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Stroke: risk factors, preventive actions and rehabilitation

Plus

- Reference intervals for serum creatinine and urea

- VMMC among university students

- Hepatocellular carcinoma and aflatoxin

- Paranasal sinuses in patients with chronic rhinosinusitis

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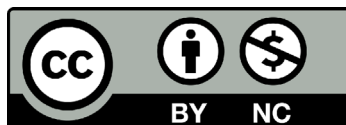
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FRONT IMAGE: Brain CAT scan of a stroke patient showing acute right non-haemorrhagic infarct in posterior middle cerebral artery territory as well as right basal ganglia with mass effect. (Credit: Eluzai Hakim)

Address risk factors as part of clinical practice to prevent stroke

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Part of this issue of the journal is dedicated to important aspects of prevention, diagnosis and management of stroke in low- and middle-income countries (LMICs).

In the South Sudan there are no guidelines on the prevention and management of stroke. Most African countries lie among the LMIC where 87% of disability adjusted life years are lost from stroke[1] and 86% of stroke related deaths occur.[2] Although stroke mortality is high in Africa there is a paucity of information on stroke subtypes and outcomes[3] to inform appropriate intervention. In addition, there is scarcity of Stroke Units on the continent where effective management and delivery of newer interventions such as thrombolysis in ischaemic stroke and thrombectomy may be delivered or organised. Hence, defining what has been shown to be effective in stroke care, such as prevention by addressing risk factors, good outcomes when stroke patients are managed in a dedicated Stroke Unit[4] and prompt rehabilitation will undoubtedly help inform policy decisions in the development of stroke services in Africa.

The working age (16-64 years) population in sub-Saharan Africa is estimated to increase by 700 million between 2020 and 2050.[5] In LMIC countries the population is predominantly young and, as such, stroke in young adults will have considerable socioeconomic impact because of healthcare costs and loss of labour productivity.[6]

The papers on stroke published here present a clear insight into the management of stroke from acute onset in a dedicated stroke unit to rehabilitation.

It is recommended that LMIC, especially in sub-Saharan Africa, institute a policy of regularly screening for vascular risk factors such as hypertension, ischaemic heart disease, dysrhythmias, and serum cholesterol. In addition, random blood sugar must be estimated in those who are overweight or with a family history of diabetes mellitus. Modifiable lifestyle risk factors such as smoking, excessive alcohol consumption and use of recreational drugs (e.g. cannabis and cocaine) should be considered at consultations and the public advised against their use through radio, newspapers, or other means to reduce the burden of stroke.

LMIC need to develop guidelines on the management of stroke, integrate preventive measures into standard clinical practice and train physicians, nurses, physiotherapists, occupational therapists, and speech and language therapists to form multidisciplinary specialist teams dedicated to stroke care. In addition, facilities for Computerised Axial Tomographic (CT) are urgently needed. These would allow more precise diagnoses hence enabling more appropriate treatment-see figure.
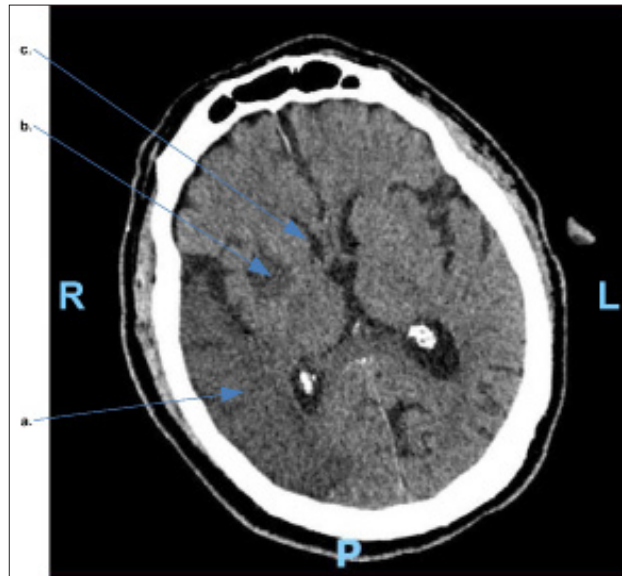
Brain CAT scan of a stroke patient showing acute right non-haemorrhagic infarct in posterior middle cerebral artery territory as well as right basal ganglia with mass effect. a. Acute ischaemic infarct in posterior middle cerebral artery territory, b. Acute right basal ganglia ischaemic infarct, c. Compressed right lateral ventricle (Mass effect) (Credit: Eluzai Hakim)

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Reference intervals for serum creatinine and urea in the adult western Sudanese population

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ABSTRACT

Introduction: Serum creatinine and urea levels are affected by numerous factors such as ethnicity, environment, age, sex, and anthropometric measurements. The Clinical and Laboratory Standards Institute (CLSI) recommends that each laboratory should establish its own reference intervals for biochemistry and haematology. There are no local reference intervals for serum creatinine and blood urea in Sudan; instead, intervals derived from worldwide research are used. The purpose of this study was to determine the blood urea and serum creatinine reference intervals for healthy adults in the Western Sudanese population.

Method: Randomly selected adult Sudanese residents of Al Fashir City who were from the Western Sudan states of Kordofan and Darfur were the subjects of a cross-sectional study conducted in September and October 2018. We recruited 153 participants. After giving their consent, they were evaluated using a questionnaire that collected medical history and demographic information. We used standard techniques to measure blood pressure, body mass index, urea, and creatinine. Kolmogorov-Smirnov tests were used to assess the distributions of the creatinine and urea values, and reference intervals calculated. T-tests were used to investigate differences of mean creatinine and urea levels by sex and age. IBM SPSS Statistics version 25 was used to analyse the data and $p \leq 0.05$ was considered significant.

Results: Overall, the reference intervals (Mean±1.96*SD) for serum creatinine and urea levels were 0.45-0.92 mg/dL and 7.6-27.9 mg/dL respectively, compared to international reference intervals adopted from the American Board of Internal Medicine (ABIM) serum creatinine (males 0.7-1.3, females 0.5-1.1 mg/dL) and blood urea (17.12-42.8 mg/dL for both sexes) and The Western Sudanese population's mean serum creatinine and urea levels were, respectively, 0.69 mg/dL and 17.8 mg/dL. Male sex was associated with higher levels of both creatinine and urea ($p<0.001$).

Conclusion: This study documented lower reference intervals for creatinine and urea in the Western Sudanese population.

Key words: creatinine, urea, reference, intervals, renal, function, test, Sudan

Introduction

Serum creatinine, urea, cystatin and beta-2 microglobulin are endogenous markers of kidney function. Serum creatinine and urea are the cheapest of these to measure and easily accessible. Exogenous filtrated markers, like inulin, are accurate indicators but impractical. The management of chronic kidney disease greatly depends on the accurate measurement of both filtrated markers, which are acknowledged as the best overall indicator of kidney function.[1] While industrialized nations have thoroughly studied the levels of these markers, most African nations have not.[2]

Most laboratories in Sudan use reference intervals that are taken from developed country populations, which may not apply to the Sudanese population. In a study to ascertain the normal values of respiratory function for Sudanese, such a difference was observed.[3]

The aim of this research was to determine the reference intervals of serum creatinine and urea in healthy adults in the Western Sudanese population. Additionally, the data were analysed by age and sex, and compared with regional and international studies.

Method

Study design and setting

In September and October of 2018, adults from the Western Sudan states (Darfur and Kordofan) who resided in Al Fashir city participated in a cross-sectional study.

Three federal Kordofan states—the north, south, and west—and five federal Darfur states—the north, south, central, east, and west—combine to form the western Sudan region. With an estimated population of 5,207,900 in 2017, Kordofan spans an area of 376,145 km² (146,932 miles²), with the Nuba Mountains located in the southeast. The main town is El-Obeid. With the Marrah Mountains (Jebel Marra) in the middle of the region, Darfur occupies 493,180 km² (190,420 sq mi) and is home to 9,241,369 people according to estimates from 2017. The three largest towns in the area are Nyala, Geneina, and Al Fashir.[4, 5]

Study population and eligibility criteria

College students voluntarily participated in the study, as did employees of both sexes working in factories, laboratories, and schools. The study included individuals who had no acute or chronic conditions at the time of enrolment, with ages ranging from 18 to 64, and originally from the western Sudan region.

Sample size and technique

According to the International Federation of Clinical Chemistry (IFCC) and Clinical and Laboratory Standards Institute (CLSI) recommendations on the establishment of reference intervals, the sample size should include at least 40 participants for each analysis category if data values are normally distributed and a parametric method is used.[6] Originally, we had planned to gather at least 240 samples, or 120 samples for each sex. However, due to budgetary constraints, we were only able to gather 153 samples.

Study procedure and data collection

After gaining informed consent, participants were evaluated using a questionnaire that asked about personal information and medical history. Standard methods (mercury sphygmomanometer and a stethoscope, weight (kg)/height (m)2, and Mindray B 300 chemistry auto analyzer), were used to measure blood pressure, body mass index, and serum creatinine and blood urea respectively.

Quality control

All pre analytical and post-analytical precautions were followed in order to guarantee the precision and accuracy of the test results, as indicated by CLSI-IFCC. The manufacturer recommended using commercial standards for daily calibration of the analyzer. Every day, the analyzer's accuracy was checked using controls for normal, abnormal low, and abnormal high values. 10% of the sample was reanalyzed in the Blood Bank quality control laboratory, using the same kind of chemistry analyzer, as part of an external quality control procedure.

Data analysis

IBM SPSS Statistics version 25 was used to conduct the statistical analysis. We used the Kolmogorov-Smirnov test to test whether values were normally distributed. The CLSI (C28-A3) guidelines suggest using mean±(1.96 * SD) to define the reference intervals (thus accounting for 95% of the data values) when the data have a normal distribution, and 2.5th and 97.5th percentile otherwise.[6] Means and standard deviations (SD) were calculated, both overall and for sub-groups by age and sex. T-tests were then used to compare sub-groups, using a significance level of $p \leq 0.05$.

Results

A total of 153 individuals were studied: 56 (36.6%) males and 97 (63.4%) females. Ages ranged between 18- 64

years with a mean of 23.5 years. Table 1 shows means and SDs for blood pressure and BMI.

The means (SDs) of serum creatinine levels for females and males were 0.66 (0.11) and 0.75 (0.12) mg/dL

Table 1. Blood pressure and BMI (n=153)

Test	Mean	SD	Range	Minimum	Maximum
Systolic BP mmHg	113.9	11.2	55	80	135
Diastolic BP mmHg	73.7	6.8	40	50	90
Body mass index	22.6	3.3	16.6	18.0	34.6

Table 2. Serum creatinine and blood urea (n=153)

Test	Mean	SD	Range	Minimum	Maximum
Urea mg/dL	17.8	5.2	23	10	33
Creatinine mg/dL	0.69	0.12	0.6	0.4	1.0
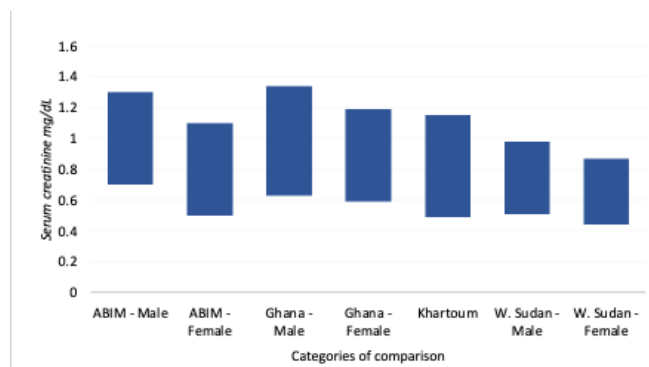
Figure 1. Comparison of serum creatinine mg/dL reference intervals (upper and lower values) between Sudanese (Khartoum/Western), African (Ghanaian) and international reference (ABIM)
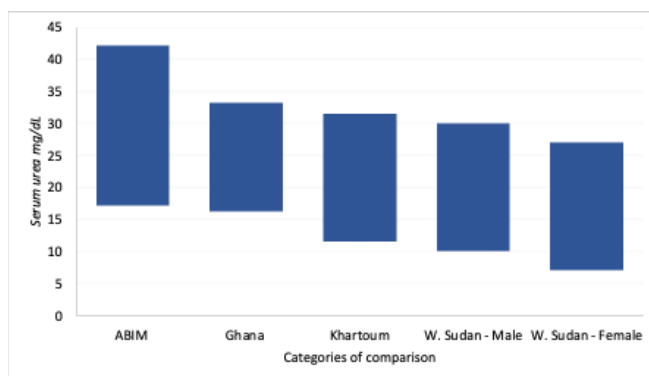
Figure 2. Comparison of serum urea mg/dL reference intervals (upper and lower values) between Sudanese (Khartoum/Western), African (Ghanaian) and international reference (ABIM)

respectively. For blood urea they were 17 (5) and 20 (5) mg/dL for females and males respectively. The reference intervals (mean±1.96*SD) of serum creatinine for females and males were (0.44-0.87) and (0.51-0.98) mg/dL respectively. For blood urea they were (7-27) and (10-30) mg/dL levels for females and males respectively.

The mean of serum creatinine and urea levels for combined males and females are shown in Table 2.

For all participants the results showed lower reference intervals of serum creatinine and urea levels (0.45-0.92mg/dL and 7.6-27.9mg/dL respectively) compared to the regional (Ghanaian)[7] study reference intervals of serum creatinine and urea levels (0.55-1.3 mg/dL and 16.2-34.2 mg/dL respectively) and international reference intervals adopted from ABIM[8], for serum creatinine (males 0.7-1.3, females 0.5-1.1 mg/dL) and for blood urea (17.12-42.8 mg/dL) (Figures 1 and 2).

T-tests showed that serum creatinine and urea correlate significantly with sex, with higher levels in males. Serum creatinine levels increased with age while urea level decreased with age, but the effect was not significant (Table 3).

Discussion

In this study we set out to determine the local reference intervals of serum creatinine and blood urea as this is a recommendation from CLSI.

Our findings showed lower serum creatinine and urea levels when compared to ABIM[8] and to a Ghanaian study.[7] The study showed little difference when compared to another Sudanese study[9] (Figures 1 and 2). These international and regional variations in the results might be due to ethnic and geographic variations between the studies' populations. Furthermore, western countries' life style, especially a diet rich in protein, may have led to a higher production of endogenous substances; that is a main reason why CLSI recommend establishing local reference intervals.

The means of the serum creatinine and urea levels were slightly higher in males than females, consistent with other studies.[9, 10, 11]

Although the mean serum creatinine concentrations were slightly higher with advancing ages this did not reach significance. This is similar to the findings of others.[9, 12, 13] With advancing age the mean serum urea concentrations tended to be lower but not significantly so.[14]

Table 3. T-tests of the means of serum creatinine and urea by sex and age

Variables	Category	Creatinine mg/dL			Urea mg/dL		
		Mean	SD	p-value	Mean	SD	p-value
Sex	Male	0.75	0.13	<0.001	20	5	<0.001
	Female	0.66	0.11		17	5	
Age	18-40 years	0.69	0.13	0.779	18	5	0.846
	41-64 years	0.74	0.10		16	3	

Conclusion

Both serum creatinine and blood urea concentrations reference intervals were lower than the ABIM reference intervals. Both serum creatinine and blood urea concentrations were higher in males than in females (p<0.001).

Recommendation

A fully supported household survey project including all Sudan states is needed to establish biochemical and haematological reference intervals for the Sudanese population and to encourage young Sudanese researchers to collaborate with the Federal Ministry of Health to achieve this goal.

Limitation

Because of the war in Sudan the authors no longer have access to the data and so have not been able to follow all of the recommendations from the reviewers but this did not affect the clarity of the paper.

Ethical consideration

Ethical approval of this study was obtained from the Sudanese Federal Ministry of Health and from The National Ribat University, Faculty of Medicine, Khartoum, Sudan.

Conflict of interest: None

Author contributions: Muaath Ahmed Mohammed comprehensively contributed to the data collection, and study design, and wrote the manuscript. Ibrahim Abdelrahim Ali and Abdarahiem Alborai Abeadalla contributed to data collection, analysis, and interpretation, and edited the paper. Omer Abdelaziz Musa contributed to supervision of the project, study design and reviewing the scientific context. All authors approved the final manuscript.

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Stopping women dying of postpartum haemorrhage

Postpartum haemorrhage (PPH) affects about 14 million women each year and claims the lives of around 70 000 women annually - mostly in low and middle-income countries - the equivalent to 1 death every 6 minutes. PPH is defined as the loss of more than 500ml of blood within 24 hours after birth, it is the leading cause of maternal mortality worldwide.

Delays in the detection or treatment of postpartum haemorrhage can result in complications or death.

A new solution, known as E-MOTIVE, could provide a major breakthrough in reducing deaths from childbirth-related bleeding, according to this landmark study published by researchers from the World Health Organization (WHO) and the University of Birmingham.

See

https://allafrica.com/stories/202305120469.html?utm_campaign=daily-headlines&utm_medium=email&utm_source=newsletter&utm_content=aans-view-link and Africa: Randomized Trial of Early Detection and Treatment of Postpartum Hemorrhage https://allafrica.com/stories/202305090529.html

Prevalence and perceptions of voluntary medical male circumcision among University of Juba students, South Sudan

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ABSTRACT

Introduction: Voluntary medical male circumcision (VMMC) is one of the key interventions against heterosexual spread of HIV. However, its prevalence in South Sudan is not clearly understood. This study aimed to assess the prevalence and perceptions of VMMC among University of Juba students.

Method: A cross sectional descriptive study design was adopted. Data from randomly selected students from six schools of the University of Juba were collected using a respondent-administered structured questionnaire. IBM SPSS Statistics version 23.0 was used for data analysis. Chi-squared tests were performed to determine variables significantly associated with VMMC.

Results: Amongst 390 students interviewed, the prevalence of VMMC was 41.8% and the overall male circumcision rate was 83.8%. Most respondents expressed positive attitudes and perceptions towards VMMC. The respondents believe VMMC is an important health programme. The decision to get circumcised is associated with age, marital status, religion and state of origin (p<0.001).

Conclusion: Most participants were circumcised and perceive VMMC positively. A countrywide study and scale up of the current VMMC programme are recommended.

Key words: Male circumcision, VMMC, HIV, prevention, University of Juba, South Sudan

Introduction

Voluntary medical male circumcision (VMMC) is a key preventive measure that reduces the risk of heterosexual transmission of human immunodeficiency virus (HIV) by 60%.[1] It has also been established that VMMC reduces the prevalence of penile inflammatory conditions such as balanitis which contributes to a 3.8 fold increase in the risk of penile cancer, by 68%.[2] The key benefits of VMMC have been summarised as reduction of individual HIV risk, reduction

of community HIV risk, and reduction in incidence of STI and urological infections.[3] VMMC is implemented by trained health professionals through surgical and nonsurgical techniques.[4] Surgically, a cut is made around the head of the penis to remove the foreskin while the nonsurgical procedure involves a *ShangRing* placed on the penis for seven days; the skin slowly disconnects and is removed with the *ShangRing*.[4]

Male circumcision is a traditional practice amongst some, but by no means all social / religious groups. Evidence has shown that the success of a VMMC programme is greatly influenced by religious beliefs and cultural sentiments around: lack of openness between parents and children on sexual matters, traditional leadership, and consultation with stakeholders.[5] Such influences shape the uptake of the programme in different settings.

Driven by evidence, major health bodies such as the World Health Organisation (WHO), the Joint United Nations Programme on HIV/AIDS (UNAIDS), and the US Centres for Disease Control and Prevention (CDC) recommend VMMC in HIV-1 epidemic settings in which the major route of HIV transmission is through heterosexual intercourse; four sub–Saharan African countries were identified as hot spots for rollout.[6,7] Current estimates suggest 30% of the world's males aged 15 years or older are circumcised.[6]

In South Sudan, a 2010 study by IGAD and UNHCR found only 9.4% of the men interviewed were circumcised and one third of these were circumcised before their tenth birthday, while a quarter reported being circumcised after the age of 20.[8] The study further found 39.5% of the uncircumcised men willing to be circumcised if the process was affordable and safe.[8] By 2016, the prevalence of male circumcision in South Sudan was estimated at 23.6%.[6] This is still too low compared to the global target of 80% coverage of all men, given that the South Sudan Modes of Transmission Study attributes 80% of new infections to sexual transmission.[9]

Since commencement at Juba Military Referral Hospital in 2017, the VMMC programme has grown slowly and is now offered in three PEPFAR-supported military health facilities in Juba, Bor and Wau.[10] The programme aims to rapidly achieve optimal coverage among boys and men in the age groups that are most likely to be sexually active, 15 years and above.[11] No assessment has been done on the programme so far. Therefore, this study assessed the prevalence and perceptions of VMMC among University of Juba students.

Method

The study was conducted in August 2022 at the University of Juba in South Sudan. The university hosts 30,000 students spread across 21 schools, 2 colleges, 3 institutes, and 4 specialized centres, of which 4,000 students are studying at postgraduate level.[12] Our study participants were undergraduate students. This population fairly represents the VMMC target group and was economically more accessible to the study team at the time of the study.

A cross-sectional descriptive design was chosen. Participating schools were selected by drawing lots while individual male students were randomly selected from the schools' lists through their coordinators. The sample size was calculated using Cochran's formula specifying a precision of 5%, a confidence level of 95% and estimated prevalence of 0.5.[13] This resulted in a sample size of 384 which was adjusted to 422 by adding 10% to cater for possible nonresponse.

IBM SPSS 23.0 was used for data entry and analysis. Chi-squared tests were performed to detect significant associations. Quality was ensured by training of the research team on ethical data collection, use of questionnaires and adherence to approved protocol as well as pretesting of study tools and close supervision.

Ethical clearance was obtained from the Department of Community Medicine, School of Medicine and the Dean of Students, while written informed consent was obtained from each participant prior to data collection. Throughout the research period, confidentiality, privacy and anonymity of participants' information were maintained. All COVID-19 safety protocols were observed to protect the health of both the participants and those carrying out the research during data collection and throughout the study.

Results

Out of 391 respondents recruited, one was excluded due to missing circumcision data. From the remaining 390 respondents analysed, 84.9% were in the age group 18 - 30 years, 90.3% were Christians while 77.9% reported being single. Most of the respondents (57.7%) originated from Lakes (20.0%), Warrap (19.5%) and Jonglei (18.2%) states (Table 1).

From Table 1, the prevalence of VMMC is 41.8% and the overall male circumcision rate among the respondents was 83.8%. All the circumcised students were Christians aged 18-30 years and close to 93% of these were single. Those aged 31 and above were uncircumcised. All respondents

Table 1. Relation of respondents' sociodemographic characteristics to circumcision status

Variable	Circumcised		Not circumcised n (%)	Total n	p-value
	VMMC n (%)	Other means n (%)			
Age in years					
18-30	163 (49.2)	164 (49.5)	4 (1.2)	331	
31-45	0 (0)	0 (0)	50 (100)	50	
46-60	0 (0)	0 (0)	6 (100)	6	
61 and above	0 (0)	0 (0)	1 (100)	1	
Unspecified	0 (0)	0 (0)	2 (100)	2	
Religion					<0.001
Christianity	163 (46.3)	164 (46.6)	25 (7.1)	352	
Islam	0 (0)	0 (0)	13 (100)	13	
African beliefs	0 (0)	0 (0)	22 (100)	22	
Others	0 (0)	0 (0)	3 (100)	3	
Marital status					<0.001
Single	163 (53.6)	141 (46.4)	0 (0)	304	
Married (monogamous)	0 (0)	23 (37.7)	38 (62.3)	61	
Married (polygamous)	0 (0)	0 (0)	19 (100)	19	
Divorced	0 (0)	0 (0)	4 (100)	4	
Unspecified	0(0)	0(0)	2(100)	2	
State of origin					<0.001
Upper Nile	14 (100)	0 (0)	0 (0)	14	
Central Equatoria	36 (100)	0 (0)	0 (0)	36	
Eastern Equatoria	20 (100)	0 (0)	0 (0)	20	
Western Bahr el Ghazal	10 (100)	0 (0)	0 (0)	10	
Western Equatoria	19 (100)	0 (0)	0 (0)	19	
Jonglei	64 (90.1)	7 (9.9)	0 (0)	71	
Lakes	0 (0)	78 (100)	0 (0)	78	
Warrap	0 (0)	76 (100)	0 (0)	76	
Abyei Administrative Area	0 (0)	3 (50)	3 (50)	6	
Ruweng	0 (0)	0 (0)	5 (100)	5	
Unity	0 (0)	0 (0)	28 (100)	28	
South Kordofan (Sudan)	0 (0)	0 (0)	1 (100)	1	
El Fashir (Sudan)	0 (0)	0 (0)	1 (100)	1	
Northern Bahr el Ghazal	0 (0)	0 (0)	25 (100)	25	
Total	**163 (41.8)**	**164 (42.1)**	**63 (16.2)**	**390**	

Chi-squared tests exclude participants with missing data for age and marital status
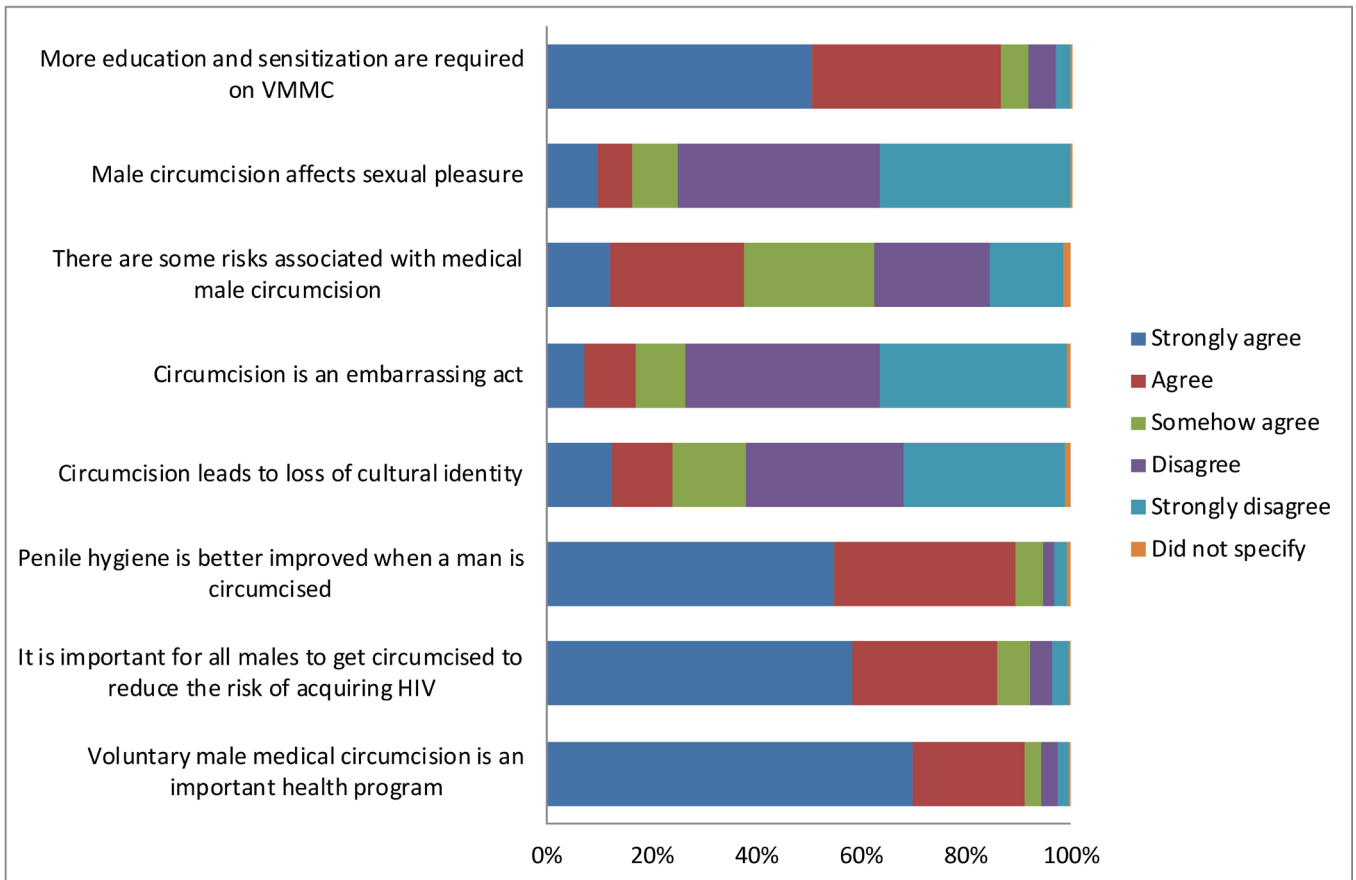
Figure 1. Respondents' perceptions of VMMC

from Lakes, Warrap, Jonglei, Central Equatoria, Eastern Equatoria, Western Equatoria, Upper Nile and Western Bahr Al Ghazel states were circumcised. Contrarily, all 13 Muslims and 22 African traditional believers were not circumcised, as were all students from Unity and Northern Bahr Al Ghazel States.

The circumcised did so for different reasons; almost half said they were circumcised through the VMMC programme while 37.8% said it was part of cultural practices. Factors associated with the decision to get circumcised are age, marital status, religion, and state of origin all of which had p<0.001.

As shown in Figure 1, over two thirds (69.5%) believe VMMC is an important health programme and more than 90% said they would recommend it for HIV prevention because it reduces risks of acquiring HIV (58.1%) and improves penile hygiene (54.5%). There was disagreement with the perceptions that VMMC interferes with culture (60.6%) and is an embarrassing act (72.6%).

Discussion

VMMC is a relatively new programme, launched in 2017 at the Juba Military Referral Hospital, near to the University of Juba, with a target to reach 80% circumcision amongst males of 15 years and above. This has been achieved amongst our study population, although VMMC only accounted for half those circumcised. We do not know how representative our sample is of the general population.

VMMC was perceived positively as preventing HIV and STI transmission and improving penile hygiene. Age, marital status, religion and state of origin were associated with the decision to be circumcised, all of which had p<0.001. In contrast a student focused study in Ethiopia found perceived threat and knowledge of the process by the students were positively associated, and fear of community rejection negatively associated, with willingness to get circumcised.[14]

Most of our participants did not share the belief that male

circumcision affects sexual pleasure, the same finding as a similar study carried out in Zambia.[15] Moreover a study that examined the perceptions of VMMC among circumcising and non-circumcising communities in Malawi showed that VMMC was viewed positively by all participants, just as a similar study in South Africa found that those who perceived benefits of VMMC were more likely to undergo circumcision.[16,17] In an Eswatini study however, students had negative attitudes.[18] Unexpectedly, this study finds that all respondents from the usually non-circumcising states were circumcised while all those from the usually circumcising states and the Muslims were not. This is an unusual finding which requires further investigation.

Conclusion

The prevalence of VMMC among the University of Juba students is below the international target of 80% but the overall circumcision rate is well above this. The students are aware of VMMC as an HIV prevention intervention and would recommend it for those who have not yet been reached. A countrywide assessment is therefore recommended for better understanding of the baseline prevalence and perceptions of VMMC and the issue of risk compensation among the circumcised. We also recommend VMMC outreach health promotion programmes and incorporation of VMMC into the national health policy and strategies.

Conflict of interest: None

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MAMI: Management of small and nutritionally at-risk infants under 6 months and their mothers

Save the Children has launched 4 new tools to implement support for small and nutritionally at-risk infants <6 months and their mothers (MAMI). The MAMI Care Pathway provides practitioners with resources to screen, assess, and manage infants under 6-months and their mothers. Included in these tools is the first published training package for the implementation of the MAMI Care Pathway.

Explore the resources here. Also available in Arabic.

1. Orientation Kit: A 4-hour orientation on the management of small and nutritionally at-risk infants under 6-months and their mothers (MAMI) and the MAMI Care Pathway Package. The workshop provides participants with an overview of what MAMI is, understanding why the MAMI care pathway is important, and what is involved with the MAMI care pathway.

2. Contextualization Workshop: After the orientation has been provided, this 4-hour workshop package can be used to guide the adaptation of the MAMI Care Pathway Package to a given context.

3. Training package for frontline workers:* This 3-day training transfers capacity to health workers to assess, classify and support at-risk infants under 6-months and their mothers using the MAMI Care Pathway Package.

4. Monitoring and Evaluation Guidance:* This package is aimed at health/ nutrition technical staff and MEAL staff during programme design and implementation to ensure a robust monitoring and evaluation package accompanies the implementation of the MAMI Care Pathway Package.

Paranasal sinuses in patients with chronic rhinosinusitis, Tanzania

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ABSTRACT

Introduction: Chronic rhinosinusitis is inflammation of the nasal cavity and paranasal sinuses that lasts for at least twelve weeks. Paranasal sinus variations account for various pathologies, including chronic rhinosinusitis. This study assessed the anatomical variations of paranasal sinuses among patients with chronic rhinosinusitis attending otorhinolaryngology services in a tertiary hospital in Tanzania.

Method: This was a descriptive prospective cross-sectional study of 120 patients aged 15 years and above who fulfilled the Rhinosinusitis Task Force criteria. A structured checklist was used to collect socio-demographic characteristics and clinical presentations. Cone-beam computed tomography scan and the Lund-Mackay scoring system were used. Data analysis was done using SPSS version 26, and p-values <0.05 were considered statistically significant.

Results: A total of 120 patients were enrolled with a median age of 37 (IQR 27-52) years, with 40% aged 30-49 years. There were 65 (54.2%) males, and 55 (45.8%) females. Maxillary sinuses were affected in 85.8% of all patients with chronic rhinosinusitis. The overall proportion of anatomical variation was 53.3%, with concha bullosa, deviated nasal septum, Onodi cells, and septal spur being the most common, accounting for 40.6%, 25.0%, 23.4%, and 20.3%, respectively. Twenty-four patients with concha bullosa had chronic maxillary rhinosinusitis, with 14 (58.3%) having ipsilateral rhinosinusitis.

Conclusion: Half of the patients had one or more paranasal sinus anatomical variations. The most common variants were concha bullosa followed by deviated nasal septum. Onodi cells and septal spurs were rarely identified. Most patients with concha bullosa had ipsilateral maxillary sinusitis.

Keywords: anatomical variations. paranasal sinuses, rhinosinusitis, laterality, Tanzania

Introduction

Chronic rhinosinusitis (CRS) is inflammation of the paranasal sinuses (PNS) and nasal cavity that lasts for at least twelve weeks. Its pathophysiology is complex, with bacterial, viral, fungal, and infectious mechanisms all contributing. It's also

linked to allergic reactions, nasal polyposis, and mucosal vasomotor dysfunction. It is one of the most prevalent conditions and has a negative impact on quality of life.[1-3] Anatomical variation of paranasal sinuses plays a significant role in the pathogenesis of chronic rhinosinusitis.[4]

The global prevalence ranges from 2% to 15%, with a high prevalence of 24.7% in Nigeria and 1.1% in Tanzania[5-7] with a male-to-female ratio of 1:1.5.[5,8]

Paranasal sinus variations are responsible for numerous pathologies, including CRS, which is caused by a mechanism that blocks or interferes with mucociliary clearance, and the sinus drainage system, causing increased mucus viscosity, ostium obstruction, and decreased mucosal resistance to sinus infections.[1,8] Concha bullosa, deviated nasal septum (DNS), paradoxical middle turbinate, Haller cells, Onodi cells, and Agger nasi cells are the most prevalent, though their frequency varies by region.[9,10]

Variations are classified based on their impact on sinus drainage and surgical significance. The first category includes anatomical variations obstructing the drainage system: concha bullosa, paradoxical middle turbinate, congenital absence of middle turbinate, pneumatized or absent uncinate process, septal pneumatization, and bulla ethmoidalis. The second category of variations that has an impact on surgical safety includes Haller cells, anterior clinoid process pneumatization, Onodi cells, and supraorbital recess.[2,12] Some uncommon anatomical variations such as sphenoethmoidal cells, pneumatization of anterior clinoid process and pneumatization of dorsum sellae can occasionally increase the risk of surgical complications.[11,13]

The Rhinosinusitis Task Force (RSTF) created a list of major and minor clinical diagnostic criteria. The RSTF major symptoms are facial pain or pressure, nasal obstruction or blockage, decreased sense of smell, and discoloured or purulent nasal or postnasal secretion. The RSTF minor symptoms are fever, halitosis, fatigue, dental pain, cough, ear pain or pressure, or fullness.[11]

Chronic rhinosinusitis is probable if the patient has two or more major factors or one major and two or more minor factors for more than twelve weeks.[11] CRS can be caused by several risk factors including allergy, infections, mucociliary dysfunction, mucosal oedema, PNS anatomical variations, genetic disorders like cystic fibrosis, autoimmune diseases, and sarcoidosis.[12]

CRS is diagnosed through multi-slice computed tomography (MSCT) of the PNS. Additionally, it is useful in identifying additional risk factors for CRS, including trauma and tumours.[8,11] The current treatment for CRS is functional endoscopic sinus surgery (FESS). Understanding the complex anatomy of the PNS is a requirement for a successful FESS.[11]

Method

This was a prospective cross-sectional study among patients with CRS attending the ORL Department. Cone Beam Computed Tomography Scan with a 128-slice detector (gantry rotation 0.33, slide thickness 0.5mm, gantry bore 7mm) was used.

Participants were patients aged 15 years and above who fulfilled the RSTF criteria of CRS. The exclusion criteria were patients with sinonasal tumours, previous sinus surgery, or trauma. Inclusion criteria were patients with the RSTF criteria, that is, two or more major symptoms or one major and two or more minor symptoms that lasted for more than 12 weeks.

Each CT scan was assessed using the Lund-Mackay CT scoring system. Diagnostic evidence of CRS was defined by a Lund-Mackay score of four or more. Data were analysed using SPSS version 26.

Ethical considerations

Ethical approval was granted by the MUHAS institutional review board (IRB). Informed consent was obtained from each participant and confidentiality was maintained.

Results

Table 1 shows that 53.3% of participants had PNS anatomical variations, and there was no significant difference in the proportion by age or sex.

Figure 1 shows that the most common site of CRS was the maxilla (85.8% of participants), with 69.2% having ethmoid CRS. The least common site was the sphenoid (20%).

Concha Bullosa was the most common anatomical variation, accounting for 26 (40.6%) patients with anatomical variations, followed by DNS 16 (25.0%), and Onodi cells 15 (23.4%) (Figure 2).

The 64 patients with anatomical variations had between them 86 variations. Twenty-four participants with maxillary CRS had concha bullosa, for 14 (58.3%) of which it was ipsilateral. In eight (72.7%) of the 11 subjects with a maxillary CRS with DNS, the variation was contralateral (Table 2)

Table 1. Demographic characteristics and PNS anatomical variations

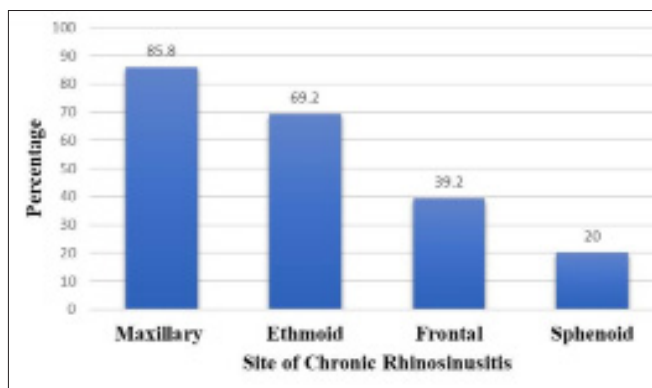|		PNS anatomical variation		
	Total n (%)	Yes n (%)	No n (%)	p-value
Age in Years				
15-29	38 (31.7)	21 (55.3)	17 (44.7)	0.899
30-49	48 (40.0)	26 (54.2)	22 (45.8)	
50-69	31 (25.8)	16 (51.6)	15 (48.4)	
≥70	3 (2.5)	1 (33.3)	2 (66.7)	
Sex				
Male	65 (54.2)	35 (53.8)	30 (46.2)	0.903
Female	55 (45.8)	29 (52.7)	26 (47.3)	
	120 (100.0)	64 (53.3)	56 (46.7)	

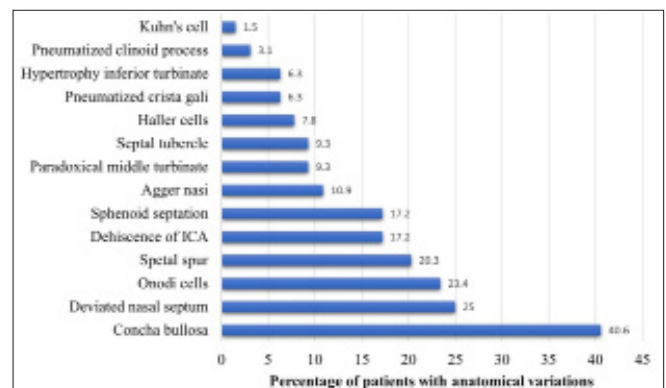*Figure 1. Sites of CRS among study participants*

Figure 2. Anatomical variations among patients with CRS having anatomical variations

For ethmoid CRS, concha bullosa, DNS, PMT, and Haller cells had higher proportions of contralateral CRS than ipsilateral (69.2%, 75.0%, 75.0% and 100% respectively).

Discussion

The overall proportion of anatomical variations in patients with CRS was 53.3%. Depending on which sinus is involved the anatomical variation can block the drainage of affected sinus e.g Haller cells which is a variation in the pneumatisation of ethmoid cells near the maxillary sinus ostium can lead to maxillary sinusitis and during surgery if they are not addressed can lead to recurrence. The Onodi cells, which is a variation in pneumatisation of posterior ethmoid cells on the superolateral region of the sphenoid sinuses can pose a challenge during endoscopic

sinus surgeries whereby the internal carotid artery and optic nerve can be dehiscent leading to intraoperative complications if injured. Furthermore, there can be residual sinusitis for inexperienced surgeons where multiple cavities exist in the sphenoid sinuses. In this study, there were no significant differences in the occurrence of anatomical variations by age group or gender. Ipsilateral concha bullosa (pneumatisation of middle turbinate) was the most common anatomical variation among patients with chronic maxillary sinusitis accounting for 13.6% of patients who had chronic maxillary sinusitis. For ethmoid sinusitis, the most common variation was contralateral concha bullosa (13.6%). These findings were similar to other studies.[1,6,9] The commonest site affected by CRS was maxillary sinuses (85.8%) and the least identified site was sphenoid sinuses (20%).

Table 2. Laterality of anatomical variations in relation to the site of CRS

Anatomical variation	Contralateral CRS n (%)	Ipsilateral CRS n (%)	Total(N=86)
Maxillary CRS			
Concha Bullosa	10 (41.7)	14 (58.3)	24
Deviated nasal septum	8 (72.7)	3 (27.3)	11
Paradoxical middle turbinate	3 (50.0)	3 (50.0)	6
Haller cells	3 (100)	0 (0.0)	3
Ethmoid CRS			
Concha Bullosa	9 (69.2)	4 (30.8)	13
Deviated nasal septum	6 (75.0)	2 (25.0)	8
Paradoxical middle turbinate	3 (75.0)	1 (25.0)	4
Haller cells	1 (100)	0 (0.0)	1
Sphenoid CRS			
Onodi cells	2 (66.7)	1 (33.3)	3
Dehiscence of ICA	1 (50.0)	1 (50.0)	2
Sphenoid septation	2 (66.7)	1 (33.3)	3
Frontal CRS			
Concha Bullosa	1 (33.3)	2 (66.7)	3
DNS	1 (100)	0 (0.0)	1
Paradoxical middle turbinate	1 (50.0)	1 (50.0)	2
Agger nasi	0 (0.0)	2 (100)	2

Conclusion

The majority of patients (53.3%) with CRS had PNS anatomical variations. Chronic maxillary sinusitis was the commonest affected site. The most common variant identified was concha bullosa which was associated with chronic maxillary, ethmoid and frontal sinusitis in descending order of frequency. Healthcare providers treating patients with CRS should consider evaluating them for anatomical variations using CT Scan of PNS, to ensure better outcomes by addressing the primary problem.

Conflicts of interest: None

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South Sudan: MSF Launches Mass Vaccination Campaign Amid Deadly Hepatitis E Outbreak

Juba - In response to a deadly hepatitis E outbreak in South Sudan, MSF has launched a vaccination campaign in collaboration with the Ministry of Health to provide protection to women and girls of reproductive age, who are at greatest risk of death from the disease.

Fatality can be as high as 40 per cent among pregnant women, and there is no cure, meaning that many of those at advanced stages of illness do not survive. Since April 2023, 501 cases of hepatitis E have been treated at the MSF hospital in Old Fangak, Jonglei State, and 21 people - mainly women - have died.

The vaccination campaign - the first to be conducted during the acute stages of an active outbreak and in such a remote and isolated part of South Sudan - is intended to prevent further loss of life.

https://allafrica.com/stories/202401300263.html?utm_campaign=daily-headlines&utm_medium=email&utm_source=newsletter&utm_content=aans-view-link

Hepatocellular carcinoma and aflatoxin in Sudan: The way forward

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ABSTRACT

Hepatocellular carcinoma (HCC) is the sixth most common type of cancer and the third leading cause of death worldwide. It is especially prevalent in developing countries, with around 80% of cases occurring in Asia and Africa. Aflatoxin B1 is a well-documented risk factor for HCC, among other factors. In Sudan, there is limited reliable and comprehensive data on cancer epidemiology, including HCC. This paper focuses on the current status of HCC in Sudan, specifically in relation to aflatoxin. Additionally, recommendations are provided to enhance the control measures for HCC in the country.

Keywords: hepatocellular carcinoma, aflatoxin B, mycotoxins, groundnuts, sub-Saharan Africa

Introduction

Primary liver cancer, which is the sixth most commonly diagnosed cancer and the third leading cause of death globally in 2020, is composed of several subtypes such as hepatocellular carcinoma (HCC), cholangiocarcinoma, hepatoblastoma, and angiosarcoma, but typically HCC accounts for 85-90% of cases.[1] Annually around 906 000 new cases of HCC are reported worldwide, with the highest incidence (>20 per 100,000) reported in countries in Eastern Asia, Southeastern Asia and North Africa. In contrast, South and Central America, as well as most of Europe, have low-incidence rates of less than 5 per 100,000.[1,2] The burden of HCC has been on the rise in developing countries, with approximately 80% of cases occurring in Asia and Africa.[1] Although several factors can increase the risk of developing HCC, the most documented ones are exposure to aflatoxin B1, heavy alcohol consumption and the hepatitis B and C viruses' infections, as well as iron overload.[1]

In Sudan, the incidence and mortality of HCC are difficult to determine as reliable and comprehensive data on cancer epidemiology are lacking since there is no functional national cancer registry. However, studies have suggested that HCC is amongst the 8th commonest cancer in Sudan with an age-standardized rate of 4.2 per 100,000.[3] Data from the National Cancer Institute, Sudan (Figure 1) revealed a sharp increase in HCC cases diagnosed between 2000 and 2018. This may be due to a combination of factors, including exposure to

aflatoxin B1, alcohol consumption, and limited access to preventive measures such vaccination against hepatitis B virus. In Sudan, approximately 4.98% and 1.62% of the population in 2019 had chronic hepatitis B virus and chronic hepatitis C virus, respectively. Moreover, about 12% of liver cancer deaths are attributed to hepatitis B virus, whereas hepatitis C virus is responsible for 10% of these fatalities.[4] The implementation of screening for hepatitis B virus and hepatitis C virus in all blood banks nationwide, along with the addition of hepatitis B virus vaccination to the extended immunization program in 2006, represent significant milestones in the country's efforts to combat viral hepatitis. Total alcohol consumption per capita (litres of pure alcohol, projected estimates, 15+ years of age) in Sudan was reported at about 0.51 litres/year in 2018.[5]

Despite the high incidence of HCC in Sudan, there are few data regarding its burden in this region. This work highlights the current status of HCC in Sudan, specifically in relation to aflatoxin. Additionally, recommendations are provided to improve control measures for HCC in the country.

Aflatoxin as a risk factor for HCC

Aflatoxins are toxic secondary metabolites produced by fungi belonging to Aspergillus family, with *Aspergillus flavus* and *Aspergillus parasiticus* being the major producers. These toxins are classified into four major types: B1, B2, G1 and G2, with B1 being considered as the most hepatotoxic and hepatocarcinogenic. Aflatoxins can be found in variety of grains but most often occur in peanuts and maize. An estimated 4.5 to 5.5 billion individuals worldwide are at risk of exposure to these toxins.[6] The optimal environmental conditions for fungal growth and toxins production are temperatures between 24 and 35°C, and the moisture content exceeding 7% (10% with ventilation).[7] As a result, aflatoxin contamination predominantly impacts regions situated between 40° north and 40° south of the equator. Consequently, this issue is more prevalent in developing countries within the tropical region.[7] With the impact of climate change, it is expected that the contamination of food crops with aflatoxins will increase, as these conditions are favourable for proliferation of Aspergilli. In Sudan, like most sub-Saharan African countries, the high temperature and humidity are highly suitable for growth of Aspergillus fungi and production of mycotoxins.[6]
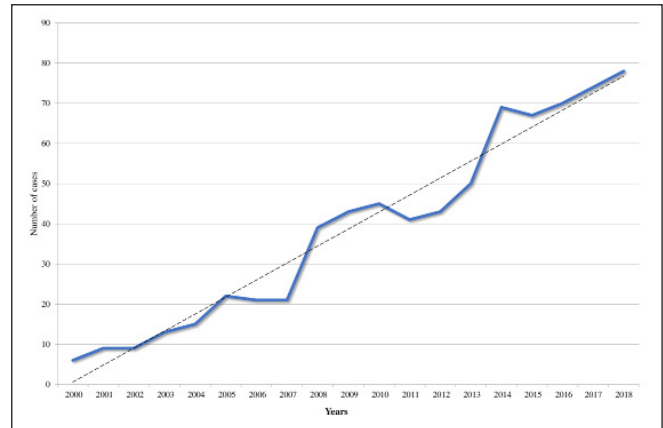

Figure 1. Number of hepatocellular carcinoma cases treated at the National Cancer Institute, Sudan between 2000 and 2018 Source: Annual Reports, Oncology Department, National Cancer Institute, Sudan

Humans can be at risk of exposure to aflatoxin either directly by consuming aflatoxin-contaminated products like maize and peanuts or indirectly by consuming animal-produced food such as milk, eggs, and liver, wherein animals were fed aflatoxin-contaminated feed.[6,8] The European Commission and the United States (USA) have different maximum limits for aflatoxins in human food commodities. The European Commission sets a maximum limit of 4 μg/kg, while the USA allows a higher limit of 20 μg/kg. However, the USA has stricter limits for specific commodities like milk and milk products, which have an action level of 0.5 μg/kg for aflatoxin M1, a metabolite of aflatoxin B1 found in milk.[9] The maximum levels for aflatoxins set by the Codex Alimentarius Commission, established by FAO and WHO, in various nuts, grains, dried figs and milk are in the range of 0.5 to 15 μg/kg.[10]

Many studies have demonstrated the association between the ingestion of aflatoxin-contaminated foods and the risk of HCC. The International Agency for Research on Cancer (IARC) has categorized aflatoxins as a group 1 carcinogens. They have also confirmed the link between food contamination, specifically with aflatoxin B1, and the increased risk of HCC.[8] It has been estimated that aflatoxins may be responsible for 28.2% of all HCC cases worldwide.[11] Omer et al. investigated the combined effects of hepatitis B virus infection and aflatoxin B1 exposure on the development of HCC in Sudan.[12] They found that Hepatitis B virus and aflatoxins exposure account for approximately 80% of HCC cases, whether alone or in combination.

Aflatoxin and HCC in Sudan

Populations in developing countries especially those in tropical and subtropical areas are almost universally exposed to moderate to high levels of aflatoxins. Aflatoxins can contaminate a wide range of food commodities, such as cereals, oilseeds, spices, nuts, and milk products, posing a potential health hazard for both humans and animals along with huge economic losses. Sudan, the leading producer of peanuts (groundnuts) in the world, primarily cultivates peanuts in Western Sudan and the irrigated schemes of the Gezira State. Homemade peanut butter, locally called "dakwa," is a popular dish throughout the country, particularly among impoverished communities. Omer et al. evaluated aflatoxin levels in peanut butter samples collected from the Western and Central Sudan. In this study, contamination of peanut butter samples with aflatoxins was defined as levels exceeding 10 µg/kg. The authors reported that peanut butter contains aflatoxins 5-20 times higher than the WHO safety guidelines. Furthermore, aflatoxin contamination in peanut butter samples was higher in Western Sudan (63%) compared to Central Sudan (50%).[12] Another study examined traditionally prepared and distributed peanut butter samples sold by street vendors in the Khartoum State, Sudan. The study found high levels of aflatoxin B, which is above the internationally regulated tolerance levels, in all screened peanut butter samples.[13]

Younis and Malik investigated aflatoxin contamination in Sudanese groundnuts and groundnut products (excluding oil). They discovered that the percentage of aflatoxin contamination was as follows: 2% for kernels, 64% for butter, 14% for cake, and 11% for roasted groundnuts. Their findings indicated that aflatoxin B1 was predominant in all samples.[14]

A study on vegetable oil samples collected in Khartoum state reported that nearly all (98.8%) samples were contaminated with aflatoxins, with a mean level of 57.5 µg/kg. Notably, all sesame oil was found to contain aflatoxin levels that exceeded the United States FDA acceptable limit of 20 µg/kg.[15] Similarly, another study in Sudan aimed to measure aflatoxin levels in groundnut, sesame, and cottonseed oils. Aflatoxin was detected in 14.3% of samples, the highest incidence of aflatoxin contamination occurred in sesame followed by groundnut while no aflatoxin contamination was detected in cottonseed oil. All aflatoxin contaminated samples are unrefined, highlighting the importance of refining processes for eliminating aflatoxins from edible oils. The

higher incidence of aflatoxin contamination in sesame oil warrants further investigation, considering its wide consumption in Sudan without refining.[16] In their study, Mariod et al. found that the concentration of aflatoxin B1 in groundnut oil samples collected from various regions in Sudan showed a range of 0.5 to 70 µg/kg. Similarly, in samples of sunflower oil, the range was found to be 0.7 to 35 µg/kg. The study also highlighted that unrefined samples had significantly higher levels of contamination. As a result, it was concluded that inadequate practices during the cultivation, harvesting, handling, and storage of crops were contributing factors to the elevated levels of aflatoxin B1 in the oil samples.[17]

The prevalence of aflatoxins in animal feed in Khartoum State was investigated. The results showed higher levels of aflatoxin B1 contamination, which was detected in 32.14% of the samples. The average concentration was found to be 109.68 µg/kg, with a concentration range of 5.94–327.73 µg/kg. Additionally, the aflatoxin M1, major metabolite of aflatoxin B1, was found to be prevalent in the samples of dairy cattle milk in the Khartoum State.[18] Several studies conducted in Africa have also reported high concentrations of aflatoxin M1 in raw milk.[19]

The above-mentioned literature from the Sudan revealed that aflatoxin B1 contamination in food commodities is alarmingly high. Climatic conditions, poor storage conditions and ineffective food regulations favour the occurrence of mycotoxins in the Sudan.

The Way Forward

The following measures are proposed to different stakeholders to effectively prevent and control aflatoxin contamination.

Recommendations to farmers:

• Empower farmers to implement aflatoxin prevention and control measures, including:

  - Conduct regular inspections of whole grains (especially maize, sorghum, rice) and nuts such as peanuts, which are commonly contaminated with aflatoxins.

  - Discard any items that show signs of mould.

  - Avoid causing damage to grains during drying and storage, as damaged grains are more prone to fungal invasion and mycotoxin contamination.

  - Store grains properly in dry and well-aerated storage facilities.

Recommendations to the public:

• Raise public awareness about aflatoxin prevention and control through effective communication, including:

- Purchase grains and nuts as fresh as possible.

- Ensure proper storage of food, keeping it free from insects, dry, and not exposed to excessive warmth.

- Minimize the time interval between purchase and consumption of food products.

- Encourage a diverse diet, which not only reduces mycotoxin exposure but also improves overall nutrition.

Recommendations to local authorities:

- Demonstrate the political will to address the issue of aflatoxin exposure.

- Disseminating information on proper storage, handling, and processing techniques.

- Strengthen the coverage of the hepatitis B vaccination program to reduce the prevalence of the virus, as it can compound the effects of aflatoxin exposure and contribute to cancer development.

- Support the development and accreditation of laboratories at the national level for mycotoxin testing.

- Enforce regulations to ensure that the concentration of aflatoxins in traded foods is minimized and comply with the globally recognized standards.

- Promote the use of crop varieties with a lower risk of aflatoxin contamination.

- Ensure the implementation of refining processes to eliminate aflatoxins from edible oils. Additionally, authorities should conduct regular inspections and testing of edible oils to check for aflatoxin levels. If oil samples exceed the maximum limits, they are considered unsafe for consumption and are removed from the market.

Recommendations to scientific communities:

- Conduct epidemiological studies to identify the risk factors for HCC in Sudan, as there is a limited amount of research in this field.

- Perform more research to investigate the dietary habits, farming methods, food storage conditions, and environmental factors that can decrease the risk of aflatoxin exposure in Sudan.

- Develop affordable and accessible methods for detecting aflatoxin contamination.

- Gain a better understanding of the true cost of aflatoxin contamination, as this information can potentially drive policy changes and a shift in attitudes toward the issue.

Conclusion

Sudan is witnessing an increasing incidence of HCC, possibly due to food contamination by aflatoxins. Further research is crucial to provide evidence for taking policy action. The results obtained from such studies would provide policymakers with valuable evidence to develop a control programme for HCC in the Sudan that is based on scientific evidence. Additionally, there is a high need for a comprehensive aflatoxin control programme that raises awareness about the disease and prompts the government, regulatory bodies, and the food industry to establish and enforce strict guidelines and standards to combat aflatoxin contamination. The ultimate goal is to reduce the impact of this life-threatening disease on the populations.

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Stroke rehabilitation in low resource countries: time to provide an organised service

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ABSTRACT

Introduction: Stroke is one of the leading causes of death and disability in low- and middle-income countries (LMICs). The proven efficacy for rehabilitation interventions in improving stroke outcomes in LMICs supports the need to strengthen the rehabilitation workforce. Low-cost physical rehabilitation interventions requiring minimal resources, self-rehabilitation, tele-rehabilitation and involvement of family and other carers can be a solution and improve functional outcomes.

Method: A literature search using the terms Stroke and Rehabilitation were carried out by the Chief Librarian at St. Richard's Hospital, the University Hospital Sussex. Four databases, namely Ovid Medline, EMBASE, CINAHL and Ebsco CINAHL, were searched using appropriate subject headings and free text terms such as stroke and rehabilitation . We used free text terms to look for concepts synonymous with rehabilitation in LMICs. We did not search for individual countries or continents/sub-continents.

Results: Relevant results from 2015 to current were included. Twenty articles were finally chosen which included the most relevant and useful information for the purpose of this article.

Conclusion: Populations in LMICs are exposed to health systems which do not include rehabilitation services. In addition, there are personal barriers to accessing quality stroke rehabilitation that could improve stroke survival and functional outcomes. Although there have been some improvements in the development of stroke rehabilitation in some LMICs, further investment is required to ensure that LMICs continue to receive the best quality rehabilitation services. There are measures that can be put in place to reduce these deficiencies. Collaboration between LMICs and developed countries has been growing but this needs to be extended, especially in training doctors in Rehabilitation Medicine and upskilling therapists. The World Health Organisation Rehabilitation 2030 is an action plan to scale up rehabilitation so that countries, especially LMICs, can be better prepared to address the evolving rehabilitation needs of populations by 2030.

Keywords: rehabilitation, stroke rehabilitation, physical and rehabilitation medicine, low- and middle-income countries.

Introduction

Stroke is one of the leading causes of death and disability in low- and middle-income countries (LMICs).[1] The proven efficacy for rehabilitation interventions in improving stroke outcomes in LMICs supports the need to strengthen the rehabilitation workforce.[2] Low-cost physical rehabilitation interventions requiring minimal resources, self-rehabilitation, tele-rehabilitation and involvement of family and other carers can be a solution and improve functional outcomes.[1]

A literature search using the terms Stroke and Rehabilitation were carried out by the Chief Librarian at St. Richard's Hospital, the University Hospital Sussex. Four databases, namely Ovid Medline, EMBASE, CINAHL and Ebsco CINAHL, were searched using appropriate subject headings and free text terms such as stroke and rehabilitation. We used free text terms to look for concepts synonymous with rehabilitation in LMICs. We did not search for individual countries or continents/sub-continents. Relevant results from 2015 to current were included. Twenty articles were finally chosen which included the most relevant and useful information for the purpose of this article.

I present the findings and discussions under the following headings and a conclusion at the end of the article.

Rehabilitation and Multidisciplinary Team (MDT) nature of rehabilitation delivery

Rehabilitation is a pathway to active change by which a person who has become disabled acquires the skills needed for optimum physical, psychological, and social function. It is a process of assessment, and management by which the individual, family and carers are supported to achieve optimal physical, cognitive, social and psychological function, participation in society and improvement in quality of living.[1,3,4] The National Health Service (NHS) in the United Kingdom defines rehabilitation as a process of adjustment and recovery from injury, illness or disease. Effective rehabilitation requires input from the patient, family, and friends as well as treatment from the specialist healthcare team.

The core function of an MDT is to bring together a group of healthcare professionals from different fields (Physiotherapy, Occupational therapy, Speech and language therapy, clinical psychology, orthotists, and Medical Doctors) with training in Rehabilitation Medicine in order to formulate and support with an appropriate holistic treatment plan. MDT meetings, to set or review treatment goals, need to be held regularly to ensure satisfactory progress is being made. Rehabilitation is central to Universal Health Coverage and access should be considered a human right.

Stroke in Low and Middle income countries (LMICs)-challenges to rehabilitation

Expanding access to rehabilitation services in LMICs requires overcoming barriers at macrosystemic, professional, and community levels.[6] Whereas in higher income countries the incidence is falling[7] stroke is the second leading cause of global disability with 87% of stroke-related disability occurring in LMICs.[8] Stroke is a huge public health burden worldwide with substantial treatment, rehabilitation and social costs. Developing countries lack data, resources, policies and structures to deal with this burden.

The urgent need for improvements in access to coordinated stroke rehabilitation in LMICs is clear. The greatest needs are in countries with the least rehabilitation infrastructure,[5] where service development, guidelines, and research are lacking. The global burden of stroke is highest, and rising, in LMICs.[1]

A meta-analysis concluded that an MDT with supported early discharge reduces length of hospital stay, increases independence for survivors of mild-to-moderate stroke.[9] However, in most LMICs, patients are discharged from hospital without post-discharge professional support and to prevent falls, contractures, pressure ulcers, depression and consequences of swallowing difficulties.

Personal experience

Establishing effective MDTs in LMICs can be challenging. The traditional organ-based disease doctor-centred approach still dominates in some countries. It is assumed that the doctor knows best, will act in the patient's best interest, and can dictate the relationship. This model does not involve working members of an MDT. The Lead Doctor might see himself/herself superior to other team members and not realising that a shared experience with other MDT members is a better approach.

The importance of the rehabilitation medicine specialty is not well-recognised in some LMICs. The health professional may perceive it as inferior to organ-based medicine. The public attitude tends to focus on medical and surgical specialties which generate a good income for

doctors and hospitals.

Governments need to demonstrate publicly that rehabilitation provides good long-term outcomes enabling people to return to the community and hence participate in that community and possibly gainful employment so benefitting local and national economies.

In some cases (e.g., spinal injuries) patients may require longer stays in the rehabilitation unit to achieve their goals. Most patients cannot afford the cost of rehabilitation and insurance companies do not usually pay for rehabilitation for stroke.

A number of patients need a prolonged rehabilitation process to be continued in the community. In most developing countries, patients are discharged from acute stroke care with the expectation that families undertake their ongoing care without adequate advice.

Some private providers of rehabilitation use some techniques and equipment that are not fully evidence-based. For example, some private clinics use expensive "repetitive transcranial magnetic stimulation" (rTCMS) therapy for stroke sufferers. These and other such remedies cannot replace a hands-on and effective rehabilitation programme via an MDT approach which is more evidenced based for better patients' outcome post stroke.[9]

WHO-Rehabilitation 2030

In 2017 the World Health Organisation (WHO) launched Rehabilitation 2030[10]- a call for action to scale up rehabilitation so countries can be prepared to address the increasing needs of populations up to 2030.

The WHO recommends that after a stroke, a patient should have access to rehabilitation specialists (physiotherapists, occupational therapists, and speech and language therapists). Successful implementation of the WHO's plan to scale up rehabilitation services will require political, professional, economic, and sociocultural issues to be addressed.

Action plan and suggestions

The following points are suggested to inform an action plan to improve rehabilitation service in LMICs. Raising awareness among public and healthcare professionals is a first step to show the importance of rehabilitation. New stroke rehabilitation service models should be tested with associated education and information systems.

The provision of a structured stroke rehabilitation in a defined hospital unit is strongly advised. This will act as a base for the MDT where education and skills training for patients, caregivers, and community health workers is carried out. This can be progressed through face-to-face contact, use of well-illustrated pamphlets, and small teaching sessions. Sharing experiences by patients who have undergone successful rehabilitation is a valuable exercise.

Setting patient-centred and personalised SMART (Specific, Measurable, Achievable, Relevant, Time bound) goals should be reviewed regularly to measure progress and enhance motivation to continue the process of rehabilitation.

Using home-based equipment requires appropriate supervision by therapists or trained community health

Table 1. WHO initiatives to strengthen the health system by integrating rehabilitation needs[10]

- Increase the multidisciplinary rehabilitation workforce.
- Develop and implement financing and procurement policies that ensure assistive devices and products are available to all who need them, and ensure adequate training about their use.
- Integrate rehabilitation into health system policy and practice and also into and between primary, secondary, and tertiary levels of the health system.
- Ensure both community-based and hospital-based rehabilitation services are available.
- Ensure financial resources are allocated to rehabilitation services.
- Where health insurance exists or is to be made available, ensure that it covers rehabilitation services.
- Expand the use of affordable technologies and devices (e.g. wheelchairs, orthotics) and ensure adequate training in their use.
- Expand research programmes and develop good practice guidelines.
- Ensure hospitals include specialised rehabilitation units for inpatients with complex needs.

workers. Tele-rehabilitation might be worth exploration at a later stage in some LMICs but extra funding would be needed. Workshops involving community health workers, caregivers, and patients are worth consideration.

Needs and role of community health workers and field workers [5,11,12]

Developing community health workers to continue rehabilitation programmes is a most important aspect of rehabilitation services in LMICs. Transfer of more roles to community health workers is practical. These health workers should be educated and supported to provide surveillance and referrals to hospital rehabilitation units as well as provision of social support, enabling self-help groups, networking with families, health centres and other agencies.

Strategies to motivate community health workers in the provision of good quality services should include training, options for career progression, accreditation, regulation, and licensing by a regulating body. Recognition of the importance of acquired skills further incentivizes health workers. Family members and caregivers of people with stroke are valuable as therapy extenders, assisting patients with mobility, wheelchair activities, balance and self-care, and speech and language. As the population ages, families increasingly have to provide broad support for older family members who culturally and traditionally are respected members of the family in LMICs.

The minimum requirements for establishing a Rehabilitation Unit are:[13]

- A geographical unit within a hospital with a Therapy gymnasium, MDT room, occupational therapy kitchen, an activities room, wheel chair bay.

- If space allows a one bed room facility through which complex stroke cases may be discharged to see how well they are likely to cope at home.

- Doctor with interest in stroke rehabilitation.

- Physiotherapists, occupational therapists, Nurses, Healthcare Assistants, cleaners to cover morning, twilight, and night shifts.

- A community Early Supported Discharge (ESD) team to provide care in the community.

Conclusions

There is evidence for the value of rehabilitation interventions post-stroke in developing countries. The introduction of organized, structured rehabilitation post stroke services into LMICs is imperative. This will improve physical and psychological outcomes and help with reintegration and participation of stroke survivors in their communities.

With a higher burden of stroke and stroke-related morbidity and mortality, residents of LMICs face multiple health systems and personal barriers to accessing quality stroke rehabilitation that could improve survival and functional outcomes. Rehabilitation services need to be developed and integrated into current physical medicine services to provide seamless care.

Measures should be put in place to close the gap of the inadequate services currently available in LMICs. These must include the expansion of training opportunities, and upskilling general physicians and doctors interested in Rehabilitation Medicine. The training of therapists needs to be enhanced and community rehabilitation healthcare workers should be trained in the local stroke rehabilitation units thence to continue rehabilitation in the community. It is essential to implement cost-effective and low-resourced systems of acute stroke care, community-based rehabilitation and group rehabilitation sessions, using, where possible, tele-rehabilitation programmes, and task-shifting rehabilitation programmes to lower-level healthcare workers and/or informal family caregivers.[1,11]

Governments in LMICs must be involved in prioritising stroke rehabilitation services as a crucial component for achieving the World Health Organisation's Rehabilitation 2030 Action Plan. Stroke rehabilitation in LMICs has the potential to lead to better survival and outcomes with less stroke-related disability and improved national economic productivity.

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QUIZ:
Unenhanced Brain Computerised Axial Tomographic (CAT) scan quiz

Answers on page 41

Scan 1

A right-handed 73-year-old case, usually well and living alone, was found on the floor by a friend with dense right sided weakness and dysphasia.

Figure 1 above shows her brain CAT scan on admission to hospital.

1. Describe two findings on the CAT scan.

2. What is the diagnosis?

3. Give a brief outline of the management of this patient in the first 24 hours.
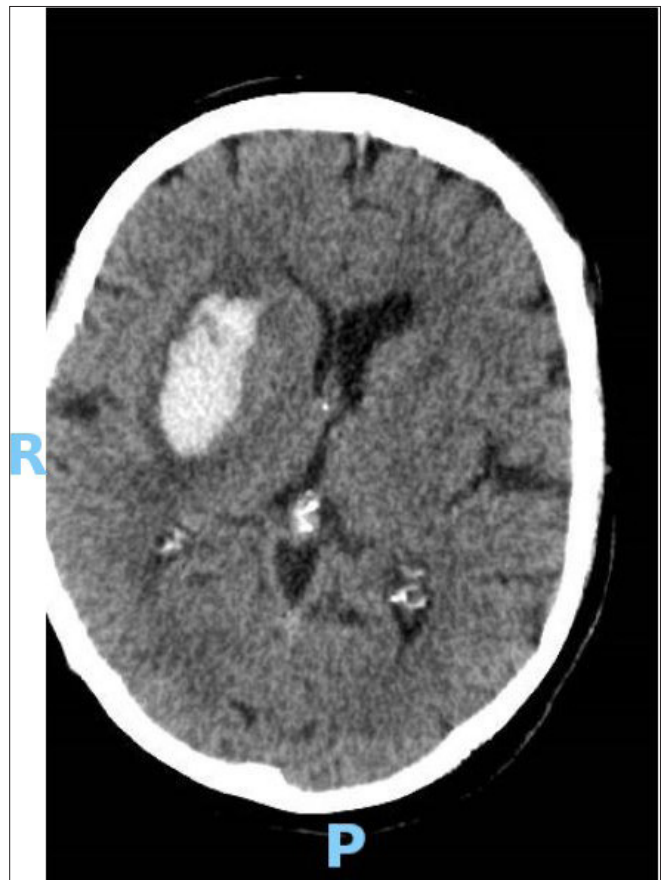
Scan 2

An 89-year-old ex-smoker with a long-standing history of hypertension presented to hospital with left sided weakness of sudden onset and a fall

Figure 2 shows his brain CAT scan on admission to hospital

1. Describe the findings on this scan

2. What is the diagnosis?

3. How do you manage this patient in the first 24 hours?

Risk factors for stroke in the African populace: need for action

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ABSTRACT

The burden of stroke cannot be overemphasized especially in low and middle-income countries (LMICs). More than two-thirds of stroke deaths arise from these countries as well as nearly 90% of stroke-related morbidities. Unfortunately, it has been suggested that there might be up to a three-fold increase in stroke incidence and a higher prevalence in Africa in the year 2021. The known risk factors for stroke are similar to those in developed countries: age, hypertension, diabetes mellitus, hypercholesterolaemia, and central obesity. These risk factors have often been overlooked in patients who present with stroke in Africa. Other important risk factors for stroke include high salt intake and red meat consumption, low consumption of green leafy vegetables, air pollution, undernutrition in infancy and genetic factors. Possibly the most efficient way of curbing the impact of stroke in Africa is to address the risk factors. The aim of this article is to shine some light on these risk factors in sub-Saharan Africa and proffer some solutions to address the menace of stroke.

Key words: stroke, risk factors, non-communicable diseases, Africa

Introduction

Richard Walker gave a memorial lecture in 2021 on the burden of stroke in Africa, in honour of a foremost neurologist in Africa, Prof Benjamin Osuntokun. He concluded that "the most important challenge is to improve primary prevention for which improving diagnosis and control rates for hypertension is the number one priority".[1]

Stroke is the most common cause of disability, dementia, and death worldwide and is associated with a significant economic cost to individuals and the populace.[2] While stroke mortality seems to be on the decline globally in the last 30 years, the stroke burden appears to be rising in low and middle-income countries (LMICs). It has been suggested that there might be up to a three-fold increase in stroke incidence and a higher prevalence in Africa in the year 2021.[2] Between 1970 and 2010, 70% of stroke deaths and 87% of disabilities occurred in LMICs with Africa representing a high proportion.[3]

Africa is experiencing a proportional change from communicable diseases to non-

communicable diseases. In a recent systematic analysis, stroke, with meningitis and migraine, was the main cause of disability-adjusted life years in all parts of Africa.[4] This increase in non-communicable diseases, especially cerebrovascular and cardiovascular diseases, has been linked to risk factors unique to the African population such as dietary habits including high salt intake and reduced intake of green leafy vegetables,[5] environmental pollution,[6] HIV,[7] and Sickle Cell Disease. Other well-recognised risk factors remain in African populations: age, hypertension, diabetes mellitus, dyslipidaemia, obesity, smoking, alcohol consumption, sedentary lifestyle, and atrial fibrillation.[2] With increasing stroke research in Africa, there are now emerging risk factors from genomic studies in sub-Saharan Africa that have shown associations between ischaemic stroke and IL 6, CDKN2A/2B and APOL1-(SIREN).[8]

Management of patients with stroke is a major challenge in LMICs. The average time from the onset of symptoms and signs to arrival in a healthcare facility in Western countries is about 140 minutes compared to 31 hours in Africa.[9] However, it is worthy of note that there have been encouraging improvements in stroke care, especially in Southern and Northern Africa. Good leadership, governmental support and stroke awareness have given an impetus to this change. Improvement of stroke care is nevertheless slow, complex, and multifaceted. Hence, addressing stroke risk factors might be easier leading to a reduction in stroke epidemics.

Risk factors for stroke in Africa

Age is a major risk factor for stroke. The African populace has a lower mean age compared to western countries. One study[7] has shown that the mean age of stroke patients was ten years lower than in the USA. This lower age in Africa has a devastating effect at the peak of productive life.

Hypertension is the major modifiable risk factor for stroke in Africa.[10] Half of the people aged 25 years and above have hypertension: a ticking time bomb. It is alarming that more than 75% of patients with hypertension are either unaware or do not have treatment for hypertension.[11] In addition only about 5% of known hypertensives have their blood pressure controlled within the target range.[11] The reason for the burden of hypertension has been linked to ethnicity, high salt consumption, westernised diet, and emerging risk factors such as air pollution.[8]

Diabetes mellitus is a further important risk factor for stroke in Africa; 80% of patients with diabetes live in LMICs. There is likely to be many undiagnosed patients with diabetes and pre-diabetes.[12]

Other risk factors, such as dyslipidaemias, central obesity, and atrial fibrillation, are increasing in incidence in Africa. [2] Transient Ischaemic Attacks (TIA) and previous strokes are known risk factors for strokes in Western literature. However, there seems to be a paucity of African studies related to TIA. This is likely because it is underdiagnosed.

Detrimental lifestyles prevalent in Western societies are now growing rapidly in Africa, further contributing to the increased incidence of stroke. Smoking, a sedentary lifestyle, greater access to transport and less physical exercise were part of the ten modifiable risk factors in the INTERSTROKE Study in Africa.[2]

There are also risk factors commonly associated with stroke in some African studies. High salt intake, red meat consumption, lack of green leafy vegetables and increased stress have been increasingly linked to stroke incidence and prevalence in Africa.[2] Sickle cell disease and HIV/AIDS are also known risk factors for stroke in the African population.[2] Sickle cell disease is a common cause of stroke in young patients in the African Population.[2,6] This is because of the vaso-occlusive events in the circle of Willis in the brain. HIV/AIDs has also been reported as a risk factor for stroke in countries with a high burden of the disease in Africa.[7,13]

Awareness of additional risk factors for stroke in Africa is emerging. Genomic studies are indicating links to stroke. In Northern Africa, polymorphisms in multiple genes such as APOE IL1, IL-1B, PPARD and many more candidate genes have been elucidated.[8] A large African cohort study has revealed links with variants of IL6, APOL 1 and CDKN2A/2B.[8] Air pollution, especially in urban areas, and infant undernutrition and stress are other issues requiring attention.[2]

Targeting the risk factors for stroke in Africa

Hypertension and diabetes remain the major risks for stroke in Africa. Effectively targeting these chronic diseases has the potential to mitigate the stroke epidemic.

A "call-to-action" from the World Hypertension League has highlighted the urgency for all African countries to address hypertension with three key goals to accomplish before 2030:

1. 80% of adults with hypertension to be diagnosed in Africa,

2. 80% of all diagnosed hypertensive patients to be treated and

3. 80% of treated hypertensives to have their blood pressure adequately controlled.[11]

These goals were categorised into four areas:

1. Actions by Government,

2. Action by African health workers,

3. Actions by African communities, individuals, and civil society and

4. Action by African development partners.

There was an emphasis on a top-down approach in terms of national policies and strategic plans for hypertension control including addressing hypertension in all non-communicable disease programmes, increased funding, increased access to primary health care and investment in quality research.[11] This "call-to-action" is welcomed, but it does not address reasons for undiagnosed hypertension in the African populace. This is important to ensure any initiatives are effective.

Beliefs, attitudes, and behaviours impact healthcare-seeking in Africa.[14] My colleagues and I recently conducted a survey (unpublished) and noticed that 25% of 57 patients who volunteered to have their blood pressure measured at a black British festival in the United Kingdom had high blood pressure: about 90% of those with high blood pressure were neither previously diagnosed nor treated for hypertension.

Beyond policies and access to healthcare, there is the need for a bottom-up approach to modify prevailing beliefs and attitudes of Africans to their health, and Western Medicine. Africa is a religious and multi-faith-based society and Western Medicine may be viewed with suspicion. A strategy is needed to inform faith leaders that Western Medicine is complementary to their faith, and not in opposition.

Social media is a valuable method to influence beliefs and perceptions about chronic diseases. As weight reduction campaigns are spread on social media, so similarly could the awareness of hypertension be advertised. Celebrities have large numbers of social media followers and, maybe by engaging these individuals, appropriate messages could be broadcast. Blood sugar monitoring campaigns could also be included. It could be that such high-profile people, who themselves have hypertension or diabetes, might be willing to share their experiences in the public domain.

Appropriate weight loss and reduction in salt intake reduce the chances of developing hypertension and hence stroke. [15] In addition, diets high in red meat and low in green leafy vegetables have been shown to be risk factors for stroke. Therefore, there is a need for effective campaigns about healthy lifestyles. Top-to-bottom and bottom-to-top approaches should drive this crusade through sound policies from primary and secondary stakeholders.

Conclusion

Education about prompt recognition of stroke or TIA as well as awareness of stroke risk factors are essential. Most importantly, there is an urgent need for the World Stroke Organisation (WSO) and the African Stroke Organisation (ASO) to follow the lead of the World Hypertension League regarding the need for stroke prevention in Africa. A "call-to-action" from WSO and ASO with strategic goals is a valuable resource to target those with risk factors for stroke.

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The burden of bacterial antimicrobial resistance in the WHO African region in 2019: a cross-country systematic analysis

December 19, 2023 DOI: https://doi.org/10.1016/S2214-109X(23)00539-9

This study presents one of the most comprehensive sets of regional and country-level estimates of bacterial AMR burden in the WHO African region to date.

This study reveals a high level of AMR burden for several bacterial pathogens and pathogen–drug combinations in the WHO African region. The high mortality rates associated with these pathogens demonstrate an urgent need to address the burden of AMR in Africa. These estimates also show that quality and access to health care and safe water and sanitation are correlated with AMR mortality, with a higher fatal burden found in lower resource settings. Our cross-country analyses within this region can help local governments to leverage domestic and global funding to create stewardship policies that target the leading pathogen–drug combinations.

Stroke units in low and middle income countries (LMICs) save lives: application of the western model of stroke care

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ABSTRACT

Stroke is defined as a syndrome of rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting 24 hours or longer or leading to death with no apparent cause other than of vascular origin. In the current management of stroke in developed countries, stroke units form a vital part of the care pathway. Stroke units save lives, reduce disability, mitigate against complications such as aspiration pneumonitis, facilitate early discharge home with timely interventions by a Multidisciplinary Team. Whilst the burden of stroke has decreased in high income countries, this decrease is lowest in sub-Saharan Africa.

Key words: stroke units, low and middle-income countries, multidisciplinary team, reduced mortality, ideal stroke units.

Introduction

Stroke is defined as a syndrome of rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting 24 hours or longer or leading to death with no apparent cause other than of vascular origin.[1]

Although stroke used to be considered a rare disease in Africa,[2] it is a common condition with an annual incidence of 250-316 per 100,000 of population and a prevalence of 560 to 1,460 per 100,000 of population. In the last 40 years, mortality due to stroke is reported to have fallen by 42% in high income countries whereas in Africa and other low- and middle-income countries (LMICs), it has risen by 100%.[3,4] The African population accounts for 1.256 billion of the 7.5 billion world population,[5] which will inevitably translate to a huge rise in the incidence and prevalence of stroke.

Sub-Saharan Africa will account for approximately half of the world population by 2050.[6] In addition to infectious diseases, accidents and war-associated injuries, a corresponding increase in health services to cope with this surge in population growth is imperative. Stroke is estimated to be the second most common cause of death in the world and 7th cause of disability,[7,8] but there is no known treatment

which can be administered at the onset for most people suffering a stroke.[8] In developed countries, stroke units are established central components of modern stroke services[9] being able to deliver reperfusion treatment including thrombolysis for those with ischaemic strokes and thrombectomy if needed, with the collaborative support of a Multidisciplinary Team (MDT) will help improve the outcomes.

Benefit of stroke units in low and middle-income countries

The benefit to patients treated in stroke units is highly significant and this extends to both younger (< 75 years) and older patients (> 75 years) who have suffered ischaemic or haemorrhagic strokes. Those treated in stroke units are more likely to survive, gain independence and be discharged home compared with care in a general medical ward.[10,11]

To answer the question whether stroke units can be effective in LMICs, Langhorne et al[9] identified and reviewed several studies from five continents and concluded that all noted statistically significant lower death rates in many studies in the stroke unit group compared with the controlled group. Information was scarce for other outcomes such as discharge home or recovery of independence. In studies comparing interventions for stroke based on a district hospital of one million people suffering 2,500 strokes per year,[9] stroke units offered the greatest number of extra independent survivors (Figure 1).

It is therefore imperative that sub-Saharan countries set up stroke units to increase the number of survivors. In addition, the stroke units would act as focal points for collecting more data such as early discharge and recovery of independence.

We propose that stroke units are established in a geographical unit within hospitals to improve patient care in the acute stage of the illness and enable healthcare professionals to monitor physiological parameters such as blood pressure, blood sugar, state of hydration, oxygen saturation, core temperature and offer preventive measures against pulmonary thromboembolism and aspiration pneumonia by early provision of intermittent pneumatic compression to prevent deep vein thrombosis and assessment of swallowing to mitigate against aspiration pneumonia. When available, thrombolysis and thrombectomy could be offered early if patients are admitted to a stroke unit. Secondary prevention can also be initiated early and with an opportunity to organise rehabilitation and orderly transfer to the community.
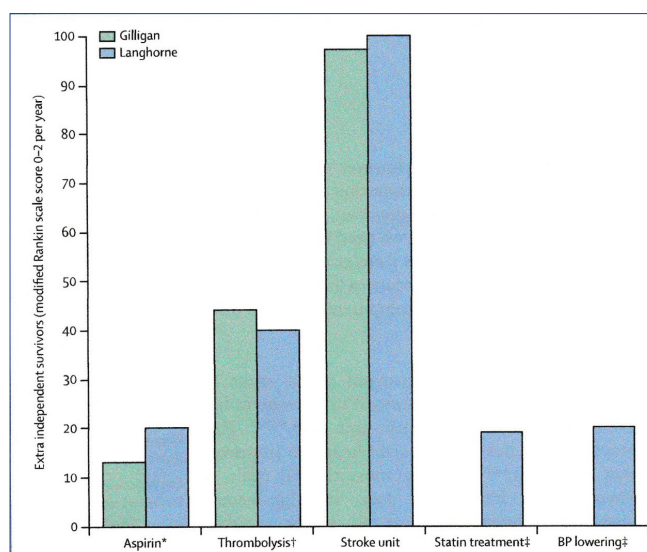

Figure 1. Potential population effect of stroke interventions in a district of one million population. The population effect is shown for a hypothetical district of 1 000 000 population with 2500 strokes per year. Estimates are shown for the number of extra independent survivors (modified Rankin scale score 0–2 points) resulting from an intervention for 1 year. The assumptions and calculations are detailed by Gilligan and colleagues and Langhorne and colleagues[9]. BP=blood pressure. *Acute aspirin treatment. †0–6 h of thrombolysis. ‡Prevention. (Reproduced from Lancet Neurology 2012; 11:341-48 with permission of the Author, Professor Peter Langhorne)

Organisation of an ideal stroke unit

Stroke unit

The term Stroke Unit refers to the co-ordination of the multidisciplinary stroke care within a geographically defined area. The core specialities involved are usually medical doctors (stroke specialists), nursing stroke specialists and ward-based stroke nurses, speech and swallowing therapists, physiotherapists, occupational therapists, dieticians, social workers, orthoptists, clinical psychologist, discharge-coordinators and the stroke research team.

Types of organised stroke unit service tested in trials

1. Acute / Hyper acute stroke unit -This unit offers stroke care during the initial hours to days following a stroke. Patients are admitted immediately after undergoing an emergency CT scan.

2. Rehabilitation stroke unit – Individuals are admitted to this unit approximately 1-2 weeks after a stroke, engaging in rehabilitation that extends for weeks to months as needed. Patients

initially admitted to an acute stroke ward might transition to this unit after 1-2 weeks.

3. Comprehensive stroke unit – This unit combines acute care and rehabilitation, embodying the optimal setting for stroke care.

Proposal for a stroke unit

A. Physical Structure

- An acute geographical unit with 6 to 8 hyper acute beds equipped with monitoring facilities offering care in the first 72 hours.

- A 10-bed step down ward linked to the acute beds.

- An adjoining stroke rehabilitation unit of 10 beds.

B. Staffing

- Consultant with training and interest in Stroke Medicine.

- Registered Nurses.

- Therapists (Physiotherapists, Occupational Therapists, Speech and Language Therapists, Dieticians).

- Care assistants / Nurse Auxiliaries

- Ward Administrative staff such as Ward Clerks.

- Cleaners and Housekeeping staff.

- Staffing to cover all shifts round the clock.

C. Equipment

- Basic Physiotherapy equipment.

- Occupational Therapy kitchen.

- Multidisciplinary Team (MDT) meeting room.

- Computers

D. Processes

- Guidelines (may be adopted from well-established units in developed countries and adapted to local circumstances).

- Regular MDT meetings.

- Access to CT, MRI scanning.

- Liaison with other medical and surgical teams.

- Community rehabilitation teams.

Conclusion and recommendations

1. Patients with suspected strokes should be transported promptly to a hospital equipped with essential diagnostic resources and a dedicated acute stroke unit offering round-the-clock service. Upon admission, they should receive care within the stroke unit rather than a general medical ward, as stroke-specific care within a stroke unit has demonstrated superior efficacy.

2. The most important aspect of the stroke unit that saves lives is the MDT, to cater effectively for the requirements of the local stroke population. It is imperative to ensure sufficient adequately trained staff members as well as available stroke unit beds. Stroke care necessitates specialization, organization, and an MDT approach involving medical, nursing, physiotherapy, occupational therapy, speech therapy, and proficient social workers, all skilled in stroke care. Ideally, these MDTs should convene at least once a week to discuss and coordinate patient care.

3. Paramount to the management of a stroke unit is the comprehensive training of medical, nursing, and therapy staff. Offering clinical attachments, implementing training programs for staff, and facilitating scholarships can augment staffing by attracting a greater number of skilled personnel.

4. Stroke patient should receive a swallowing screening test within 24 hours of admission, those patients with evidence of dysphagia should have a formal clinical/instrumental assessment followed by swallowing management and input from dieticians for individualised nutritional therapy.

5. Early recognition of important conditions underlying stroke such as internal carotid arterial stenosis need to be detected by Doppler ultrasound scanning to indicate the need for carotid endarterectomy by vascular surgeons if significant stenosis is detected. The involvement of cardiologists in the investigation of patients with suspected foramen ovale or dysrhythmias is essential. Gastroenterologists may also be involved for the insertion of feeding tubes into patients with persistent dysphagia who need percutaneous endoscopic gastrostomies (PEG) six weeks after feeding with nasogastric tubes.

6. Enabling early discharge services from the stroke unit, supported by community rehabilitation teams, not only reduces the length of hospital stays but

also enhances rehabilitation within a home setting, ultimately fostering improved patient outcomes.

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See details, including activities in South Sudan, in the 2022 Activity Report.AnnualReport_MSFAcademy2022_EN.pdf

Domesticating Obstetric fistula repair: towards fistula-free South Sudan

Dr. Koma Akim, a general surgeon by profession was one of the outstanding trainees on Obstetric Fistula in 2022 at Juba Teaching Hospital. For Dr Koma his interest in Fistula repairs started in 2019 when he first came into direct contact with patients suffering from obstetric fistula in South Sudan.

https://southsudan.unfpa.org/en/news/domesticating-obstetric-fistula-repair-towards-fistula-free-south-sudan

QUIZ ANSWERS:
# Unenhanced Brain Computerised Axial Tomographic (CAT) scan quiz

Scan 1

1. Left middle cerebral artery (MCA) territory low attenuation. There is loss of the sulci lateral to the area of low attenuation.

2. Acute left MCA infarction.

3. Assess and monitor level of consciousness, oxygen saturation, assess swallowing, if dysphagic, not to drink or eat until deemed safe to do so after reassessment, start intravenous fluids to maintain hydration, start high dose aspirin 300mgs orally daily (or if allergic to aspirin, prescribe clopidogrel according to local guidelines), apply intermittent pneumatic compression (IPC) to legs to prevent deep vein thrombosis unless there are contraindications. Review patient by senior doctor daily or if condition changes.
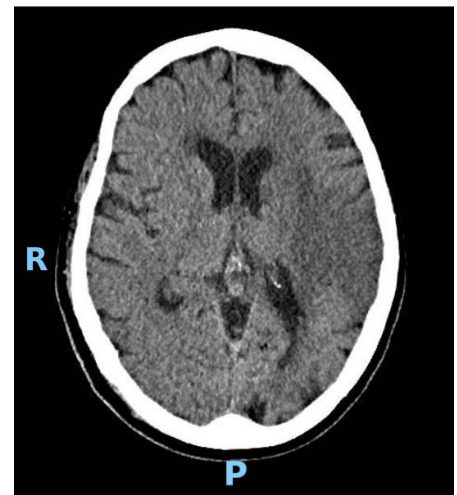
Scan 2

1. Hyperdense ovoid lesion in the right basal ganglia region, there is associated perilesional oedema (dark rim surrounding the hyperdense lesion) and the right lateral ventricle is compressed suggesting a mass effect.

2. Right basal ganglia intracerebral haemorrhage, most likely due to uncontrolled hypertension.

3. Monitor level of consciousness using the Glasgow Come Scale (GCS). If there is a drop of two points on the GCS, rescan the brain in case of increase in the haemorrhage or development of hydrocephalus if intraventricular extension should complicate the clinical picture. Maintain blood pressure ≤140/80 but above 100/60 mmHg. If dysphagic, keep "nil by mouth" until re assessed. Insert nasogastric tube for feeding, hydration and administration of medicines until patient can swallow safely. Monitor temperature and oxygen saturation in case of aspiration pneumonitis.

   Apply intermittent pneumatic compression (IPC) to prevent deep vein thrombosis. Review patient by a consultant or senior doctor daily in the first week. Inform the local Neurosurgical centre, if there is one, for an opinion on surgical intervention should this become necessary.
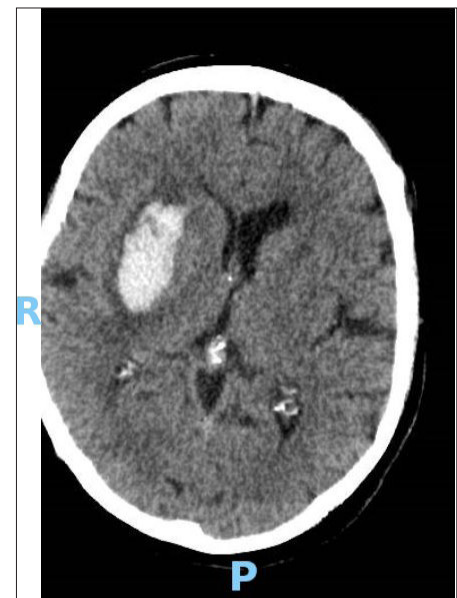
Dr Eluzai Hakim

Dr Asia Dawud Kuek

Dr Asia Dawud Kuek Kuol Ajak died in Kampala Uganda on 17 January 2024 following a long battle with breast cancer. Before her illness, Dr Asia was an intern doctor in the Department of General Surgery in Juba Teaching Hospital.

She was born on 11 October 1988 in Khartoum, Sudan. Her father is Dawud Kuek Kuol Ajak of Dinka Tribe from Tonj North County, Aliek Payam (Kongor), Tharwang Boma of Warrap State, South Sudan, and her mother is Omalkher Yussuf Babiker from Sudan, originally from Chad.

Dr Asia started her primary education in 1995 at Id Hussein Primary School and completed her secondary school education in 2008 at Zatakeen Girls Private School in Khartoum, Sudan. She was then admitted to the University of Juba, College of Medicine in 2011 and graduated in 2019 with the Bachelor Degree in Medicine and Surgery (MBBS).

She worked at Juba Teaching Hospital as an Intern Doctor from 2020 – 2021 in the Departments of Obstetrics and Gynaecology and General Surgery, as well as other private clinics in Juba before she was referred to Khartoum Sudan for further management after she was diagnosed with breast cancer in February 2021.

She was single and described by her colleagues as a humble, peaceful and quite young doctor who had dedicated herself to saving lives. She wanted to become an obstetrician and gynaecologist before her dreams were cut short.

Her legacy will live on in the professional and personal development of those with whom she has spent time.

She was much more than a colleague, she was a friend, a confidant, and in many ways the glue that held those who were close to her together.

Dr Asia Dawud will be dearly missed by her colleague and the medical fraternity in South Sudan.

Dr Lou Joseph Bosco

Dr Lou Joseph Bosco died in northern Uganda after a short illness on 19 January, 2024. Born on 5 July 1986, Dr Lou hailed from the Leri Pasobe Clan, Nyargang Boma of Kansuk Nyepo Payam in Kajokeji County.

He studied for his O level certificate in 2002 to 2005 at Comboni Senior Secondary School, Lomin, Uganda, and sat for his A level certificate at Moyo Senior Secondary School between 2006 – 2007.

Dr Lou went on to study medicine at the University of Bahr el Ghazal in 2008, but took a break from 2011 to 2014. He went back to the university and graduated in 2017. He did all his internship training in Wau Teaching Hospital, except for paediatrics which he did at Al Sabah Children Hospital in Juba.

From 2018 to 2022, Dr Lou worked as a medical doctor at the Millennium Medical Clinic in Juba. In 2023 until his death, he worked at the Mundari Hospital in Kajo Keji, South Sudan.

Dr Lou Joseph was married and had a 9-years old daughter.

Mr Gideon Wurube Kara

South Sudan has lost a senior and longtime anaesthesia medical assistant who was working at Juba Teaching Hospital (JTH), Mr Gideon Wurube Kara died on 26th January 2024 in Juba, South Sudan. Mr Kara was born in Kajokeji on 1st January 1955, to Peter Kara Waran (father) of the Saburi clan, Lejo Boma, Kangapo 1 Payam, in Kajokeji County, and Ludia Poni Dilla (mother) of the Porongo clan, Lemi Boma, Kangapo 1 Payam, in Kajokeji County. He was married to Jesilen Juru Elioba Abale.

Mr Kara started his education in 1962 at Leikor Primary School, Kajokeji. His father did not approve of advancing his education, but due to his determination to study, he escaped with his sister to Uganda where they continued with their education at Lepori Junior Intermediate School, Uganda, from 1967 to 1970.

After working for several years in various positions in South Sudan, Mr Kara started nursing training at the Technical Nursing Secondary at JTH in Juba in 1989. Mr Kara travelled to Khartoum to study anaesthesia from 1997 to 1999, from where he graduated as an Anaesthesia Medical Assistant. He returned to Juba to work at the JTH in 2008 and, until the time of his death, had been the Assistant Director of anaesthesia since

2015.

Mr Kara had been described in different fora by many doctors who served with him in the theatre as "a truly humble soul who devoted his life to helping and serving patients at JTH."

He was featured on the cover of the SSMJ Vol 5 No 2 for May 2012 in the discussion of safe caesarean section in which anaesthesia is a crucial component.

> ## "A truly humble soul who devoted his life to helping and serving patients"

He will surely be missed by all who knew and loved him.

Mr Kara died from complications of heart failure. He is survived by eight children: five boys (one had died) and three daughters, and several grandchildren.

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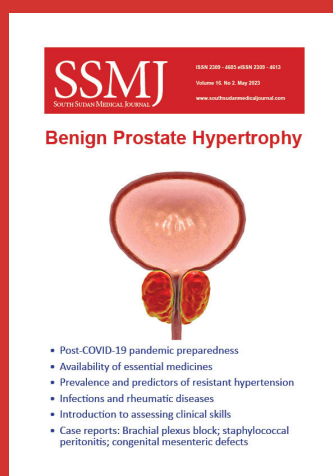SSMJ is now indexed by Scopus . . .

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