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ORIGINAL ARTICLE

Spectrum of Neurological Disorders in Neurology Outpatients Clinic in Tertiary Care Hospital: A Cross Sectional Study

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ABSTRACT

Background: Neurological disorders are one of the most noticeable causes of morbidity and mortality that have a negative impact on patient's lifestyle. A significant rate of these diseases exists in developing populations. However, there is lack and shortage of literature on neurological illnesses in Pakistan. This study was therefore carried out to determine the pattern of neurological diseases in this setting which can also provide a benchmark for planning and care for neurological illnesses at tertiary care level.

Methodology: This is a Descriptive cross-sectional review conducted at the neurology outpatient clinic of the Lahore General Hospital, Lahore over the duration of 9 months between April, 2021 and December, 2021. Data was gathered through a predesigned questionnaire from the patients which included data regarding gender, age, marital status, occupation, residential status and affected disease.

Results: Among all patients (140) who visited the neurology clinic over this duration, the most frequent neurological disorder was migraine (40%), followed by stroke (25%) and seizures (20%). The major age group that visited the neurology clinics was between 51 and 60 years (30%) and among them, most were males (60%).

Conclusion: Stroke, migraine, and Parkinson's disease were the most common neurological disorders among participants of present study. Neurological diseases outnumber other diseases in Pakistan, affecting all age groups and genders. Headache, migraine, stroke, and seizure were found to be more common than AD and other dementias in Western countries and as significant reasons of morbidity.

Keywords: Neurological disorders, neurology clinic, outpatients

INTRODUCTION

In developing countries, neurological illnesses constitute the leading cause of morbidity and mortality[1]. There is a dearth of data about presence of neurological disorders in the urban and rural populations[2]. Stroke rates are predicted to rise globally, with the biggest increases in South Asia. Stroke was more common in rural than urban areas in India. In Indonesia and Thailand, urban areas outnumber rural areas. Stroke incidence was 21.8% in a Karachi slum, according to studies (with 66.4% females). In comparison to the international literature, a Pakistani population-based study indicated a stroke prevalence of 19,000 per 100,000 people (191%), showing a considerable increase in stroke risk[3]. Out of over 194.9 million people (one of the most populous countries in the world), neurological illnesses affect at least 10% of Pakistan's population[4]. It is vital to obtain information from hospitals or the local community regarding the profiles of neurological disorders in urban and rural areas. It reflects the distinctions between rural and urban areas of the countries, and it would help formulate large-scale population-based intervention research. There is a lack of epidemiological data on neurological illnesses in Pakistan. Conducting community-based research to analyze the differences in neurological disorders across urban and rural areas is difficult due to resource constraints. Previous research in Pakistan focused on specific diseases and mostly took conducted in cities. For example, show the spectrum of neurological disorders and assess how their profile differs across patients in urban and rural outpatient settings[3,5]. The diagnosis and treatment of functional diseases including irritable bowel syndrome and functional dyspepsia have become more pragmatic in some specialties such as gastroenterology[6].

The objective of the study was to determine the frequency of the main Neurological Disorders among patients presenting in neurological outpatient clinic at a Lahore General Hospital, Lahore,

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METHODOLOGY

Present research was a descriptive cross-sectional study conducted in a tertiary care hospital at Lahore, in collaboration with University Institute of Public Health, Faculty of Allied Health Sciences, the University of Lahore, Pakistan for the period of nine months starting from April, 2021 to December, 2021. Lahore is the 2nd largest city of Pakistan and is the capital of province Punjab having an estimated population of 12 million. Non-probability purposive sampling technique was used.

Sample Size: The sample size for this study was calculated using the appropriate sample size calculation formula, used for a cross sectional study. The sample size was estimated using frequency of Neurological Diseases using following formula:

$$n = \frac{z^2_{1-\frac{\alpha}{2}} p(1-p)}{d^2}$$

Where "*n"* is the minimum sample size, "Z" is the standard normal deviate at 95% confidence interval (1.96), so $Z^2_{1-\alpha/2} = 1.96^2$, "P" is Overall incidence of Stroke (Neurological Disease) among adult population = 21.8 [28], "q" is the complementary probability (1 – p) and "d" is the precision of the study set at 0.075 (7.5%). Sample size (*n*) calculated was 116 patients suffering from Neurological diseases. After Attrition (10%), sample size of 140 patients was selected.

Inclusion Criteria: Inclusion criteria included adult patients of more than 18 years of age suffering from Neurological Disease and patients who have been visiting Neurological Outpatient Clinic for follow up ranging from one to three.

Exclusion criteria included patients who have been visiting Outpatient Clinic of Neurology Department of LGH for the first time and have not been diagnosed by Neurologist, extremely sick patients who could not provide the information about the Neurological Disease. Patients who had co-morbidities like Hypertension, Diabetes Mellitus, or taking treatment for some cancerous condition were also excluded from the study.

Ethical considerations: The rules and regulations set by the ethical committee of UOL (University of Lahore) was followed while conducting the research, respecting fully the rights of the research participants. All the participants were briefed before the study about their rights of withdrawal from study, any risk or disadvantage and written informed consent was signed by all the participants. Data collection and information obtained was kept confidential and participants involved in the study were kept anonymous. Data was kept in under key and lock and in password protected laptop.

Methods for Collection of Data: Demographic information including age, sex and monthly income of patients with Neurological Diseases was obtained with the help of questionnaire. Neurological conditions were grouped according to following International Classification of Diseases. List of neurological disease included in the study are provided in supplementary data.

Statistical data analysis: After collection, data was transferred to SPSS (version 24.0) spreadsheet for further analysis. Descriptive analysis done for demographic and other variables. Results were reported as numbers (n) with percentages (%) for quantitative variables and mean ± standard deviation (SD) or median with ranges for all qualitative variables. Association of different age groups and gender with neurological diseases was performed using Pearson Chi square test. P value< 0.05 was considered as statistically significant.

RESULTS

Demographical characteristics of patients: A total of 140 patients were recruited for current study who have attended neurology clinical in a tertiary care hospital. A written consent was obtained from each of the patient, before recruiting them for current study. From 140, 84 were male and 56 were female. Most of the patients (n=30) were belongs to the age group 51-60 years however the patients with < 10 years of age were only n=5. From total studied subjects, 104 was married and 36 was unmarried. The general distribution of studied subjects has shown in Table 1.

Table 1: Demographic profile of the patients (n=140)

Variable		Frequency	%age
Gender	Male	84	60.0
	Female	56	40.0
Age (Years)	less than 10	7	5.0
	11-20	14	10.0
	21-30	21	15.0
	31-40	28	20.0
	51-60	42	30.0
	above 60	28	20.0
Marital status	Married	104	74.3
	Unmarried	36	25.7
Residential status	Urban	98	70.0
	Rural	42	29.9
Occupation	Office workers	35	25.0
	Labourers	28	20.0
	House workers	20	14.3
	Students	22	15.7
	Retirees	28	20.0
	Others	7	5.0

From total studied subjects, a total of 98 was living in urban areas and remaining 42 was living in rural areas. The studied patients consisted of office workers which includes government as well as private offices (n=35) and different workers (n=105). From these 105 workers, majority were labourers (n=28) and retirees (n=28). However, 22 was working as students in different institutes and 7 was involved in other daily workers distribution.

Type of Referrals of patients to the hospital: Most of the patients (90) were referred to the neurology clinics by other physicians in the city and n=8 visited the clinic by referring from their family members or any of the friends. A significant number of patients visited the clinic by their own choice

Family history and previous history of patients: Family history of patients was noted on the written informed consent form before recruiting them for current study. Maximum patients (112) were having no family history, however a total of 28 patients found with family history. Patients suffering from different clinical issues did not take any medication (n=62). Majority of the patients (49) who were taking medicine were choosing Allopathic medicine as the choice for treatment. However, 14 was using Homeopathic treatment, 8 was using Herbal medicine and 7 was using Unani medicines as a choice for their `. Majority of the patients (91) were not taking medication seriously. Only 49 of the patients was using the medicine on daily basis with strict compliance. A total of 63 patients were partially recovered from the disorders. While remaining were not recovered. From the total studied subjects in their previous treatment choices 28 was faced worse critical situations. The type of treatment and their outcomes has shown in Table 2.

Table 2: Previous history of neurological disorders, type of treatment and outcomes of the treatment in patients (n=140)

Variable		Frequency	%age
Previous measures taken by patients	Allopathic medicine	49	35.0
	Herbal medicine	8	5.7
	Unani medicine	7	5.0
	Homeopathic medicine	14	10.0
	No treatment	62	44.3
Compliance of previous measures	Yes	49	35.0
	No	91	65.0
Outcomes of previous treatment	Partial recovery	63	45.0
	No recovery	49	35.0
	Worsened	28	20.0

Prevalence of different neurological disorders in studied patients: In the current study, the most common neurological disorders were Migraine (56), Ischemic or Hemorrhagic stroke (35), Focal or Generalized seizures (28), Peripheral neuropathy (7), Lumbar spondylosis (7), and Disc prolapse (7). Majority of the patients (91) have chosen Allopathic medicine as their treatment of choice. However, 14 wanted to use Homeopathic medicine for their treatment and 7 used Herbal medicine as a choice of treatment for them. A total of 49 patients were coming for their checkup for the first time, 14 was having their 2nd follow-up visit while 77 were came for their regular check-up from the clinic.

Prevalence of neurological symptoms in patients: The common symptoms observed in the studied patients were headache (42), neck pain (28), dizziness (21), lower back pain (14), paresthesia in extremities (14), pain in extremities (7), facial weakness (7), and difficulties in walking (7). All of these symptoms were asked from the patients before telling them their final diagnosis, so minimizing the risk of bias. The prevalence of different neurological symptoms in studied patients has shown in Table 3.

Table 3: Neurological symptoms in patients (n=140)

Variable	Frequency	%age
Neck pain	28	20.0
Low back pain	14	10.0
Dizziness/vertigo	21	15.0
Paraesthesia in extremities	14	10.0
Pain in extremities	7	5.0
Facial weakness	7	5.0
Walking difficulties	7	5.0
Headache	42	30.0

Most of the patients (60) in current study were suffering from the diseases from last one year. However, a total of 27 patients was suffering since > 2 years, 29 was in the last 1-2 years, and 24 were sick since < 6 moths. The patients were given treatment and asked for their second visit follow-ups. A total of 49 patients were coming

for their checkup for the first time, 14 was having their 2nd follow-up visit while 77 were came for their regular check-up from the clinic. The duration of disorder is shown in Table 4.

Table 4: Duration of neurological disorder (n=140)

Variable	Frequency%	Mean	Standard Deviation
<6 months	24(17.1)	2.4214	.98964
1 year	60(42.9)		
1-2 years	29(20.7)		
>2 years	27(19.3)		

Table 5: Prevalence of co-morbidities in neurological patients (n=140)

Variable	Frequency	%age
Diabetes mellitus	29	20.7
Hypertension	28	20.0
CVS related disorders	14	10.0
Ortho related disorders	14	10.0
Gynaecological disorders (in females)	7	5.0
None of above	48	34.3

Prevalence of different co-morbidities in neurological patients: The studied patients were clinically checked for co-morbidities (if any) to find out the correlation between neurological disorders and possible co-morbidities. The most common co-morbidity was Diabetes mellitus (29), hypertension (28), cardiovascular disorders (14), ortho related disorders (14) and gynecological disorders in females (7), however48 were not suffering from any co-morbidity. The prevalence of different co-morbidities has shown in Table 5.

Significant (p value .000) association between age and non-neurological symptom was found. Above table shows association of age with common neurological disorders. According to this, there is significant (p value .000) association between age and neurological disorders

Above table shows association of gender with non-neurological disorders. According to this, there is significant (p value .000) association between gender and non-neurological disorders. Above table shows association of gender with common neurological disorders. According to this, there is significant (p value .000) association between age and neurological disorders

Table 6 shows association of residence with neurological disorders. According to this, there is significant (p value .000) association between both variables.

Above table shows association of occupation with non-neurological disorders. According to this, there is significant (p value .000) association between both variables.

Table 6 shows association of residence with non-neurological disorders. According to this, there is significant (p value .000) association between both variables.

Occupation of participant * Common neurological disorders: Table 7 shows association of occupation with neurological disorders. According to this, there is significant (p value .000) association between both variables.

Table 6: Association of residential status and non-neurological disorders of patients

Residential status of participants	Non-neurological disorder of participant						Total
	Diabetes Mellitus	hypertension	CVS related disorders	Ortho related disorders	Gynaecological disorders (in females)	none of above	
Urban	21	8	0	14	7	48	98
Rural	8	20	13	0	0	0	41
3.00	0	0	1	0	0	0	1
Total	29	28	14	14	7	48	140

Table 7: Association of occupation and non-neurological disorders

Occupation of participants	Non-neurological disorder of participant						Total
	Diabetes Mellitus	Hypertension	CVS related disorders	Ortho related disorders	Gynaecological disorders (in females)	None of above	
Office workers	7	7	0	7	7	7	35
Day laborer	1	14	0	0	0	13	28
House holders	7	0	6	7	0	0	20
Students	0	7	1	0	0	14	22
Retirees	14	0	0	0	0	14	28
Others	0	0	7	0	0	0	7
Total	29	28	14	14	7	48	140

Table 8: Association of occupation and non-neurological disorders

Occupation of patients	Common neurological disorders of participant						Total
	Migraine	Ischemic/hemorrhagic stroke	Focal/generalized seizures	Peripheral neuropathy	Lumbar spondylosis	Disc prolapse	
Office workers	14	0	21	0	0	0	35
Day laborers	21	7	0	0	0	0	28
House holders	0	13	0	0	0	7	20
Students	7	8	0	0	7	0	22
Retirees	7	7	7	7	0	0	28
Others	7	0	0	0	0	0	7
Total	56	35	28	7	7	7	140

DISCUSSION

Infectious diseases, malnourishment, and chronic neurological conditions are frequent in Pakistan's highly populated cities. This study was conducted in a busy Lahore tertiary care hospital with a wide range of neurological illnesses. The patient demographics revealed that for 1–3 months, whereas 29.16% used it for 3–6 months[1]. Patients' compliance with prescribed medications was suitable for neurological diseases were more common in males aged 51 to 60. This conclusion matched a WHO survey that found over 20% of persons over 60 had neurological problems. This study's findings matched those of a similar survey done in India, both in terms of age and gender. In Kumasi, Ghana, researchers discovered 882 men and 930 women (a male to female ratio of 1.0:1.1) with an average age of 54. Strokes, epilepsy and seizure disorders, and movement disorders were the most common primary neurological disorders, correspondingly[7]. In a cross-sectional study in Kolkata, India, neurological diseases were quite common (prevalence rate >60/100 people)[8]. This study found that among those aged 60 and older, stroke, essential tremor, Parkinsonism, and dementia were common illnesses. Stroke was also shown to be more likely in men. However, both genders saw a rise in neurological problems. Another study in Bangladesh found that of 1,684 patients[9], 28.38% were aged 51–60, with a male (57.19%) majority. The study also found that 29.75 percent of patients had headaches or migraines, while 23.93 percent had strokes and 7.07 percent had seizures. The majority of patients chose Allopathic drugs for therapy. But few patients employed homoeopathy, herbal, or Unani medicine[10]. Patients did not take medication seriously. Only a third of patients took their medications

on a daily basis[11]. This conclusion is in line with a research conducted in Bangladesh, which found that most patients took NSAIDs and other analgesics. The patients' trust in the physician's prescribed drugs was a major factor in selecting them. 39.73% of patients used prescribed treatment 34.56%, good for 28.15% and reported for 23.22%. This study's findings included headache, migraine, ischemic or hemorrhagic stroke, focal/generalized seizures, neck pain, epilepsy and dizziness. In an out-patient neurology clinic, headache was the main repeated presentation, followed by CVAs and epilepsy, according to a Peshawar study[12]. Another study found that 29.75% of patients had headaches and migraines, followed by stroke (23.93%) and seizures (7.17%). According to the Aga Khan Medical College, Karachi, a prospective study found that headaches were present in 18.6% of patients, followed by vascular diseases (17.4%), nerve and root lesions (14.1%), and epilepsies (12.5%)[13]. Parkinson's disease afflicted about 71% of males and 62% of females. Females had more migraines and vertigo. Epilepsy was more common in children. 3 In their study in Nigeria, Lagunju et al. (2009) found that Nigerian children had epilepsy (45.3%), cerebral palsy (36%), neuromuscular diseases (4.5%), and mental retardation (4.5%). (4.5%)[14]. The current investigation found that most patients lived in cities. Similarly, Awan et al. (2019) found that ischemic stroke and psychiatric illnesses were more common in rural locations than metropolitan areas. Stroke, headache, nerve and root lesions are common in both urban and rural locations[15]. In 2010, Siddiqi and colleagues researched neurological illness in Zambia. Viral illnesses (26), neuropathy/radiculopathy (10) and cerebrovascular disease (6) were the most common neurological problems among HIV+ individuals (7.5%)[16]. Infectious diseases impacted 47 people (12.5%), neuropathy and radiculopathy affected 37 people (9.8%), and seizures/epilepsy affected 27 people (9.8%). (7.2%). Infectious diseases dominate inpatient neurological illness. Outpatient neurological disorders had several non-infectious causes. They said most common neurological illnesses can be addressed with over-the-counter medications. A Saudi Arabian study looked at neurological diseases at tertiary care outpatient clinics. After epilepsy and seizure disorders (37.71%), headaches (15.51%) were the most common neurological condition, followed by stroke (9.29%) and MS (9.29%)[17] (9.20%). Headaches (31.9%), epilepsy (9.86%), intervertebral disc problems (7.67%), lumbar and cervical arthrosis, polyneuropathy, stroke, Parkinson disease, and dementia were the most frequent neurological disorders, according to Tegueu et al. (2013)[18]. In this study, the most common co-morbidities were diabetes, hypertension, cardiovascular illnesses, ortho-related disorders, and gynaecological problems in females. However, one-third of patients had no co-morbidities. However, a Lithuanian study found that COPD patients often develop neurological and psychological co-morbidities (COPD)[19]. At this hospital's neurology clinic in Lahore, Pakistan, non-communicable disorders like stroke, migraine, and Parkinson's disease were shown to contribute significantly to the burden of neurological disorders. It was astonishing to learn that neurological ailments were more common than other illnesses in Pakistan, and that this was true for people of all ages and genders. Headache/migraine, stroke, and seizure were more noticeable ailments in this survey, but they were not similar to diseases widespread in western nations, where Alzheimer's disease and other forms of dementia are important neurological diseases. A larger research of the incidence, prevalence, and socio-demographic aspects of neurological illnesses in this specific location will undoubtedly aid us in recognizing the neurological burden that our country bears.

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