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A Comparative Review of Spine Surgeries in Two New Neurosurgery Centres in an Urban and Rural Environment in Southeast Nigeria

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ABSTRACT

Background: The Imo State University Teaching Hospital (IMSUTH) located in a rural setting commenced neurosurgical services in January 2016 with a spine procedure as the first case whereas the Imo State Specialist Hospital (IMSSH) located in an urban setting commenced neurosurgical services in April 2021 and spine procedures in August 2021. The presentation of surgically managed spine pathologies in both hospitals were compared.

Aims: The study aimed to descriptively compare the number of spine procedures performed in both hospitals including the age and gender distribution of the surgically managed spine patients, the spine pathologies and their distribution.

Methods: The surgical records of all spine patients who had surgical procedures at IMSUTH, Orlu, from January 2016 to May 2020 (42 months), and at IMSSH, Owerri, from August 2021 to July 2024 (36 months) were retrospectively reviewed.

Results: During the study periods, in IMSUTH, Orlu, there were 27 spine surgeries, giving an average of 1 spine procedure in 2 months whereas in IMSSH, Owerri, there were 157 spine surgeries giving an average of 4 spine surgeries per month. Interestingly the distribution of spine procedures revealed that the highest frequency of spine surgeries was performed in the lumbar spine (n=7, 26% in IMSUTH; n=43, 27.3% in IMSSH) followed by lumbosacral spine (n=6, 22.2% in IMSUTH; n=42, 26.8% in IMSSH) in both hospitals. And quite interesting also is that trauma (n=15, 55.6%) accounted for the highest number of spine surgeries in the rural environment of IMSUTH, Orlu, while degenerative spine diseases (n=113, 71.9%) accounted for the highest number of spine surgeries in the urban environment of IMSSH, Owerri.

Conclusion: The study revealed that spine pathologies are not uncommon in resource poor settings especially in the urban environment. There is a male preponderance for spine surgeries. Lumbar/lumbosacral spine pathologies are common in our resource poor settings but trauma related spine pathologies are more common factors for spine surgeries in rural settings. There is need to improve access to spine care in the rural environments.

KEY WORDS: spine surgery, urban, rural, new neurosurgery center, Nigeria

INTRODUCTION

The Imo State University Teaching Hospital, Orlu, South-East Nigeria, established in June 2004, is a tertiary healthcare institution affiliated to the Imo State University. It serves as a center for medical education, research and healthcare delivery in the region. Orlu is considered a rural settlement and is the second largest city in Imo State with a population of 198,500 as of 2022 while the population of Imo State is estimated at 5.4 million as of 2022.[1]

The Imo State Specialist Hospital, Owerri, is a tertiary health facility established on 22nd January by Imo State Law No 3 of 2018 for the purpose of providing medical services, teaching and research in the field of medicine and related areas; and secondary and tertiary health care services. Owerri is the capital of Imo State, and the largest city in Imo State with an estimated population of 560,700 as of 2022.[1]

Both IMSUTH and IMSSH are public hospitals and serves Imo and the neighbouring States of Rivers, Abia, Anambra and beyond. IMSUTH, Orlu, approved my neurosurgery training at the University of Witwatersrand, Johannesburg, South Africa from September 2008 to October 2012. On my return to IMSUTH, there were no facilities for neurosurgery practice in IMSUTH, hence I had to volunteer at King Faisal Hospital (KFH), Kigali, after registration with the Rwandan Medical Council as a Consultant Neurosurgeon, from January 2013 to August 2013. I gained much experience in both spine and cranial procedures while working at the Neurosurgery Department, KFH, Kigali. I returned to IMSUTH in September 2013 but still with no facilities to work with, the

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Hospital Management approved a leave of absence that enabled me to take up a contract appointment as a Consultant Neurosurgeon at Delta State University Teaching Hospital (DELSUTH), Oghara, (from December 2013 to January 2015) where I worked with the renowned Neurosurgeon, Prof Wale Sulaiman, to establish neurosurgery services in the hospital. Prof Sulaiman is renowned for his spine expertise, hence working with him helped me to improve my neurosurgery skills and developed more as a spine surgeon. And to my advantage, the rural location of DELSUTH afforded me an understanding and appreciation of neurosurgery practice in a rural environment. I returned to IMSUTH in February 2015 when the new Hospital Management assured me of setting up facilities for neurosurgery services at the hospital. Neurosurgical services started with only outpatient consultations from February 2015 at IMSUTH during which period I assisted in guiding the construction and equipping of a neurosurgery theatre. The Hospital Management secured funds from the Imo State Government for the construction of a neurosurgery theatre at the back of the main theatre complex. Funds were also released to equip the neurosurgery theatre including the purchase of a brand new C-arm x-ray machine. And interestingly the first surgical procedure in the newly constructed and equipped neurosurgery theatre was a spine procedure in a young man [with paraplegia (ASIA B)] who had pedicle screw stabilization/decompression of a thoracolumbar fracture/dislocation. He had full neurological recovery of motor function and actively mobilized on Zimmer's frame at discharge 3 weeks later, and subsequent normal active mobilization while on outpatient follow-up. This case generated tremendous confidence in neurosurgery practice at IMSUTH. Thus began my neurosurgery services at IMSUTH and more significantly spine services which prior to my arrival was not available in Imo State.

In October 2020, I was seconded to the IMSSH, Owerri, as the Chief Medical Director of the Hospital. And as part of the transformation of the hospital, Neurosurgery services commenced in April 2021 with outpatient consultations and later the first neurosurgery procedure, a cranial surgery, was performed in the same month. Spine surgery services started in August 2021 after the purchase of a C-arm x-ray machine which was deployed to the neurosurgery theatre. A review comparing the demographics of the spine surgeries performed at both hospital is presented here, after 3 years of spine surgeries at IMSSH, Owerri. Of particular note is the fact that the hospitals are located in different settings and this made for an interesting comparison of the spine surgeries in the two hospitals.

MATERIALS AND METHODS

RESEARCH DESIGN

A descriptive retrospective study design was used.

PLACE AND PERIOD OF STUDY

This retrospective study was carried out at the Imo State University teaching Hospital, Orlu, and the Imo State Specialist Hospital, Owerri, over a period of 42 months (January 2016 to May 2020) and 36 months (August 2021 to July 2024) respectively.

PATIENT SELECTION

Surgical records of patients operated on for spinal pathologies at both hospitals were retrieved and data collected using a structured proforma.

It is worth noting that the Spine Surgeon went on Sabbatical leave in 2018, hence only one spine surgery was performed in January 2018 at IMSUTH, Orlu. Also the resident doctors at IMSUTH, Orlu, embarked on a strike action from June 2020, hence there were no surgical services from June until the secondment from IMSUTH to IMSSH in October 2020.

DATA ANALYSIS

The data obtained was analyzed by the use of computer aided statistical analysis of the variables. Simple statistical calculations such as mean, frequency, percentages and standard deviation of variables were worked out.

ETHICS

Approval for the study was obtained from the Human Research Ethics Committee (Medical).

RESULTS

During the 42 months study period at IMSUTH, Orlu, (excluding the 11 months in 2018 when the spine surgeon was on sabbatical leave), 27 patients had spinal surgeries, giving an average of 1 spine procedure in 2 months. Whereas during the 36 months study period in IMSSH, Owerri, 157 patients had spinal surgeries, giving an average of 4 spine procedures per month. The summary of patient's characteristics for both hospitals is as shown in table 1.

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Table 1: Summary of Patient Characteristics

Variables	Frequency	
	IMSUTH	IMSSH
Total number of patients	27	157
Male	18 (66.7%)	98 (62.4%)
Female	9 (33.3%)	59 (37.6%)
M: F	2:1	1.7:1
Mean age (years)	40±19.13	54±16.03
Mean age for males (years)	36±18.4	53±17.18
Mean age for females (years)	46±19.44	55±14.05
Peak age range	40-59 (n=11, 40.8%)	60-79 (n=68, 43.3%)

The mean age of the patients that underwent spinal surgery during the study period was 40±19.13 years for patients in IMSUTH and 54 ± 16.03 years for patients in IMSSH. The mean age for male patients was 36±18.4 years for IMSUTH and 53 ± 17.18 years for IMSSH while that of female patients was 46±19.44 for IMSUTH and 55 ± 14.05 years for IMSSH. The peak age range was in the age group 40-59 (n=11, 40.8%) for IMSUTH and 60-79 years for IMSSH (n=68, 43.3%) (Table 2).
The study revealed that males (n=18, 66.7% in IMSUTH; n=98, 62.4% in IMSSH) had higher frequency than females (n=9, 33.3% in IMSUTH; n=59, 37.6% in IMSSH).

Table 2: Comparison of age of patients at presentation

	Age Interval n (%)				
Hospital	0 – 19	20 – 39	40 – 59	60 – 79	80 - 99
IMSUTH, Orlu	4 (14.8%)	7 (25.9%)	11 (40.8%)	5 (18.5%)	-
IMSSH, Owerri	2 (1.3%)	25 (15.9%)	58 (36.9%)	68 (43.3%0	4 (2.6%)

Table 3: Comparison of patients according to location of spine surgeries

	Location of spine surgery n (%)							
Hospital	Cervical	Cervicothoracic	Thoracic	Thoracolumbar	Lumbar	Lumbosacral	Sacral	Lumbosacropelvic
IMSUTH, Orlu	5 (18.5%)	1 (3.7%)	6 (22.2%)	2 (7.4%)	7 (26%)	6 (22.2%)	-	-
IMSSH, Owerri	42 (26.8%)	3 (1.9%)	8 (5.1%)	13 (8.3%)	43 (27.3%	42 (26.8%)	3 (1.9%)	3 (1.9%)

Table 4: Comparison of patients according to spine pathologies

	Nature of spine pathology n (%)					
Hospital	Degenerative	Trauma	Infection	Tumour	Congenital	Sringomyelia
IMSUTH, Orlu	9 (33.3%)	15 (55.6%)	2 (7.4%)	1 (3.7%)	-	-
IMSSH, Owerri	113 (71.9%)	31 (19.7%)	4 (2.6%)	6 (3.6%)	1 (0.6%)	2 (1.3%)

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The distribution of spine procedures revealed that the highest frequency of spine surgeries was performed in the lumbar spine in both hospitals, n=7, 26.0% in IMSUTH, n=43, 27.3% in IMSSH. Lumbosacral spine surgeries, n=6, 22.2%, and thoracic spine surgeries, n=6, 22.2%, followed next in equal proportion in IMSUTH, while lumbosacral spine surgeries n=42, 26.8%, and cervical spine surgeries n=42, 26.8%, also followed next in equal proportion in IMSSH (Table 3). Sacral and lumbosacropelvic spine surgeries were performed only in IMSSH, Owerri (Table 3).

Table 4 shows that spinal trauma (n=15, 55.6%) accounted for the highest number of spine surgeries in IMSUTH followed by degenerative spine diseases (n=9, 33.3%) and spinal infection (n=2, 3.7%), while degenerative spine diseases accounted for the highest number of spine surgeries in IMSSH (n=113, 71.9%), followed by spinal trauma (n=31, 19.7%) and spinal tumours (n=6, 3.9%) (Table 4). A surgery for a congenital pathology and two surgeries for syringomyelia were performed at IMSSH during the study period.

DISCUSSION

This study reviews and compares the spine surgeries in the two tertiary State Government owned public hospitals in Imo State from the commencement of spine surgeries in both health facilities. The author has been the spine surgeon, although assisted as the case may be by other surgeons interested in spine surgery or by trainee resident doctors/medical officers/nurses. The findings from the study revealed a low number of spine surgeries in IMSUTH, Orlu, a rural environment, during the study period (n=27 over 42 months). This is in stark contrast to the higher number of spine surgeries in IMSSH, Owerri, an urban environment, during the study period (n=157 over 36 months). The marked difference in utilization of the spine services in both hospitals despite being in the same resource poor setting, in the same State and by the same spine surgeon was an interesting study findings. A factor that may have influenced this finding may be the rural environment of Orlu where IMSUTH is located, in keeping with the report by other authors that access to surgical care including neurosurgical care is poor in rural areas of the world.[2-4]

Also the findings in the study, show that there were more males (n=18, 66.7% in IMSUTH; n=98, 62.4% in IMSSH) than females (n=9, 33.3% in IMSUTH; n=59, 37.6% in IMSSH) with a male to female ratio of 2:1 in IMSUTH and 1.7:1 in IMSSH. An earlier 21 months study in IMSSH by Opara et al[5] also had a higher number of males (n=42, 58.3%) than females (n=30, 41.7%). This is also similar to a 2-year study by Adebe et al[6] in Addis Ababa, Ethiopia, which also had male preponderance in all their spine surgeries. The peak age range was in the age group 40-59 years (n=11, 40.8%) for IMSUTH followed by the age group 20-39 years (n=7, 25.9%), while the peak age range was in the age group 60-79 years (n=68, 43.3%) for IMSSH followed by the age group 40-59 years (n=58, 36.9%). The above study findings for IMSSH [including having 4 (2.6%) spine surgeries in the 80-99 age group] is not surprising when correlated with the finding of degenerative disease as the highest pathology (n=113, 71.9%) responsible for spine surgeries in IMSSH. Similarly the above study findings for IMSUTH [which had 4 (14.8%) spine surgeries in the 0-19 age group] may be a reflection of the study finding which showed that trauma (n=15, 55.6%) was the highest pathology for spine surgeries in IMSUTH, and hence spinal surgeries tended to be more common in the younger and more active age groups in IMSUTH. Interestingly in both hospitals, lumbar spine surgeries were the highest in frequency (n=7, 26% in IMSUTH; n=43. 27.3% in IMSSH), followed by lumbosacral spine surgeries (n=6, 22.2% in IMSUTH); n=42, 26.8% in IMSSH). This may reflect a propensity for lumbar/lumbosacral spine pathologies in our environment irrespective of location in urban or rural areas. However, whereas degenerative spine diseases were the highest spine pathology responsible for spine surgeries in the urban environment of IMSSH, Owerri (n=113, 71.9%), trauma was the highest pathology responsible for spine surgeries in the rural environment of IMSUTH, Orlu (n=15, 55.6%). In a number of reports, neurotrauma emerged as the highest cause of patient admission from both urban and rural centers.[7-10] And road traffic accidents (RTA) was the major factor responsible for such trauma.[9-11] The ban of commercial motorcycle riders has been reported as effective in reducing the rate of road traffic accidents in Nigeria.[12] These reports were probably confirmed in the rural environment of IMSUTH, Orlu, where we still have high incident of RTA on account of the use of motorcycles as mode of transportation. And this may explain why trauma was the highest cause of spine surgeries in IMSUTH, Orlu. Motorcycles were banned in the urban environment of IMSSH, Owerri, from 2011 and this probably influenced the low frequency of trauma in comparison to degenerative diseases as the pathologies responsible for spine surgeries in IMSSH, Owerri. Also, generally rural residents tend to be financially constrained and may therefore opt to tolerate the discomfort and disability of degenerative diseases unlike the effect of trauma, which can be incapacitating with excruciating unbearable pains, and therefore

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may force them to seek for funds to alleviate the situation. Also rural residents tend to be less educated and less enlightened than urban residents and may therefore resort more to traditional treatment practices for their degenerative spine diseases.

CONCLUSION

The study revealed that spine pathologies are not uncommon in our resource poor settings, especially in the urban environment and with a male preponderance for spine surgeries. Lumbar/Lumbosacral spine pathologies are common in our resource poor settings but trauma related spine pathologies are more common factors for spine surgeries in rural settings. It is hoped this will be helpful in guiding policy formulation and planning for the growth of spine surgeries in our environment, especially in improving access to spine care in the rural environments.

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