSTRACT

Aims: To determine the prevalence and aetiological profiles of facial paralysis in Kano, Nigeria.

Methods: This study involved three tertiary and health institutions in Kano, Nigeria between January 2006 and December 2010. Out of 11145 patients' records, 1003 cases had indication of facial nerve paralysis but 936 met the inclusion criteria. Data were extracted using research pro-forma. Data was analyzed using z-test for proportional significance, and Chi square test at 0.05 significant levels.

Results: Prevalence rate of facial paralysis was 9.1% and mostly common (48.1%) between age of 20-38 years with males (52.8%) and the married (71.2%) more affected. Left side of the face was involved more frequently (53.0%) than the right side (46.4%) and bilateral (0.6%). Lower motor neuron lesion type (74.1%) was more common. Most common co-morbidity associated with facial paralysis was infections, closely followed by diabetes mellitus and pre-eclampsia. Highest incidence was in the year 2010, and the least was in 2006. z-values showed that minor difference in the prevalence exist between male and female. There was an association between each of age, occupation, co-morbidities and place of residence and the aetiologic factors. However, the strength of relationships was weak and the degree of association is very weak as determined using Cramer V and Lambda.

Conclusion: Prevalence of facial paralysis is relatively high in this region. It is affected by urban dwelling, being a full-housewife and co-morbidity. Lower motor neuron type and sudden onset were predominant. This calls for greater awareness for preventive measures.

Keywords: *Facial nerve, paralysis, prevalence, aetiology, northwestern Nigeria*

Introduction

Facial paralysis is the most frequently occurring cranial nerve disorder/ dysfunction (Anderson, 1991; Owolabi et al, 2010). It is a disease which is both cosmetically distressing and functionally disabling, leading sometimes to social disadvantages including marginalization and stigmatization (Napoli & Panagos, 2005; Stottler & Pancioli, 2006; Cha *et al,* 2008).

Facial paralysis affects the seventh cranial nerve (facial nerve) producing unilateral or bilateral weakness or total paralysis of the facial muscles on the affected side (Stottler & Pancioli, 2006). The muscles affected are determined by the type of lesion; infra nuclear lesion affect all the muscles of facial expression while supra nuclear lesion causes weakness of lower two-third part of the facial muscles on the opposite side of the lesion (Grose *et*

al, 2002). The paralysis may include all the muscles and modalities affected by the facial nerve like mimetic facial movement, taste, cutaneous sensation, hearing ability, salivation and drooping on the affected half (Grose *et al*, 2002; Axellsson *et al*, 2003; Alberton & Zed, 2006).

Facial paralysis is associated with many underlying causes such as Bell's palsy (idiopathic), stroke, trauma (head injury, surgical or birth trauma), infections (sarcoidosis, brucellus, HIV, meningitis and hypertension), cancers, diabetes mellitus and other central nervous system disorders (Elliot, 2006). The leading causes of facial paralysis depend on environmental factors (Chukwuezi & Nwosu, 2009). Previous studies have been conducted in various parts of Nigeria and other parts of the world with variation in their findings (Danilides *et al*, 2001; Kasse, 2003; Chukwuezi & Nwosu, 2009). This variations can attributed to likely environmental variation in the study locations. Despite the existence of many studies, there is however dearth of literature covering the northern part of Nigeria. The northern part of Nigeria is peculiar in its location, weather, culture and environmental status. Therefore, findings from the existing studies cannot be generalized as there are differing social and environmental characteristics between areas.

Due to the environmental location of Kano and being the mostly populated state in Nigeria (National Population Commission, 2006), it may be speculated that facial nerve palsy will have peculiar aetiological factors which may be different from other parts of the world. The state has also been associated with high occurrence of road traffic accidents (Karofi, 2007) and the highest prevalence of stroke in Nigeria (Owolabi et al, 2010) which is prominent causes of facial nerve palsy. In addition, this area has been shown to exhibit excessively harsh weather and prolong heat conditions during throughout the year but most especially in winter (Eldorado Weather,, 2013) which results in facial infection and inflammatory reactions that can predispose to facial nerve palsy. Therefore, it will be important to investigate the aetiology and prevalence of facial nerve palsy in this area with peculiar geographical and cultural characteristics. Hence, this study determined the aetiological profiles and prevalence of facial nerve paralysis in Kano, Nigeria.

METHODS

The Approval for the protocol of this study was sought and obtained from the ethics committee of Aminu Kano Teaching Hospital, Kano, Nigeria. The permission of the authorities of each of the involved hospitals and their heads of record departments were also obtained. This study was carried out in the three main tertiary health institutions in Kano metropolis, northwestern Nigeria. All hospital files of patients diagnosed with facial palsy between 1st January 2006 – 31st December 2010 were retrieved. A case of facial nerve palsy was defined as a presentation of facial paralysis of an upper or lower motor characteristics of a defined or undefined etiology. Valid cases were ascertained and considered eligible if the following were clearly defined or implied in case files, they include: gender, age, address, marital status, ethnicity, side affected, diagnosis/impression, nature of impairment, type of lesion, onset of the disease, year of onset of the disease, occupation. However, the absence of undefined co-morbidity does not disqualify a case. Out of the 11145 patients' records in these three hospitals within the study period, a total of 1003 cases had indication or diagnosis of facial nerve paralysis but 936 met the inclusion criteria for this study. Hence, 936 cases were used for this study.

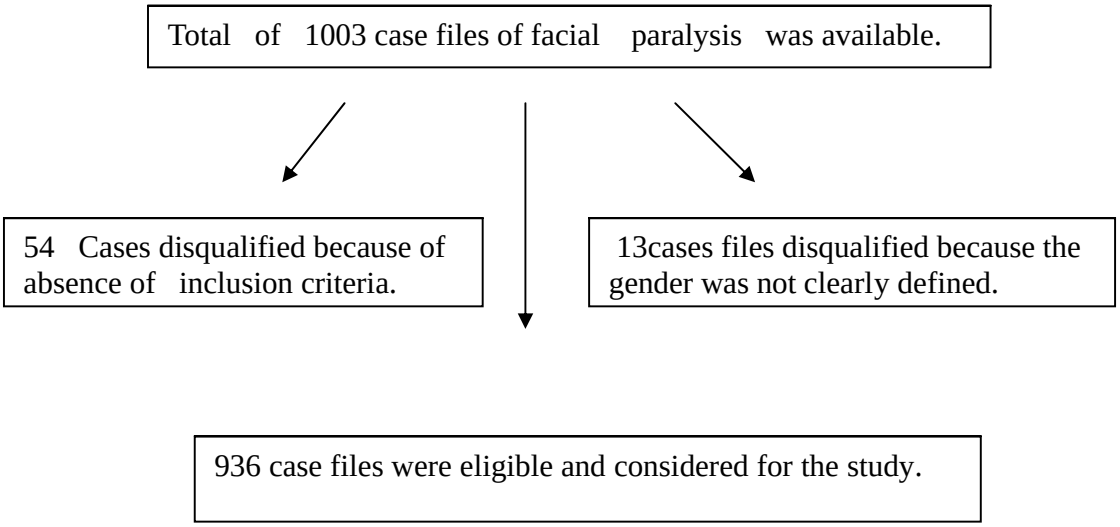

Figure 1: Case ascertainment chart

Data collection involved the use of research pro-forma to extract the information on socio-demographic and health profile characteristics of the participants from the hospital records. The hospital files of patients diagnosed with facial paralysis were pooled to serve as a source of secondary information, from which all information needed was extracted. The following information was recorded from the patient's case files: the Socio demographic and health profile characteristics of the patients, including age, sex, address, marital status, ethnicity, side affected (right or left), cause/diagnosis, nature of impairment/type of lesion, onset of the disease, year of onset, occupation and associated co-morbidities.

Data Analysis

Socio-demographic and health-profile characteristics of the patients were presented using descriptive statistics of simple frequencies, percentages, and distribution tables. Z-test for proportional significance, and Chi square test were used for predicting the significant difference between one variable and another, all statistical tests were carried out using Statistical package for social science (SPSS) Version 15 on window software, at 0.05 probability levels.

RESULT

Facial palsy is common between the ages of 20-38 years and accounted for (48.1%) of the cases (Table 1). Males were the most exposed, constituting 52.8% of those affected within the period under review. The Hausa ethnic group was involved above other tribes accounting for 93.3% of the cases. Married persons were equally found to be most exposed which accounted for 71.2% of the cases (Table 1). Among the most exposed categories, in terms of occupations were Civil servants (20.6%) and students (20.2%) (Table 1). Housewives were the most commonly affected by Bell's palsy with 19.0% of the cases recorded amongst them (Table 1). The majority (89.4%) of the participants resided in urban areas while 10.6% resided in the rural areas.

The causes of the facial paralysis included Bell's palsy, followed by stroke and trauma as reflected in Table 2. The left side of the face was involved more frequently (53.6%) than the right side (46.4). Lower motor neuron lesions accounted for (74.1%) and was thus higher than upper motor neuron lesion cases which accounted for (25.9%) of the cases (Table 2). Majority 94.0% had sudden onset while in 6.0%, the onset was insidious (Table 2). The most common co morbidity associated with facial paralysis was found to be infections, closely followed by diabetes mellitus and pregnancy/pre-eclampsia (Table 2). The highest number of incidents were recorded in the year 2010 whereas, the least number was recorded in the year 2006 (Figure 1). Facial

palsy due to stroke occurred commonly in housewives with (8.4%), trauma as a cause of facial palsy occurred most commonly among civil servants with (2.5%). Bell's palsy was slightly more in males (35.0%) than housewives (32.6%). Facial palsy due to trauma (4.9%) was more in males; however, housewives were slightly more affected by facial palsy due to stroke and infections and accounted for 11.8% and 0.4% of the cases respectively. Male accounted for (52.8%) of the cases while housewives accounted for (47.2%), only minor difference exist between the gender.

The z-value (-0.5348) showed that there was no significant difference in the prevalence of facial paralysis between male (52.8%) and female (47.2%) though there is higher value in the males. The result revealed that gender (with males having higher value) influenced the aetiologic factors of facial paralysis (p=0.000)). However the strength of association or influence between gender and aetiologic factors of facial paralysis was weak as determined using Cramer's V and Lambda respectively. House-wives had a significantly higher occurrence of facial nerve paralysis. Though there was an association between the two but the relationship index was found to be reflecting a weak strength of relationship as determined using Cramer's V. While the degree of association between the aetiologic factors of facial paralysis'' and occupation was very weak degree of association as determined using Lambda. There was an association between the co-morbidities and the aetiologic factors of facial palsy. However, the strength of relationship is weak and the degree of association is very weak as determined using Cramer V and Lambda respectively

DISCUSSION

This study described the aetiological factors and prevalence of facial palsy in Kano over a five year period. The findings of this study revealed that the prevalence of facial palsy in this sub-region (9.1%) is relatively higher compared to those previously reported in other sub-regions in Nigeria and other parts of the world (Doner & Kuthuhan, 2000; Grose *et al*, 2002; Morris et al, 2002; Shmorgun et al, 2002; Alberton & Zed, 2006; Chukwuezi & Nwosu, 2007) who had earlier reported prevalence rates of less than one percent among their study populations. The high prevalence in this study can be attributed to high road traffic accident, higher prevalence of stroke as well as the harsh weather in this region. This is much of public health concern and calls for serious action considering the fact that this study could not account for the cases in the primary and secondary health institutions in the state and those that would not report to the hospital for care. The primary and secondary health institutions are likely to record higher prevalence as they are the closes to the people and the likely most patronized. Therefore, effort should be geared towards understanding the actual causes and strategies designed towards its prevention.

The fact that the peak prevalence occur in the age group of 20-38 years may due to activities during this age range. At this age range, people are more engaged in different activities and are likely to be exposed to more environmental hazards including road traffic accidents and infections. The current finding agrees with that of Amusa *et al* (2006) in a city, southwestern Nigeria which yielded similar result. The fact that the married persons were more affected even when they are either young or old calls for research to find the association or causes in order to stem it down. The study revealed that Hausa ethnic group were involved above other tribes, although this is not surprising since the location of the study was based in Kano (the base of Hausa ethnic group in Nigeria). Therefore, ethnic association on prevalence of facial paralysis could not be inferred from this study.

The fact that gradual increase in the incidences of facial palsy exist over the five years period most especially between 2007 and 2008 could be attributed to possible increase in knowledge and improved appropriate health-seeking behaviours. The highest number of cases/referrals was recorded in the year 2010, and lowest in 2006, this increase in the number of cases seen each year may not be unconnected with increase awareness of where and when to seek help in ill situation of such medical conditions as efforts have been geared towards health awareness through different media not only in Kano but throughout Nigeria. Such awareness may have necessitated the upward rise in the prevalence rate as the patients were formally documented and managed in the hospital, when their health status is compromised.

The findings that only minor differences exist between the sexes suggest that there is no gender variation in the occurrence of facial paralysis. This finding disagrees with those of Odebode & Ologe and Chukwuezi & Nwosu (2007) that gender variation exist but there is no consensus in the direction of their variances.

In this study, Facial palsy was found to be higher in house-wives followed by civil servants. It could be, because house-wives report to hospitals more, or probably they were more sensitive to their facial cosmetics than men. In addition, it is also possible that house-wives were more prone to factors causing stroke and other infections. This pattern actually is of great concern as the practice in this region restricts most of the activities of full house-wives indoors. This shows they may not have been exposed to those hazardous activities in the outdoor. Therefore, investigation should be conducted on their activities that may have predisposed them into such high prevalence. The fact that the disease was found to be low in farmers and those residing in rural areas compared to urbanites, could be attributed to decreased awareness among rural dwellers as well as unlikely early report to hospitals. This is because health institutions especially the tertiary ones are mostly located in the urban centres. Poverty level and accessibility could also have contributed to the unlikely report of the rural dwellers. This can also be attributed to the fact that the urban dwellers are likely to have better awareness due to assess to information medias which may impact positively on their knowledge and health seeking behaviours. It is also understood that less educated people are more concentrated in the rural areas than the urban centre. This can also be a factor to their health seeking pattern of behavours. The problems in the rural areas may have been compounded with inadequate healthcare centers, while in urban areas there may be more increase awareness of the disease and it's reportage to hospitals which could be due to the level of education and availability of hospitals to access health care, and awareness of where to receive help. Among the most exposed categories, in terms of occupations were Civil servants and students. This might be unconnected to their level of education and awareness of where and when to seek help in case of ill health.

The result of this study showed that Bell's palsy was ranked as the highest cause of facial palsy. This may be due to the fact that a diagnosis of Bell's palsy is always made for facial nerve paralysis of lower motor neuron type with no clear-cut aetiology. Therefore, investigation should be conducted to ascertain other possible causes of acute facial nerve paralysis. However, this observation is still in line with those of previous findings 5,6,21-23 who concluded that Bell's palsy is the most common form of facial nerve paralysis (Napoli & Panagos, 2005; Stottler & Pancioli, 2006; Cha *et al*, 2008).

Stroke being the second leading cause of facial palsy may have accounted for the high prevalence of facial paralysis as this region. Previous study has shown that this region has the highest incidence of stroke in Nigeria (Owolabi *et al*, 2010). Also, the high prevalence of facial paralysis can be link to trauma. It has been reported that Kano is faced with increase occurrence/prevalence of road traffic accident which ranked as one of the highest in Nigeria (Karofi, 2007). This may have accounted for the reason why trauma especially from road traffic accident was the third leading causes of facial paralysis in this study. This corroborates the findings of Cha et al (2008) that trauma from road traffic accident constituted a reasonable cause of facial palsy, it is also agrees with the findings of Odebode and Ologe (2006) which found that facial nerve is the most frequently injured cranial nerve due trauma.

The findings of the study shows a weak association between gender and aetiologic factors of facial palsy, also weak but significant association exist between different occupational groups with the aetiologies of facial palsy. This shows that either gender or type of occupation of an individual does not predispose him/her to the development of facial paralysis. However, the significant association, despite being weak is still a pointer to the need to investigate the relationship between occupational and gender-related activities and the development of facial paralysis.

The most common co-morbidities associated with the diseases were infection, diabetes mellitus, pre-eclampsia, though constituted small percentage. The co-morbidities were also found to be associated with the aetiologic factors, though the association was weak.

CONCLUSION

The prevalence (9.1%) of facial nerve paralysis is relatively higher in Kano, Nigeria than any other regions in Nigeria and other parts of the world. The most common form of facial paralysis is Bell's palsy, and the most commonly affected age group was 20-38 years. The left side of the face was slightly more involved than the right side of the face; lower motor neuron facial paralysis type and sudden onset of facial paralysis were predominant. The common co-morbidities associated with facial paralysis included infections, diabetes and pre-eclampsia with the urban dwellers mostly affected. The outcome of this study calls for public health programme especially in Kano, Nigeria to stem down the prevalence of facial nerve paralysis in this region.

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Table 1: Socio-Demographic Characteristics of Ascertained Cases.

Variables	Frequency	Percentage
Age (Years)		
1-19	170	18.2
20-38	450	48.1
39-57	226	24.1
58-76	75	8.0
77-95	15	1.6
Marital status		
Married	666	71.2
Single	205	21.9
Widow	48	5.1
Widower	14	1.5
Divorcee	3	0.3
Ethnicity		
Hausa	873	93.3
Yoruba	18	1.9
Igbo	20	2.1
Others	25	2.7
Occupation		
civil servants	193	20.6
Students	189	20.2
Business	152	16.2
Farmers	14	1.5
Housewives	278	29.7
Others	110	11.8

TABLE 2: Facial Palsy Characteristics/Presentations

Variables	Frequency	Percentage
Aetiologic factor		
Bell's palsy	633	67.6
Cerebrovascular diseases	214	22.9
Trauma	63	6.7
Surgery	21	2.2
Infection(otitis media)	5	0.5
Side of Affectation		
Right	434	46.4
Left	496	53.0
Bilateral	6	0.6
Type of Lesion		
Lower Motor Neuron	694	74.1
Upper Motor Neuron	242	25.9
Onset		
Sudden	880	94.0
Insidious	56	6.0
Co Morbidity		
Diabetes Melitus	8	0.9
Infections	9	1.0
Pre-eclampsia	4	0.4
None	915	97.8

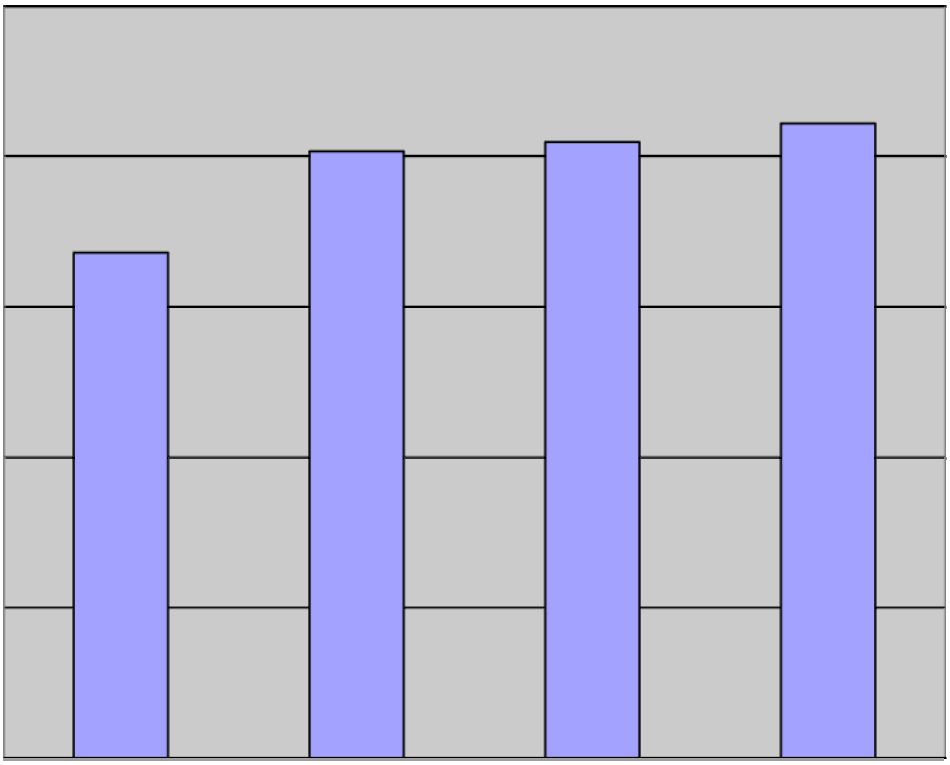

Figure 1: Annual Distribution of Facial Nerve Paralysis in the Participants