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FROM THE PRESIDENT'S PEN

Dear Colleagues,

As we prepare for the next annual general meeting of our association it is important to look at our achievements. It is also important to critically look at the existing gaps in order to build a stronger association.

One of the objectives of the association is to establish relations with other medical associations in existence and affiliate as and when expedient. The Lesotho Medical Association continues to be an active member of the African Medical Association and continues to participate in the activities of that association. The Association is an active member of the World Organisation of Family Doctors (WONCA). This allows members to participate in international activities and share with colleagues globally.

Continuing Professional Development (CPD) is one of the priorities of the association in its endeavour to promote the art of healing, to alleviate suffering and prevent disease. All members are urged to actively participate in all continuing education activities. All members are once again reminded that the Learning and Sharing Forum is held every last Wednesday of the month at 17:00 hours at Lehakoe Club. All available opportunities to gain CPD points should be utilised by members as the CPD point system will soon be implemented by the Medical Council to assess eligibility for renewal of registration as a medical practitioner.

The association will organise the Summer School to be held Lesotho in 2010 in collaboration with the HIV centre of Frankfurt University and the University of Stellenbosch. The Summer School for 2009 will be held in Stellenbosch this year. Members will be informed as soon as the date has been finalised.

I urge all members to identify existing gaps and come up with constructive ideas on how to improve and make the Lesotho Medical Association stronger. If there is any need to amend the constitution, now is the time to notify members of any proposed amendments to be tabled at the upcoming Annual General Meeting in order to build an association we can all be proud of.

Thank you.

Dr. Piet McPherson, M.D.

President

INSTRUCTIONS FOR AUTHORS

The Lesotho Medical Association Journal accepts editorials, original research papers, review papers, case discussions, clinical guidelines, letters and Lesotho medical news reviews.

The author should submit both an electronic and hard copy of the manuscript to the address below:

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EDITORIAL: BACK TO BASICS

M Mokete, MD

In the past years, five to six decades ago or more, the teaching of cleanliness and hygiene was an anchor to survival over and above other core subjects which were taught. If one was in doubt about the cleanliness of drinking water, boiling it was recommended.

Pasteurisation of milk was highly recommended and competition essays about Pasteur himself were in vogue. Nails were cut short, hairs well kempt, washing of hands after toilet and before handling food was the norm. Today, irrespective of all the sophistication of advancement, we are in many parts of the world still in the slumber of false comfort with the relaxation on basics.

We are, in this global village, witnesses to the human tragedy of loss of lives because of cholera epidemic in Zimbabwe which spread into the neighboring countries. That could have happened anywhere as long as sanitary rules were not strictly adhered to.

This reminds one of the Mediterranean Cruise through several ports. In the ship itself there is fanatic observation of rules of hygiene to the extent that taps are non-touch. You get closer to the tap it opens itself. Doors open themselves on approaching them. Hands for everybody get their mandatory cleansing before seating for a meal; similarly all port restaurants are similarly equipped in observation of non transmission of disease. Business could be the consideration but upper-most is life.

The question is how far ready are we in our respective countries in Southern Africa? Have we heeded the cholera epidemic or any other? How up-to-date is our Public Health Education in schools, villages, and at our homes?

Time has come for all and sundry to make vigorous efforts with all the available means to combat disease at all levels. After all, our predecessors, medical and public health practitioners, managed without the present array of antibiotics, e.t.c., by observing the basic primary health care rules.

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`MUSI MOKETE (M.D.)

Referral patterns, diagnoses, management and outcome in a paediatric ward in Lesotho

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Introduction

There is a paucity of information on inpatient paediatric units in Sub Saharan Africa and there tends only to be literature from larger countries such as South Africa. The aim of this paper is to give an overview of the referral patterns, main diagnoses, management, and influences on outcomes during a six month period in the paediatric referral centre in Lesotho.

Setting

There is one referral centre for paediatrics in Lesotho based in Queen Elizabeth II hospital in Maseru. This is a 42 bed unit and includes a five bed high dependency area. There are also 8 isolation cubicles. There is one consultant paediatrician plus one paediatrician rotating from Baylor College of Medicine and either four or five medical officers and interns. There are five permanent nursing staff and the remainder of the nursing staff rotate through the ward.

Aims and objectives

To look at the referral patterns, diagnoses, management provided, and factors influencing outcomes in the paediatric referral centre in Lesotho.

Methods

Data on each admission is routinely collected on discharge or death. This includes HIV status of the mother and the child, nutritional status on admission, length of stay, management given and final diagnosis at discharge or death.

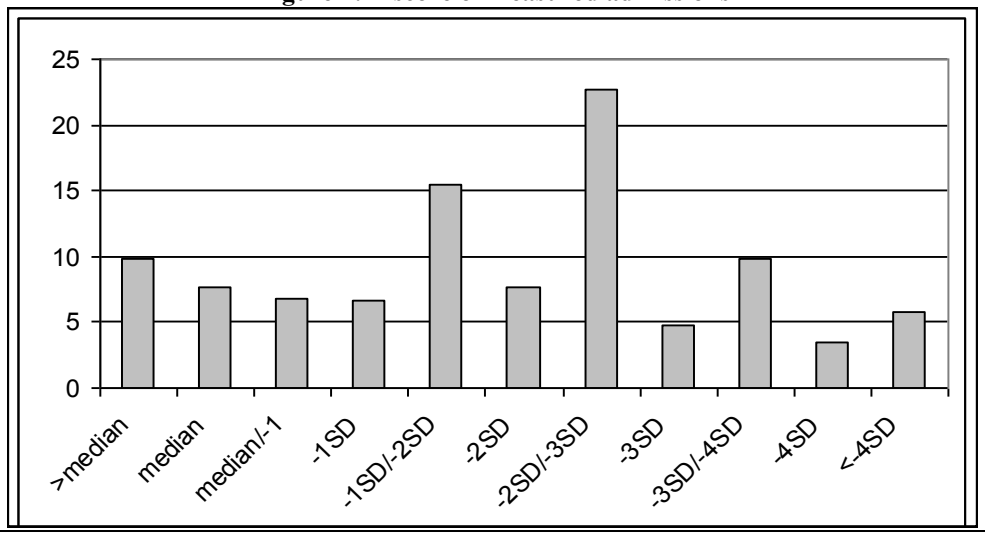
Results

Between January and June 2008 there was data collected on 849 admissions. Most referrals came from paediatric outpatients or casualty, see Table 1. 58% are male and 42% female. The median age of admission is 14 months and the mean age is 28 months.

Table 1 Source of referrals to paediatric ward in QEII

Referred from	Percentage of total
POPD	29.6%
Casualty	20.6%
Baylor	12.7%
Outside Hospital	6.6%
Paediatric HIV clinic	1.1%
Other/not stated	29.4%
Total	**100%**

Figure 1: Z score of measured admissions



Malnutrition

Measurements were available for 514 children but 39% of children did not have their weight for length calculated. 15% of those children who did have their weight and length measured and Z score calculated were less than or equal to the median. The remaining 85% had some degree of malnutrition. 19% of those children who had their weight for height measured were very severely malnourished with a weight for height <-3SD below median. (See Figure 1.)

Figure 2: Outcome of children according to degree of

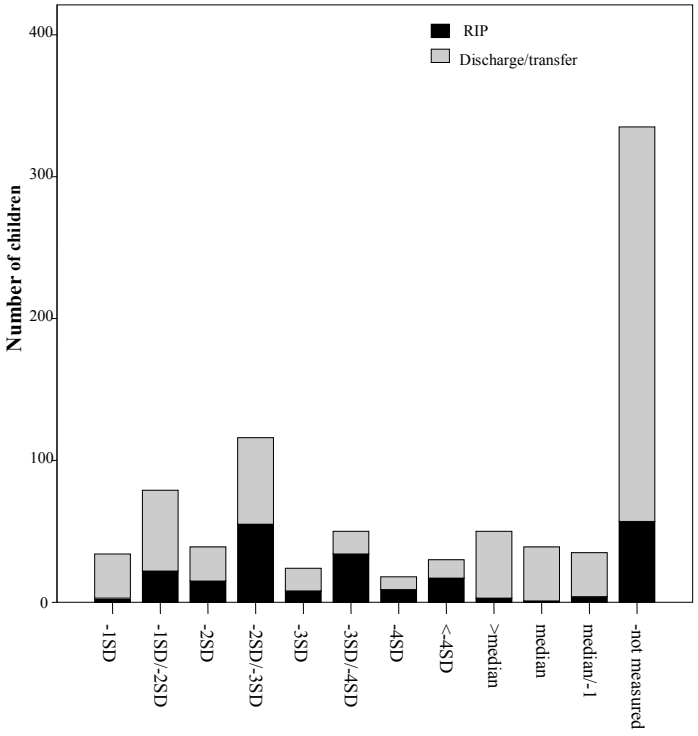
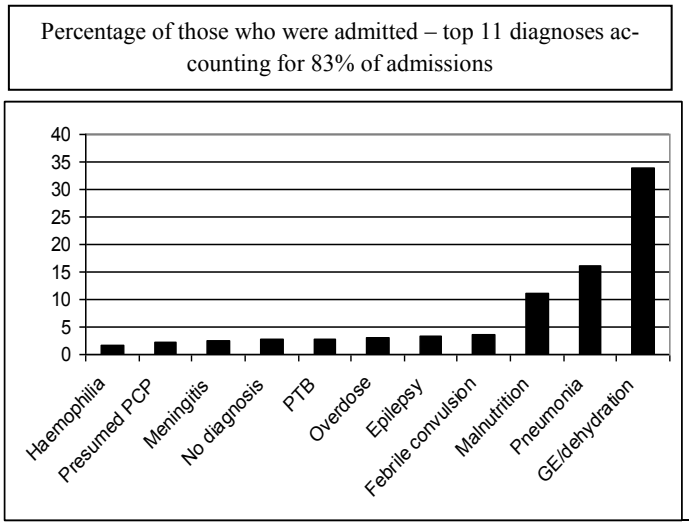


Figure 3 Most frequent final diagnoses.



The outcome was poorer for children with moderate and severe malnutrition see Figure 2.

Final diagnosis

The most common final diagnoses during this winter period was gastroenteritis, followed by pneumonia and malnutrition, where malnutrition was the reason for admission, as opposed to a secondary finding after admission. (See Figure 3)

HIV status

Of the 416 mothers whose HIV status was definitely tested and recorded in the child's hospital notes, 244 or 58.6% of the total tested were HIV positive, 172 or 41.4% of the total tested were negative. 42.5% of the mothers were not tested during the admission, see Table 2. In 54 cases the mother's status was not tested and the reported status was accepted.

The status of the children of the mothers in these different groups is summarised in Table 3. 107 children were designated to be indeterminate at discharge/death. This group of children are exposed children, aged less than 18 months, whose result of their DNA PCR is pending.

Table 4 summarises the outcome of the children according to their HIV status.

Treatment in the ward

170 children or 20% of all admissions received oxygen during their admission. 48 children or 4.1% of all admissions received a blood transfusion. 13 children or 1.5% of all admissions had their blood glucose recorded. Only 3 children or 0.4% of children had blood cultured. 82 or 9.6 % of all admissions required a lumbar puncture.

16 children or 1.9% received a bolus of dextrose. 184 or 21.6% of admissions received a fluid bolus and 236 or 27.8% received maintenance intravenous fluids. Only 59 or 6.9% of admissions did not receive antibiotics. 25.6% received a third generation cephalosporin with a further 10% starting on a narrower spectrum regime but moved onto a third generation cephalosporin due to

Table 2 Mother's status tested during admission

Mothers status	Numbers	Percentage of total
Not tested	361	42.5%
Positive	244	28.7%
Negative	172	20.3%
Reported positive	20	2.4%
Reported negative	34	4.0%
Declined	7	0.8%
RIP	6	0.7%
Total	849	100.0%

clinical failure. 32% received treatment for malnutrition although only 11% were admitted because of malnutrition. During this 6 month period, 65 children started TB treatment while inpatients, 22 children were already on TB treatment on admission and 6 children had previously been treated for TB, this accounted 10.8% of all admissions.

Children requiring oxygen were much more likely to have a poor outcome, see Figure 4

Length of stay

Information on the length of stay was available on 824 admissions. The minimum stay was less than one day and the maximum stay 46 days. The average duration of admission was 7 days; the median duration was 5 days.

Table 3 Mothers status and status of their children.

		Child status →				
		Indeterminate	**Negative**	**Not tested**	**Positive**	**Total**
Mothers Status ↓	**Not tested 42.5%**	3 (.8%)	73 (20.2%)	262 (72.6%)	24 (6.6%)	361 (100.0%)
	Positive 28.7%	94 (38.5%)	40 (16.4%)	23 (9.2%)	87 (35.7%)	244 (100.0%)
	Negative 20.3%	0	172 (100.0%)	0	0	172 (100.0%)
	Reported positive 2.4%	7 (35.0%)	2 (10.0%)	7 (35.0%)	4 (20.0%)	20 (100.0%)
	Reported negative 4.0%	0	11 (32.4%)	23 (67.6%)	0	34 (100.0%)
	Declined 0.8%	0	2 (28.6%)	5 (71.4%)	0	7 (100%)
	RIP 0.7%	0	2 (33.3%)	1 (16.7%)	3 (50%)	6 (100%)
	Total 100.0%	107	304	320	118	849
		12.6%	35.8%	37.7%	13.9%	100.0%

Table 4 Child final status and outcome

Childs status		Outcome	
		Death	**Discharge**
Positive	118 (13.9%)	36 (30.5%)	82 (69.5%)
Negative	304 (35.8%)	43 (14.1%)	261 (85.9%)
Indeterminate	107 (12.6%)	30 (28%)	77 (72%)
Not tested	320 (37.9%)	119 (37.2%)	201 (62.8%)
Total admissions	849 (100%)	228 (26.9%)	621 (73.1%)

The average length of stay if the outcome was death was 4.33 days, the average length of stay if the outcome was discharge was 7.65 days, see Figure 5. This difference is significant ($p < 0.05$). 75%, of children whose length of stay was less than one day were not tested for HIV and 68% of those whose stay was <1day passed away often as they presented critically ill.

70% of the mothers of children whose length of stay was less than one day were not tested for HIV. The longer the child remained in hospital, the more likely that both the mothers and the child was tested, see Figure 6.

DISCUSSION

Referral pattern

The majority of patients are referred from departments within the hospital. The next large group is from Baylor. A relatively small proportion, given that this is a referral centre and there are no paediatricians in the public system outside Maseru, come from outside hospitals. Reasons for this may be that when families realise their child is unwell they relocate to Maseru and use the local address. Other reasons may include the network of Baylor paediatricians visiting district hospitals around the country. Other possibilities include financial implications of travel between hospitals or a perception that coming to the referral hospital will not benefit the child. Frequently when children are referred it is very late in the natural history of their condition, making successful intervention less likely.

Malnutrition

During this six month period almost 40% of children did not have their length measures, thus making a weight for height calculation and the detection of malnutrition difficult. Length is generally done on admission and reasons for this are multifactorial but may include blurred lines of responsibility.

Figure 4 Outcome of children requiring oxygen

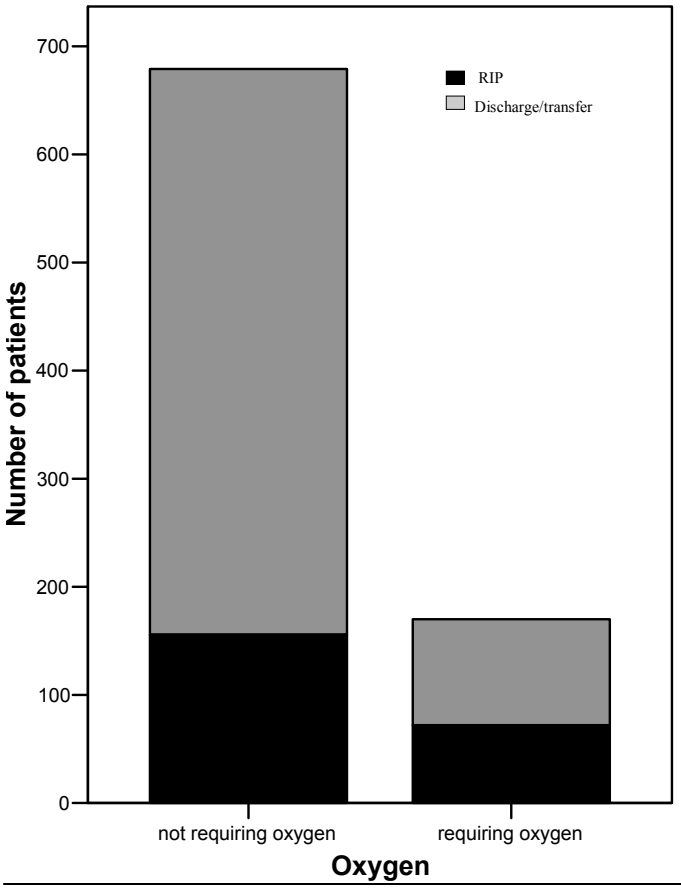
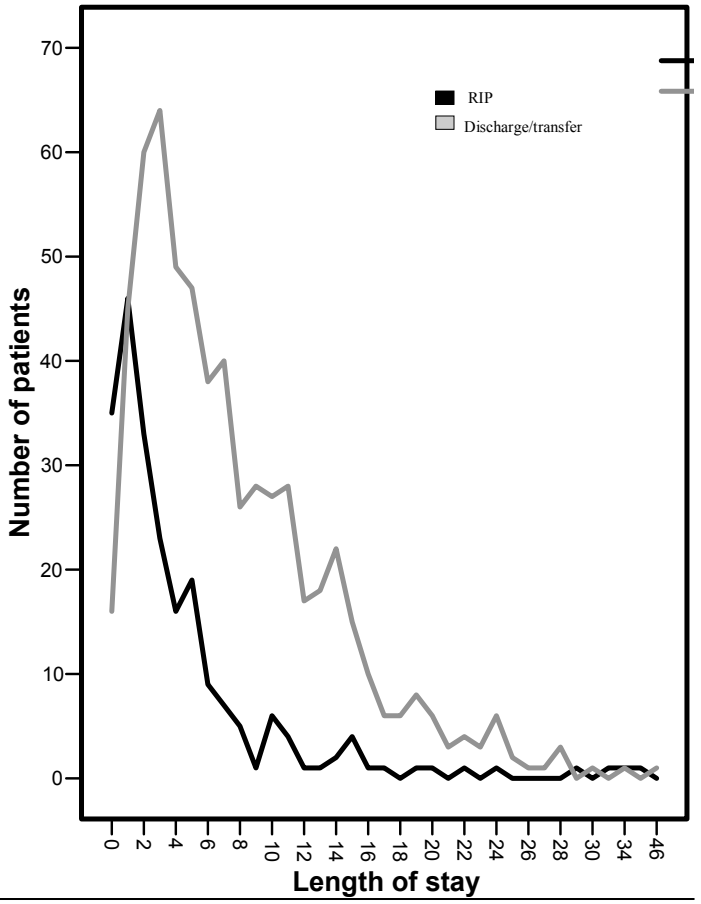


Figure 5 Length of stay before discharge or death



Final Diagnosis

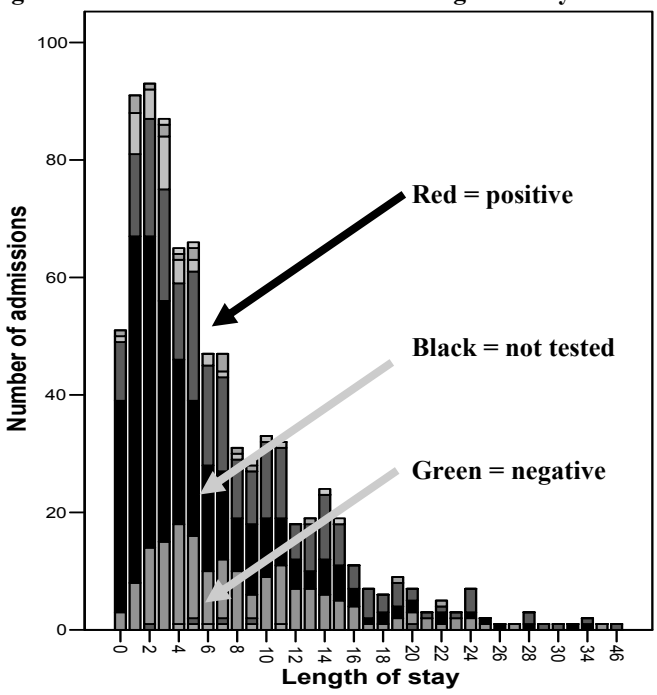
During these six months which included a summer where the incidence of gastroenteritis was extremely high it is no surprise that gastroenteritis is the most frequent reason for admission. 288 children were admitted with gastroenteritis, most of these in January and February. Children with severe dehydration, particularly if malnourished, which 85% of this group were, require intensive nursing care. This includes the monitoring of intravenous fluids and vital signs and responding to these. Poor nurse to patient ratios, little ongoing professional development, low morale plus no designated areas of responsibility and minimal monitoring combine to make the outlook for this group of patients poor. This is exacerbated by the absence of non invasive monitoring such as saturation monitors for the sickest children and lack of infusion pumps making nursing care more onerous. This set of circumstances is compounded by a high turnover of junior doctors, many unfamiliar with paediatric management protocols.

HIV status

361 or 42.5% of the mothers were not tested during the admission, and 72.6% of their children were not tested. Of those mothers who were tested almost 60% are HIV positive. The overall HIV prevalence in the country is 23% (1), indicating that children who are unwell, are more likely to be children of seropositive mothers. Only 16.4% of the offspring of the positive mothers were definitely negative, 38.5% indeterminate and 35.7% were definitely positive.

The mortality among children of mothers who are HIV negative is much lower than that of seropositive mothers, 18% compared to 33.6% of children of positive mothers. Of the 361 women who were not tested, 27.7% of their children died. High mortality among children of untested mother and child pairs may have been because their children were very sick and died before testing. The mortality among negative children is higher if mother is HIV positive (25%) than among negative children whose mother is HIV negative (14%). This is a well recognised trend (2;3).

Figure 6 Mothers HIV test status and length of stay



During the six months reported here mothers and children attended a paediatric HIV clinic, on site but off the ward for their test. Frequently several trips would be required before testing was carried out. That 23 children of known positive mothers were not tested is a reflection of this difficulty. This is compounded by non Sesotho speaking junior staff, working without interpreters.

The cumulative mortality among HIV infected infants has been reported as 35.2% at 12 months and 52.6% at 24 months. We therefore expect a high mortality among infants with a median age of 14 months who are HIV infected and who have been admitted to hospital.

Among HIV positive and indeterminate children the inpatient mortality was 30.5% and 28% respectively. This may indicate that many of the indeterminate children admitted to hospital will eventually be determined to be HIV positive. The mortality among children who were not tested is very high at 37.2%. This is probably due to the child dying before testing and being too sick prior to their death to go for testing which would have meant being off oxygen. Our mortality among HIV positive children is similar to other units which have published their outcomes, see Table 5, and as expected lower than that found in paediatric intensive care units.

Treatment in the ward

20% of all admissions required oxygen at some stage of their admission. This is a reflection of the many admissions of HIV positive infants with PJP pneumonia. This can cause problems in terms of supply. Concentrators have been donated and electricity is consistent but poor maintenance results in these frequently malfunctioning. A weak procurement system means there are often no single-use tubing available and tubing is recycled but not sterilised with all the implications for nosocomial infection. The advantage of oxygen concentrators is that they can largely be monitored by mothers. However concentrators can only supply 1-5 litres of oxygen per minute which is further reduced when divided between several patients. When severely hypoxic patients require high concentration oxygen, several difficulties are posed. An oxygen tank must be changed when empty. A regulator to release and control the oxygen delivered is required. Tubing, either single use or sterilised after use is required; all of these factors are challenging.

Only 1.5% of patients had their blood glucose tested despite 1/3 of patients been treated for malnutrition and the WHO guidelines for the management of malnutrition suggest checking blood glucose. Less than 2% of patients received a glucose infusion which is probably not a reflection of the number of children who had low sugars but rather a reflection of there being no gluconometer. Subsequent to this data being available, an inventory system was set up and the gluconometer and blood glucose recordings are freely available on the ward.

Only three children out of 849 children admitted had a blood culture drawn. This is despite the fact that 93% of patients were treated for an infection. The automated blood culture machine was not functioning during this time and blood culture bottles were unavailable. The impact of this is that there is no information on which organisms are causing illness or which antibiotics the causative organisms are sensitive to. The natural instinct, when faced with a critically ill, immunocompromised child is to use the broadest spectrum available and thus resistance is promoted. The chances of resistant organisms causing nosocomial infection is compounded by lack of infection control measures such as sterilizing cots and equipment between patients. Cleaning is carried out by nursing assistants or ward attendants but this is not routine due to lack of sterilizing agents.

Almost one third of all admissions required a bolus of fluid and/or maintenance fluids. IV cannulas and fluids are freely available for all patients. This is unlike many African countries, where parents of severely dehydrated children have to go and buy the equipment before their child can be resuscitated. However the monitoring of intravenous fluids is challenging which results in medical staff opting for the oral or nasogastric route which the mother can monitor.

10% of admissions were either started on TB treatment or were already on TB treatment on admission. Very young children do not transmit TB as they do not expectorate but rather swallow sputum; however older children or adult carers, if infected and coughing can transmit to other patients and healthcare workers. Due to this concern an isolation policy has been introduced.

Length of stay

Missing the opportunity to test mothers and children who died early in their admission is a reflection of the fact that we did not have an in house counsellor. As this group is the sickest it is crucial to test them and their mothers. The longer the child remained in hospital the more likely that the child and mother was tested. We now test all children on admission.

Benchmarking with other units

1. Our mortality among HIV positive patients is similar or better than other units. Our mortality among HIV negative patients is higher than published data from other units.
2. There are several possible reasons for this. These are
   - We do not have an intensive care unit and can therefore expect our mortality to be higher than that in units where the sickest children are trans-

ferred to intensive care as happens in South Africa.

- This data includes well and malnourished children, and outcome for malnourished children is known to be poorer than for well nourished children and 85% of our admissions have some degree of malnutrition.
- Due to the high prevalence of HIV in Lesotho, many of our negative children are HIV exposed. It is well reported that children of positive mothers are known to have a higher mortality even if the child is negative (2;3).
- Limitations in terms of nursing, high turnover of junior staff and a weak procurement system.
- Units with high mortality rates do not report their outcomes.

In conclusion

The vast majority of our admissions have some degree of malnutrition and improving the nutritional status of children is a priority, if the aim is to reduce child mortality. HIV status also has a huge impact on inpatient paediatric mortality, much higher than other countries. This is a reflection of the high prevalence in Lesotho. The opportunity of testing children and their mothers when they are admitted to hospital in a country with a high prevalence should not be missed. The reasons for testing include improving the outlook for the mother which will improve the outlook for the family who depend on her as well as to reduce the transmission to future children. There is an increased risk of death in children whose mother dies from HIV (13), thus taking the opportunity to check the mothers CD4 count and encouraging them to access treatment should reduce child mortality. Testing should also be done early in the admission, ideally on admission so that mothers of children who die shortly after admission also receive counselling and testing. Funding has been secured for a full time counsellor to be based on the ward in order to offer all mothers and children HIV testing and to check all positive mothers' CD4 count if they have not had this recently checked or if not already enrolled on a treatment programme. The testing of other children and partners is also promoted.

Table 5 Benchmarking with published data from other inpatient units.

Year Study done	Number in study	Est adult HIV prevalence (1)	Ref	Country	HIV neg Mortality	HIV inpatient prevalence	HIV pos mortality	Deaths accounted for by HIV
'99-'04	1559	3.9%	(4)	Nigeria		25.80%		
'95-'96	2015	6.5%	(5)	Tanzania	8.40%	19.20%	21.40%	
'01-'05	10,107	3.9%	(6)	Nigeria		8.30% †	36.30%	22.40%
2000	754	3.9%	(7)	Nigeria		5.7% †	32.60%	28.57%
2003	465	18.8%	(8)	SA(PICU)		10%	44%	
2000	991	14.1%	(9)	Malawi	8.90%	18.90%	30%	40%
'96-'97	281	18.8%	(10)	SA	7%	26%	21%	
2008	849	23.2%		Lesotho	14%	22% + 20% indeterminate	30.5%	33 - 60%*

* - 60% if deaths in indeterminate children included, 33% if only positive included

† - Children only screened if met WHO criteria for HIV

PICU – results from a paediatric intensive care unit

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Medical School and Medical School Education in Lower Income Countries: Options for Lesotho

Christina M. Stachur, MPH

Introduction

Sub-Saharan Africa has just over 10% of the world's population (770.3 million) and one of the highest disease burdens in the world. This region has been the focus of several measures aiming to improve health care for all, including the *Alma Ata Declaration* of 1978 and the World Health Organization's *Millennium Development Goals*. One factor that has been making it increasingly difficult to improve the health of those in sub-Saharan Africa is the shortage of physicians. While the 47 nations of sub-Saharan Africa have a total of 87 medical schools, 11 of these countries have no medical school at all and 24 have only one each [1].

Having more regionally-trained physicians will improve the quality and continuum of care by establishing a stable physician work force that is intimately familiar with the local disease burden. However, training new physicians within developing countries is not as easy as enrolling more students into medical school or building more medical schools. Due to shortages in clinical resources, funding, and trained teachers, producing more regionally-trained physicians will require innovative approaches on the part of medical schools, participating governments, educators, collaborating institutions, donors, and students alike. One sub-Saharan country currently facing this dilemma is Lesotho. Lesotho is one of the aforementioned 11 countries with no medical school and only 5.4 physicians per 100,000 population. (For comparison, the U.S. has 279 physicians per 100,000 population [1,2].

This paper will analyze four models for medical education – each tailored to the current situation in Lesotho. These models range from the traditional idea of building a medical school in the country, to the currently-used system of buying seats at medical schools in other countries, to an entirely new approach using distance learning. The focus of each model will be the cost per student and the ability to retain physicians in Lesotho upon graduation. Ideally, these suggestions will be useful for the Ministries of Health and Finance in Lesotho as they continue to seek cost-effective options for training doctors. In addition, I hope that these models and suggestions will be generalizable to other low-income countries.

Urgent Need for Trained Doctors

Reducing the burden of disease in sub-Saharan Africa will require the expertise of trained physicians. Current data indicate that Sub-Saharan Africa has fewer than 13 physicians per 100,000 population (or a total of 82,949 doctors) [2]. This data is a reflection of both lower output (fewer medical schools) and lower retention (medical school graduates leaving sub-Saharan Africa to work in other countries – otherwise known as "brain drain.") An article in the South African Journal of Science estimates that approximately a third of South African medical school graduates emigrate to the developed world [3]. This efflux has high costs for both the government and its people [4]. The reasons for such an efflux are many, but most doctors leave in search of better pay, less political turmoil, and more opportunities for occupational advancement.

While retention is an issue of great importance that must be addressed both within and between nations, examples from other countries indicate that tailoring a medical education model to a country's needs could help reduce this type of migration. Therefore, tailoring a medical education model to fit the landscape of health-care needs in Lesotho could help improve physician retention there.

The Current Situation in Lesotho

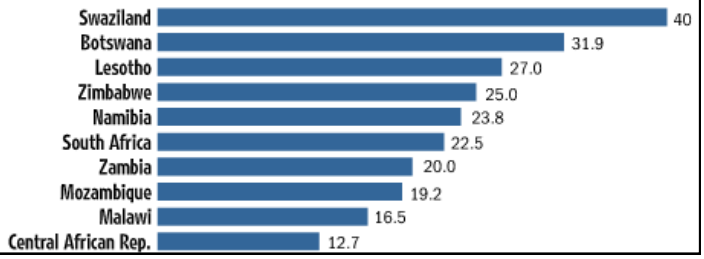
Lesotho is home to an estimated 1.881 million people [5] and has some of the worst country-level indicators with respect to both health and inequities in health care personnel. Lesotho has the world's third

highest HIV prevalence (27%) [6]. As the prevalence of HIV increases, the life expectancy in Lesotho has been steadily decreasing from the late 1990s to the present (from 54 years in 1998 to 42 years in 2006) [6-9].

Lesotho has 5.4 physicians per 100,000 population (or between 120 and 150 doctors) [2,5]. As stated above, Lesotho has no medical school, and currently trains physicians by buying seats at medical schools in other regions of sub-Saharan Africa. The majority (96%) of these seats are in schools in South Africa [10]. Unfortunately, estimates from the past 20 years suggest that only 20% of the medical doctors whose training has been financed by the Government of Lesotho (i.e. Basotho doctors) are currently working for the Ministry of Health and Social Welfare (MOHSW) or Christian Health Association of Lesotho (CHAL) [11]. Additionally, the attrition rate of these doctors is quite high [11].

The primary reason for remaining in South Africa is to receive a higher salary. The average monthly salary for junior doctors in Lesotho is US$914 - $1058, while in South Africa the average monthly salary is between US$1700 - $2500 [5,11,12,13]. In hopes of helping Lesotho retain Basotho doctors trained in South Africa, the South African government has maintained a principle of not issuing work visas to doctors from developing countries [14]. The reality, however, is that

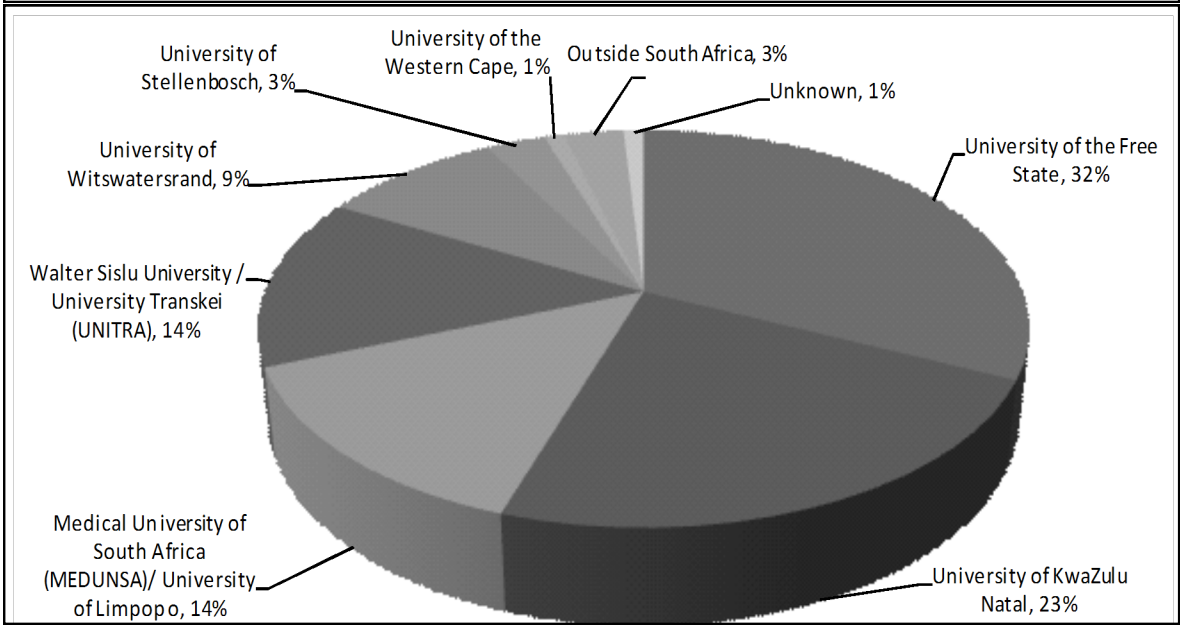
Figure 1: HIV prevalence in females aged 15-49 (2006), in percent [6]



Basotho doctors are still finding ways to stay in South Africa after completing their education there.

A second reason Basotho medical students are likely to stay in South Africa after graduation is because they are more familiar with local underserved areas. While no studies have been conducted to see exactly where this group of students eventually practices, or why they've chosen to practice there, conclusions from other studies suggest that 'familiarity with the area' may be a significant factor [15]. It can therefore be reasoned that since Basotho medical students are completing their clinical medical training in South Africa, this increases their familiarity and connections with that region, influencing them to stay in South Africa. This information is useful in that it implies that a medical education model that incorporates all or part of its medical training in Lesotho will help retain Basotho doctors in Lesotho.

Figure 2: Distribution of Current Basotho Medical Students, Expected Graduation 2007-2012 [10]



Model #1: Buy Seats from the University of Botswana School of Medicine

Botswana is currently creating a medical school at the University of Botswana (UBSM), set to graduate its first class in 2011 [16]. Those planning the UBSM have projected that up to 10% of the slots will be for students from other Southern African Development Community (SADC) countries. They have assumed that most of these slots will be going to countries without medical schools, like Lesotho [17].

Buying seats at UBSM, as opposed to other medical schools in sub-Saharan Africa, has been proposed for multiple reasons. First, the school is comparatively large, and will eventually have approximately 100 seats. Second, UBSM is in its earliest stages of development and administrators may be more likely to experiment with class size, student distribution, and adopt agreements with sister countries. Additionally, UBSM has been targeted because early communications with those planning its construction have already expressed interest in reserving seats for students from Lesotho [17]. Finally, the advantage of sending students to UBSM over medical schools in South Africa is that it is much more difficult to stay and work in Botswana after graduating [18].

While the UBSM has not formally established a cost for buying seats at their medical school, the cost is expected to be comparable to that in South Africa. As a result, the strength of this model rests largely on the assumption that it will help retain Basotho medical school graduates in Lesotho.

Model #2: Lesotho Creates Its Own Medical School

While the above model creates a situation that makes it harder to stay in the country of education after graduation, there is always the possibility that medical graduates will find ways to circumvent their return to Lesotho. In hopes of creating an education model that draws students to stay in Lesotho, to practice in rural areas, and to help a country and a people who they are most familiar with, the Government of Lesotho could create its own medical school. Given the experiences of other developing countries, Lesotho-based medical education could drastically improve retention rates [19].

Cost Analysis: An OVID literature review using search terms "medical school" "cost analysis" and "cost of education" did not return any papers that outlined a full-cost analysis of medical education in any African country. In coming to such an estimate for Lesotho, a general internet search was conducted, trying to find all estimates for the cost of 'training a physician in Africa.' The average of all African-country estimates comes to US$59,969 to train one physician. In creating their estimate for medical school education in Vietnam, Bicknell et. al., calculated that pre-clinical work is responsible for 34.6% of total costs, while clinical work is responsible for 65.4% of costs [20]. Applying these values to our average of US$59,969/student yields a cost of US$20,749/student for pre-clinical education and US$39,220/student for clinical education.

Finally, an estimate for building and maintaining a medical school in Lesotho was created by looking at costs for similar buildings in sub-Saharan Africa. Using the Doris Duke Medical Research Institute for the University of KwaZulu-Natal's Nelson R. Mandela School of Medicine in Durban, South Africa, as an example [21], and adjusting for school size [22], a conservative estimate would be approximately US$1.67million. Operating costs are projected to be approximately US$167,000/year. Embedded within the operating costs are teaching and personnel costs that are also accounted for in the pre-clinical and clinical education costs. They have been deducted from the operating costs so as not to account for them twice. Therefore, operating costs of the medical school (excluding personnel) would be approximately US$83,500/year.

Model #3: Partnering with Medical Schools in the US and Using Distance-Learning

To cater to the learning styles and schedules of medical students, many medical schools in the United States have started putting all of their pre-clinical lectures on-line. This model proposes to use US-based on-line material to teach the pre-clinical years of medical school.

This model is appealing because it acknowledges the difficulty of attracting and paying the wide variety of faculty needed to teach medical school

courses. According to Lesotho's 2005 *Human Resources Development and Strategic Plan,* the country is only meeting 31% of their medical officer staffing need [11]. Given how scarce and over-burdened these physicians currently are, it is doubtful that they will be able to teach medical students as well.

The distance-learning approach would utilize faculty who are experts in their field, delivering superior medical education in an area with limited or no faculty available to teach. A few full-time teaching faculty would need to be hired in order to teach the laboratory-based classes (i.e. anatomy and histology), guide discussion, and help bridge information learned from lectures to life in Lesotho. Ideally, these faculty members would have a broad base of medical knowledge and be familiar with community health-care needs.

Cost Analysis: The costs of this model would arise from: the cost to build and maintain the school, the cost of internet access, the cost of hiring a small number of full-time faculty, and the cost of clinical-medical education (as per Model #2). It is hoped that through partnerships with US medical schools, the medical students in Lesotho could obtain access to the lectures. Initial informal communication with faculty at Boston University School of Medicine (BUSM) indicates that BUSM has the capacity to provide this material but access and use would have to be preceded by detailed negotiations. [5].

Quotes from LEO, the internet provider in Lesotho, estimate that to equip a university with an internet connection capable of streaming videos from the US would cost US$44,145 for one year [23]. Assuming a class size of approximately 20 students, this would come to US$2,207/student. Personnel and faculty costs, which are responsible for approximately 50% of operating costs, have been outlined in Model #2 as US$83,500 – or US$4,175/student. In essence, this would be the cost of pre-clinical education - US$6,382. As in Model #2, the clinical portion of education would be approximately US$39,220/student. These figures total to US$45,602/student. The costs to build and maintain the school would be the same as in Model #2: US$1.67million in capital costs and US$83,500/year in non-personnel operating costs.

Model #4: Creating a Regional Medical Education Network

While physician shortages are seen most acutely in developing nations, even countries as affluent as the United States have struggled with shortages in health care personnel. This is especially true for the rural regions of the US. A novel approach to medical education – a regional medical education network – was pioneered by the University of Washington. Known as the WWAMI program, medical students are selected from a five-state region: Washington, Wyoming, Alaska, Montana, and Idaho [24]. Students from each of the WWAMI states complete the first year of basic science training at their home state university, they complete their second year of training at the University of Washington, and then third and fourth years are completed in clinical settings and communities similar to those in which they hope to practice. *The Lancet* has called the WWAMI program "perhaps the best academic model for addressing the shortage of rural physicians" [25].

Just as the University of Washington has been used as the major teaching area for satellite schools in Wyoming, Alaska, Montana and Idaho, I would propose that South Africa function as the major teaching area for satellite schools in Lesotho, Swaziland, and Namibia [26,27]. The distribution of students from each country would depend on need and population. In the WWAMI program, approximately 33% of the student body is from outside Washington [24]. Based on my own calculations, if the same structure is used with a similarly large medical school, for example the Nelson R. Mandela School of Medicine with a class size of 200, a total of 66 spots could be allocated to students from Lesotho, Swaziland, and Namibia [28]. Currently, there are approximately 17 seats (per year) for Basotho students in all South African medical schools combined [29]. If the above conditions for a 'regional' medical school took effect, there would be approximately 22 seats (i.e. 66/3) per year for Basotho students within just one school. In essence, you would be increasing the number of available seats (from 17 to 22), and decreasing the number of host institutions (from approximately 7 to 1). Having all Basotho medical students train together could also

help foster an appreciation for health care in Lesotho and reinforce their commitment to practice at home.

The first steps for such a plan are already in place since South African medical schools are already accepting medical students from these countries. The difference, however, is that currently the majority of clinical clerkships are conducted in South Africa and not within the student's home country [30]. In the regional model, clinical clerkships such as family medicine, internal medicine, neurology, pediatrics, obstetrics and gynecology, surgery, psychiartry, and rehabilitation medicine are taught in hospitals and health care centers throughout the region.

*Costs Analysis:*To adapt the WWAMI model to southern Africa, I would suggest that all pre-clinical education be conducted at the host institution, while the clinical clerkships occur in the student's home country. While the costs of this model are comparable to previous models mentioned, and the costs generated would be spilt between the pre-clinical and clinical years. The pre-clinical years would require the GOL to buy seats from South Africa as they do now, but from a single institution instead of multiple ones. As in Model #2, the clinical costs would be approximately US$39,220/ student.

Discussion and Conclusion

The need for more locally-trained doctors in developing countries is undeniable. Given the current burden of disease, the shortage in health care personnel, and the high attrition and low retention rates, countries of sub-Saharan Africa must seriously consider ways to increase the local supply of medical doctors. This is especially true for countries with no medical school at all. Lesotho is one such example. This paper explores several models for medical education, each hoping to address the cost of education and/or the ability to retain graduates in-country. Of the models proposed, Model #4 – "Building a Regional Medical Education Network" seems to offer the greatest benefits. This model keeps costs spent on medical education roughly similar to current expenditure, but creates a system that has the potential to substantially increase physician retention.

Care must be taken if such a model is actually implemented, since this paper only outlines the skeleton of such a model. However building a regional medical school may be easier to implement than Models #2 and #3 because even though the structural changes required are significant, they do not span every stage of medical education. The effort, time and resources that are required to develop clinical clerkship curricula in Lesotho, Swaziland, and Namibia are great. This model

Figure 3: Summary of Cost Analysis (USD)

Cost Factors	Buying Seats in South Africa	Buying Seats in Bostwana (#1)	Building a Medical School in Lesotho (#2)	Distance Learning (#3)	Regional Medical School (#4)
Cost per seat	*	*			*
Education (includes personnel costs)					
Cost for preclinical education			$20,749	$2,207 (internet) + $4,175 (faculty cost) = $6,382	
Cost clinical education			$39,220	$39,220	$39,220
School					
Capital Costs: Cost for 15,000 sq ft school			$1.67 million	$1.67 million	
Annual Operating Costs: 10% of capital.			$83,500 (excludes personnel costs)	$83,500 (excludes personnel costs)	

* These costs will become clear once information regarding the cost paid per seat in South African medical schools is obtained. Action taken to generate these figures is currently underway.

would allow oversight personnel to focus on this phase of education, while keeping pre-clinical education nearly intact. Additionally, this model could be useful as a bridge between a medical education model that is entirely based in South African to one that is entirely based in Lesotho. Above all, it is important to develop strong clinical clerkships in Lesotho to attract Basotho medical students to practice there in the future. The capacity to do this is already underway with the residency programs at Maluti Adventist Hospital in Lesotho.

Finally, this paper highlights gaps in research that should be conducted in order to illuminate medical education in sub-Saharan Africa. Specifically, future research should be focused on creating a full-cost analysis of medical education for a sub-Saharan African medical school. The paper by Bicknell et. al., outlining the full cost of medical education in Vietnam, can be used as a guide. Second, retrospective studies that address where South African-trained Basotho medial students decide to practice and the factors that guided their decision-making process should be conducted. Finally, the next phase of this study should examine sources of funding. Examples include private donor funding, government funding, and funding mechanisms through partner schools such as the tripartite agreement used to finance the College of Medicine of Malawi.

It is hoped that this analysis brings the Government of Lesotho, as well as other developing countries, one step closer to increasing their number of trained medical doctors – and in turn improving the health of their citizens.

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Immune Reconstitution Inflammatory Syndrome in Dermatology

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Introduction

Antiretroviral therapy (ART) has had a significant impact in patients with acquired immunodeficiency syndrome (AIDS) by improving CD4 count and lowering the viral road in the process, reducing the incidence of opportunistic infections (OI) and other complications of human immunodeficiency virus (HIV) infection. A complex interaction between the dysregulated immune system and the antigen burden leads to a clinical deterioration due to shortening of the time for subclinical OI to become symptomatic, a phenomenon often referred to as "unmasking", increased rapidity of initial onset of OI symptoms or a heightened intensity of clinical manifestations[1]. This is called immune reconstitution inflammatory syndrome (IRIS) but also referred to as immune restoration disease, immune reconstitution syndrome or immune reconstitution disease in the literature. The targeted antigens in IRIS can be viable infective organisms, dead or dying infective organisms, innate host antigens or inert foreign antigens leading to a wide variety of clinical manifestations. IRIS occurs within the first few weeks to months of initiating ART, when ART is restarted, or when a failing ART is intensified.

French et al suggested General IRIS case definitions in 2004[2]:

Diagnosis requires two major criteria or a major criterion plus two minor criteria to be fulfilled:

Major criteria

- Atypical presentation of opportunistic infections or tumors in patients responding to ART.
- Localized disease.
- Exaggerated inflammatory reaction.
- Atypical inflammatory response in affected tissues.
- Progressive organ dysfunction or enlargement of pre-existing lesions after definite clinical improvement with pathogen-specific therapy before the initiation of ART and exclusion of treatment toxicity and new alternative diagnoses.
- Decrease in plasma HIV RNA concentration by more than 1 $\log_{10}$ copies per mL.

Minor criteria

- Increase in blood CD4 T-cell count after starting ART.
- Increase in an immune response specific to the relevant pathogen—e.g. delayed-type hypersensitivity skin test response to mycobacterial antigens.
- Spontaneous resolution of disease without specific antimicrobial therapy or tumor chemotherapy with continuation of ART.

Shelburne[3] in 2006 proposed a simpler general criterion:

- HIV-infected patient.
- Receiving effective ART as evidenced by a decrease in HIV RNA concentration from baseline or an increase in CD4+ T cells from baseline.
- Clinical symptoms consistent with an inflammatory process.
- Clinical course not consistent with expected course of previously diagnosed opportunistic infection, expected course of newly diagnosed opportunistic infection, or drug toxicity.

The wide spectrum of causative OI, multiple other antigens and clinical presentations has led to calls for disease specific case definitions and these are starting to emerge in the literature. Meintjes et al. have recently published disease specific case definition for tuberculosis (TB) IRIS after a consensus meeting in Uganda of leading authorities on the subject[4]. This is very significant as TB is the most common OI leading to IRIS[1] and there is a need for others to follow this lead.

The earlier case definitions did not include a timeline and in the literature cases have been included

up to 4 years after initiation of ART[5]. The recent TB case definitions suggest that the symptoms have to start within three months of initiating ART[4] but as yet consensus has not been established. The other deficiency of the current case definitions is inclusion of laboratory parameters like CD4 count and viral load that are not readily available in a resource limited setting. The evolving case definitions have to be applicable in a resource limited setting. [4,6]

Some have suggested that due to wide variation and atypical presentations, as well as an unpredictable course, individual decisions and individualized management have to be applied to each case.[7]

Risk factors for IRIS [8,9]

- Male sex
- Younger age
- Lower CD4 cell count at ART initiation
- Higher HIV RNA at ART initiation
- Lower CD4 cell percentage at ART initiation
- Lower CD4:CD8 ratio at ART initiation
- More rapid initial fall in HIV RNA on ART
- Antiretroviral naïve at time of OI diagnosis
- Shorter interval between OI therapy initiation and ART initiation

Incidence

Cohort differences, inconsistent case definitions and a wide spectrum of diseases grouped under the umbrella term IRIS makes estimation of the incidence difficult. Estimations vary between 15% and 25% with the incidence up to 45% in those with underlying OI. The skin is the most common organ involved and most studies estimate that 50% or more of all cases of IRIS are dermatological with herpes zoster and herpes simplex being the most common.[10] The vast majority of cases are mild and self-limiting but substantial morbidity and mortality has been reported.[8,11]

IRIS is a diagnosis of exclusion and ART failure, antibiotic failure, other infections and a drug reaction have to be ruled out as the management of each of these is different. In most cases there is no need to stop ART or antibiotic therapy for OI. In life threatening cases it may be necessary to temporarily stop ART and start systemic steroids to dampen the inflammatory response.[12]

Dermatological IRIS

IRIS in dermatology can have a myriad of presentations just like in others organs and in this section the paper will discuss some basic management principles, challenges, and the more common conditions. Most of the management recommendations are anecdotal as there are few randomized controlled trials and most data is derived from case reports and case series.

Important Principles in Dermatological IRIS

- The skin is readily available and easy to sample.
- IRIS on the skin can be a manifestation of underlying systemic disease and careful consideration and assessment often allows early diagnosis and management to prevent further complications.
- Even experienced dermatologists find it difficult to make definitive diagnoses all the time so investigations with a broad differential diagnosis are often justified.
- There is no single diagnostic test applicable to all forms of IRIS.
- OIs are the most common cause of IRIS and often tissue microscopy and cultures are helpful and a good detailed communication with the laboratory is helpful.
- If available, histology from a skin biopsy is helpful by at least narrowing the differential diagnosis if not providing a definitive diagnosis.
- When should ART be stopped? The general consensus is that ART should be continued if the IRIS is not life threatening.[4]

Challenges in Dermatological IRIS

- Dependence on microscopy, culture and tissue histology makes it difficult to manage dermatological IRIS in a resource limited setting.
- Wide spectrum of conditions presenting as dermatological IRIS make it difficult to develop disease specific case definitions, which are necessary for studying pathogenesis, epidemiology and developing management strategy. Only from this research

can evidence based protocols be developed that will applicable in resource limited settings.

- In most cases there is no evidence that standard therapy for the different diseases presenting as dermatological IRIS is appropriate, with most of the current management strategies being anecdotal.

Common manifestations of Dermatological IRIS

Mycobacteria

Mycobacterium tuberculosis is the most common of IRIS but is less common on the skin where it can present as new or worsening lymphadenitis that may ulcerate or suppurate as well hypodermal nodules. Standard TB treatment protocols have been used successfully for cutaneous TB IRIS.[10]

Bacillus Calmette–Guérin (BCG)

Nuttall et al recently did a retrospective study in Cape Town looking at complications of BCG vaccine in HIV sero-positive children on ART, and IRIS occurred in 6% of the children who received BCG at birth. This was associated with an age younger than 6 months and a lower baseline CD4 count. It presented at a median 34 days after starting ART as ipsilateral abnormally large lymphadenitis with or without suppuration, ulceration or abscess formation. In 70% of the cases culture and/ or PCR were positive for *mycobacterium bovis*. The authors suggest anti-mycobacterial therapy for disseminated disease but there is still uncertainty in localized disease with surgery probably required for severe complications. There is currently a drive towards deferring BCG immunization in these children.[13,14]

Mycabacterium leprae

The incidence of leprosy has not been increasing with the incidence of HIV but there are more and more reports of 'type 1' reactions in the literature in HIV sero -positive patients after initiation of ART. It is also called a 'reversal reaction' and is a form of paradoxical IRIS. The ART treatment of HIV/leprosy co-infection is associated with the tuberculoid leprosy, paucibacillary leprosy and lower bacillary loads. It can present as ulceration, oedema and inflammation of typical hypopigmented paraesthetic lesions of leprosy. Of more urgent concern is the neuritis, which can present as tender thickening of the large superficial nerves or neurological deficit e.g. foot drop. This needs immediate intervention to prevent irreversible neurologic damage. Systemic steroids and thalidomide continue to be the mainstay in the management of all leprosy reactions while continuing ART and anti-leprosy therapy. [15,16,17,18]

Mycobacterium avium complex (MAC)

MAC IRIS on the skin can present as inflammatory nodules and pustules, abscesses, lymphadenitis and hypodermal nodules. It is often associated with other manifestations of MAC and it is important to rule out systemic involvement. In a long-term follow up of patients treated with a macrolide (azithromycin or clarithromycin) and ethambutol, response to therapy seemed to be related to maintenance of CD4 count and involvement of peripheral rather than abdominal lymph nodes. In this study there was 80% complete response observed at 36 months.[19,20]

There are other rarer forms of *mycobacterium t*hat have been reported to cause cutaneous IRIS including *m. marinum, m. kansasii, m. bovis and m. scrofulaceum* all of which have presented as abscesses.[10]

Human Herpes Viruses (HHV)

HHV1 and HHV2 cause orolabial and urogenital herpes simplex infections respectively. The incidence of IRIS varies considerably due to lack of case definitions but in some cohorts it goes up to 50%. When stricter case definitions, e.g. poor response to treatment, documented increasing frequency and severity, are applied, the incidence is lower. Most cases are mild and respond to standard acyclovir therapy but the more severe cases have been reported presenting as chronic erosive lesions, haemorragic erosions, periproctitis, myelopathy and encephalopathy. In complicated and severe cases higher doses of acyclovir are needed until complete resolution. [10]

HHV 3 (Herpes zoster)

The incidence of herpes zoster IRIS has been shown to be up to five times higher in the time following initiation of ART compared to HIV sero-positive patients not on ART. Most cases occur after 4-16 weeks of ART with a typical presentation along a dermatome and following a similar course to HIV sero-positive patients who are not on ART. Rarely there are atypical presentations including transverse myelitis, keratitis,

iritis and acute retinal necrosis. Disseminated disease with a fatal pneumonitis has been reported.[10,22] A randomized controlled trial has shown acyclovir to be effective.[21] It is important to remember that the patients can develop debilitating post herpetic neuralgia, which responds to tricyclic antidepressants, gabapentin and opioids. [8]

HHV 8 (Kaposi Sarcoma)

It is estimated that about 6.6% of patients with Kaposi sarcoma (KS) initiating ART will experience IRIS. It presents as enlargement or worsening inflammation of existing lesions, lymphedema or development of new lesions. It is always important in KS IRIS to exclude involvement of the respiratory and gastrointestinal system which can be life threatening. KS IRIS responds to continuation of ART and in severe cases chemotherapy and radiotherapy. There have been concerns that the use of systemic steroids in KS may worsen outcomes.[10,23,24,25] A case of severe lymphedema due to KS IRIS is shown in Figure 1.

Other cutaneous viral infections that have been commonly reported after initiation of ART are molluscum contagiosum and oral warts presenting as new lesions or inflammation of existing lesions. There is usually improvement on ART.[10,26,27] A case of inflamed molluscum IRIS is shown in Figure 2.

Fungal infections

Cryptococcus

Most patients who present with cutaneous cryptococcal IRIS have had previous signs and therapy for systemic cryptococcus. On the skin it can present as ulcers or subcutaneous abscesses. The biggest concern in cryptococcus IRIS is meningitis and skin disease may be a sign of systemic disease and efforts should be directed towards excluding CNS disease and if life threatening stopping ART, initiating steroids and antifungal therapy. Amphotericin B and flucytosine have been shown to be effective anti-fungal therapy. The recommended dose of predni

sone is 1-2 mg/kg/day over two weeks and slowly tapered off. It should be stressed that the shorter the interval between treating for cryptococcus and starting ART the higher is the likelihood of IRIS.[8] Figure 3 shows a patient with cutaneous cryptococcus IRIS confirmed by culture and histology. The CSF was sterile.

Figure 1: A case of severe lymphedema due to KS IRIS

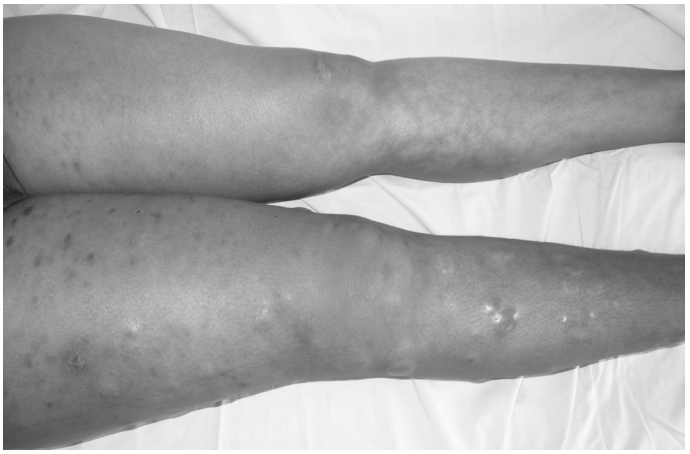
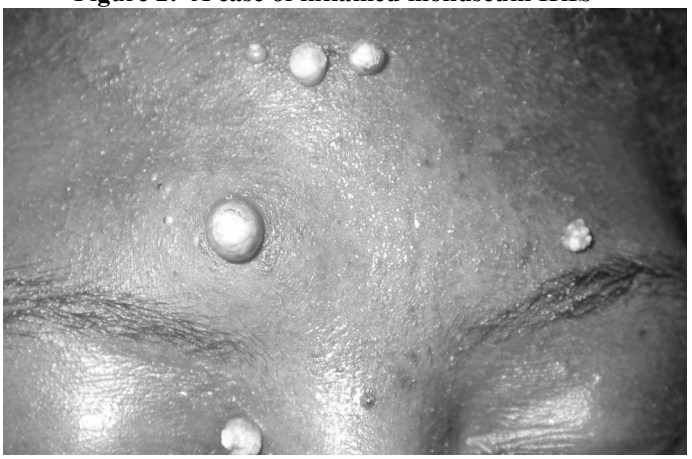


Figure 2: A case of inflamed molluscum IRIS



Tinea

Dermatophyte infections on the scalp, face and body often worsen in the weeks to months following initiation of ART[28]. Figure 4 shows a) dermatophyte IRIS presenting as inflammatory tinea (kerion), b) the clinical response after two weeks of itraconazole and c) microscopy of a hair follicle filled with fungal elements. Figure 5 shows tinea faciei with KOH microscopy 3 weeks after initiation of ART.

Candidiasis

Incidence and severity of mucosal candidiasis has also been reported on ART either as unmasking phenomenon or development of new lesions which all respond to therapy the same way as other HIV seropositive patients not on ART.[29]

Bacillary angiomatosis

We have recently had a patient in our unit who presented with multiple subcutaneous abscesses on the

face, trunk and limbs as well as a single vascular on the face 8 weeks after initiation of ART. The vascular nodule on the face, which resembled a pyogenic granuloma was the only clue to the diagnosis of bacillary angiomatosis. There was no history of any contacts with cats. *Bartonella* species was confirmed on culture. The lesions cleared within 2 weeks of erythromycin.

Eosinophillic folliculitis

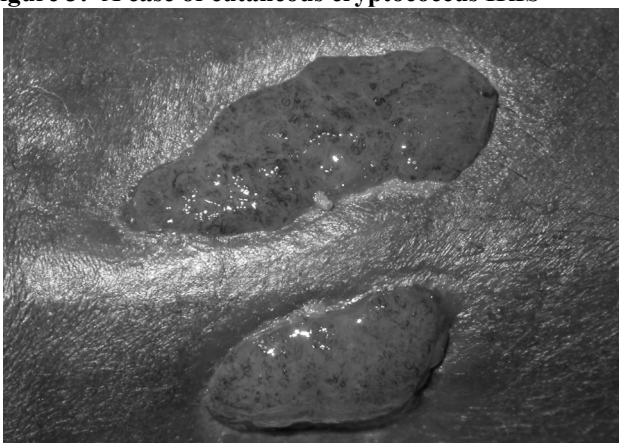
Presents as intensely pruritic oedematous and excoriated papules and pustules most often on the face and upper trunk associated with eosinophilia in 25-50% of patients. It is thought to be due to an exaggerated reaction to normal skin flora as the immunity is restored. The histology shows folliculocentric papulopustules with eosinophils. It is important to exclude other conditions that can present with folliculocentric pustules or oedema including bacterial or fungal folliculitis or a drug reaction. It responds well to ART in the long term and topical steroids with anti-histamines can be used in the interim.[30,31] Figure 6 shows a case of eosinophillic folliculitis IRIS with severe oedema.

Acne rosaceae and acne vulgaris

Acne rosaceae is increasingly being seen as IRIS. Even though there are few case reports and case series reported in the literature the authors unit is seeing it with increasing frequency. There is little published regarding management of acne rosaceae IRIS and we currently treat these patients with tetracyclines, metronidazole (preferably topical), isotretinoin, benzoyl peroxide and sun protection. Figure 7 shows a case of severe acne rosaceae following initiation ART.

Acne vulgaris has also been reported as an IRIS and we are also seeing increasing incidence in patients who previously had acne. There is also no data on management of acne vulgaris IRIS and we use standard acne therapy for these patients.[10,32]

Figure 3: A case of cutaneous cryptococcus IRIS



Foreign body reactions

Inert foreign material implanted on the skin has been reported to cause IRIS. Clinically this presents as inflammatory lesions on tattoos, traumatically implanted foreign material, tribal markings and at the site of needle punctures in intravenous drug users. Histology shoes foreign body granulomas.[10] There are case reports of many other granulomatous disorders, autoimmune disorders and parasites like leishmaniasis presenting as cutaneous IRIS.

Conclusion

Dermatological IRIS has a wide array of causative antigens and clinical presentations. All clinicians treating HIV sero-positive patients with ART need to be aware of and anticipate this complication of immune restoration.

Figure 4: A case of dermatophyte IRIS presenting as inflammatory tinea (kerion), [left], the clinical response after two weeks of itraconazole [center] and microscopy of a hair follicle filled with fungal elements [right].

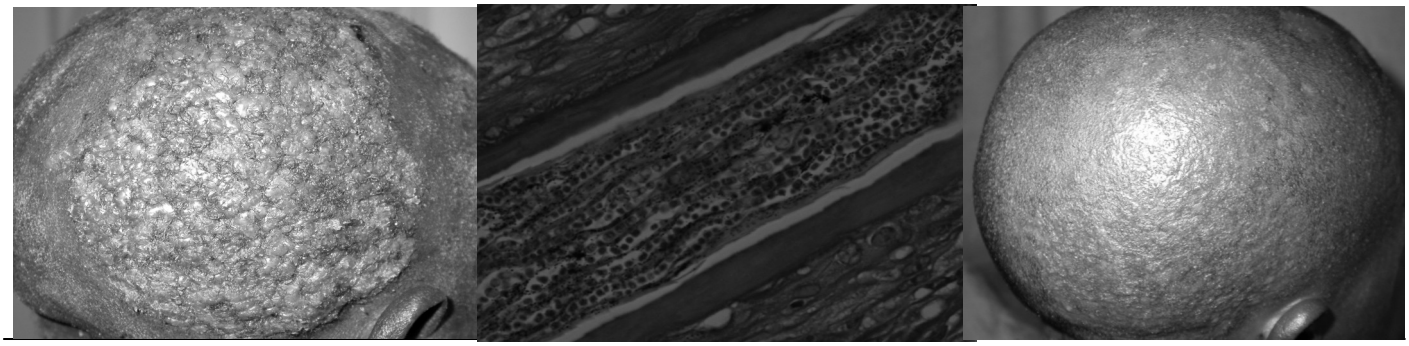
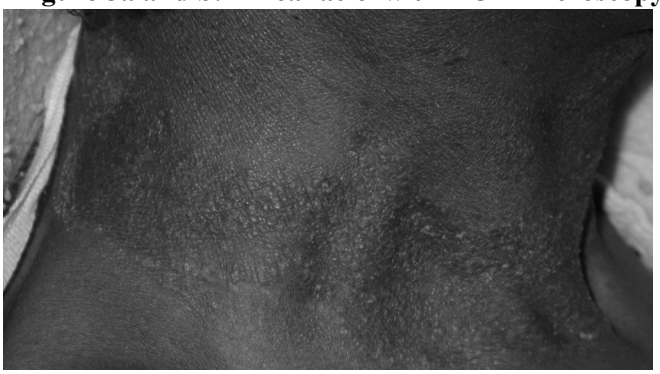


Figure 5a and b: Tinea faciei with KOH microscopy 3 weeks after initiation of ART.



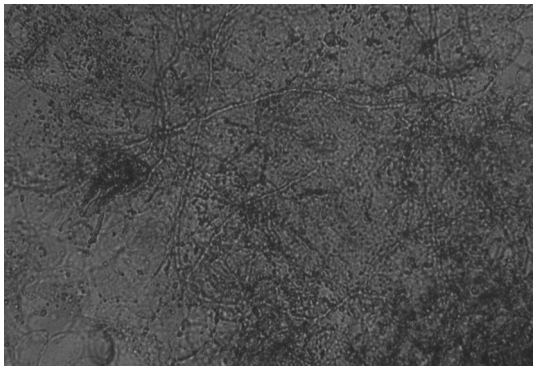


Figure 6 shows a case of eosinophillic folliculitis IRIS with severe oedema.

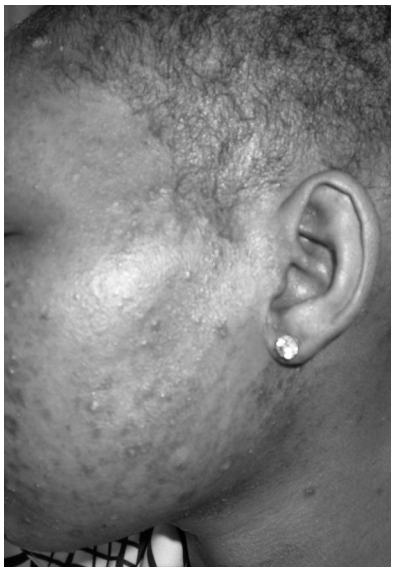
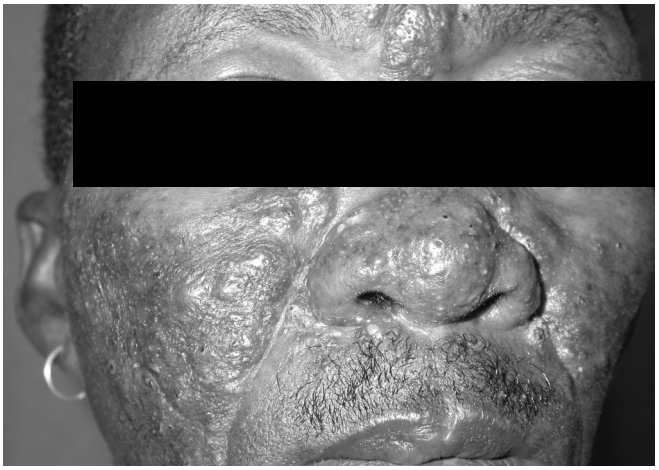


Figure 7: A case of severe acne rosaceae following initiation ART.



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EPILEPSY AND ITS MANAGEMENT

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Epilepsy is serious neurological / neuropsychiatric disorder of the brain. It accounts for 1% of the global burden of disease. Greater burden falls on developing countries. It is estimated that approximately 80% of the patients do not get proper treatment in developing countries.

Psychiatric clinic, QE-II Hospital treats epilepsy and related psychiatric disorders. In the year 2008, total attendance of clients was 7,572. Out of this 1,367 were epileptic patients (18.23%). Break down as follows:

Total Male patients	702 (9.27%).
Total Female patients	665 (8.78%).
Total Male new patients	143 (1.88%).
Total Female new patients	173 (2.28%).
New Male Patients	
age group 10-30 years	85 (1.12%).
New Female Patients	
age group 10-30 years	112 (1.47%).

Normally in male/female ratio, males are always higher than females while in the above figures more are female and it can not be explained with the limited information we have. Above figures do not represent true incidence/prevalence of the epileptic disorder in the country as all patients were referred from other clinics and sample is highly selective.

Major etiological causes of epilepsy are head traumas, CNS infections, Anti-natal and peri-natal risk factors, Cerebo-vascular diseases, space occupying lesions, genetic and familial causes.

Case findings, diagnosis and treatment is very important in epilepsy as such patients are more prone for:

Injuries: Dislocation of jaw, shoulder, tongue injuries and compression fracture of the vertebras.

Excess morbidity: Two to three times higher—mental handicap, cerebral palsy, psychiatric complications.

Excess mortality: Cardiac dysrythmias, status epielepticus.

Excess risk of suicide: 2-3 times higher especially in temporal lobe epilepsy; Over dose of medication.

*Calcification***:** Calcified into 1. Genetalize 2. Focal and 3. Mixed forms.

Generalized Epilepsy:

Primary generalized and symptomatic generalized-includes tonic, clonic, tinic and clonic, non convulsive status and absence seizures.

Focal epilepsy:

1. Simple partial epilepsy --- without loss of consciousness includes motor symptoms, sensory symptoms and auras.
2. With impairment of consciousness – mainly Temporal lobe epilepsy – symptoms includes cognitive, affective and behavioral symptoms.
3. Mixed and unclassified forms – includes reflex, gelastic and febrile convulsions.

Diagnostic challenges:

- Partial complex seizures are confused with psychiatric symptomatology e.g affective and behavioral symptoms.
- Sync opal attacks are mistaken with generalzed convulsions.
- Many a times "Akheya" is treated as epilepsy.

<u>General description</u>:

Simple partial Seizures:

- Localized tonic, clonic movements commonly of hands, facial muscles, clonic movements of mouth and tongue.
- Negative motor phenomenon – speech arrest.

- Primitive visual symptoms e.g spots, flashes of light, pattern in one visual field.
- Buzzing, hissing, whistling-lesion probably lateral part of the temporal lobe.
- Olfactory and gustatory symptoms – medical temporal lobe or fronto orbital region.
- Visceral symptoms- limbic structure and temporal frontal lobe-epigestric sensation, stomach pain, belching-autonomic symptoms like pallor, flushing, sweating, tachycardia and papillary dilatation.
- Psychic symptoms- memory flass backs, dream like state- unreality feelings, depersonalization- medical temporal and fronto limbic structures.

Complex partial epilepsy- some impairment of consciousness is necessary – lesion originates from medical temporal lobe.

Stereotyped automatisms: Lip smacking, chewing, swallowing or picking of clothes at times by motion less stare-followed by post ictal confusion. If restrained during this period violence may follow but are phenomenon. Other symptoms depend upon site of the session e.g. hippocampal, fronto orbital region.

Generalized convulsions-sudden loud cry-centricephalic in origin, loss of consciousness, falling down, violet jerking of extremities, trunk and head, incontinence of urine, or feaces, tongue bite, other injuries like drowning, fall from height, sustains burns etc.

Myoclonic jerks – brief lightning like jerks of limb or trunk – may be repetitive and may end up in generalized convulsions.

Absences seizures – no convulsion, no fall, may be brief loss of tone of axial musculature, abrupt cessation and of very short duration few seconds and resumption of the activities after the attacks. No recollection of the attacks. Frequency many times a day – common among children.

Atonic seizures – mainly in children – brief complete loss of muscle tone and consciousness. Patient fall down to ground and risk trauma particularly head injury.

Ferbrile convulsions – Children 3 months to 5 years, complicated seizure are focal in nature – last>15 minutes. Recurrent febrile attacts suggest neurological abnormality.

Challenges in differential diagnosis of epilepsy:-

Differentiate from:

Sync opal attacks: Vaso vagal attacks – young no pathology, precipitated by prolong standing, rising from squatting position, exposure to heat, hunger, dehydration and alcohol excess. Onset slow – pallor, flaccid, sweating. At times few twitching movements and rarely incontinence of urine.

Cardiac syncope: Elderly people – get up for micturation at night and are on diuretics, may be confined to bed for long time, cardiac lesion.

Hyperventilation syndrome: dizziness, tingling, muscles spasm, palpitation, dyspnea, confused with partial complex epilepsy.

Episode dyscontrol: young man with deprived social back ground, minimal provocation, directed against particular person. Epileptic nature extremely doubtful as in epilepsy violence is poorly directed and brief in duration and there is clinical evidence of having epileptic attacks.

Fague state: Psychogenic wandering, behaviors to others appear to be normal, dense amnesia of the events associated with psychopathology and or depression. Confused with partial compex epilepsy.

Psychogenic seizures: Gradual onset, asynchronous movements, no self injury, duration variable, no post ictal confusion/drowsiness, resistant to eye opening, and no dilatation of the pupil.

Hypoglycemia: Pallor, sweating, tachycardia and convulsions. H/O diabetes. Confused with partial complex epilepsy if it occurs in sleep.

Management: Important cautionary statements

- Do not consider "akheya" as epileptic attacks. It could have been sync opal attacks.
- Does not put complete trust on the note in bookana, "a known epileptic patient" satisfy you by history and eye witness accounts of the attacks.
- Epilepsy is essentially a clinical diagnosis.

Examination and Investigations:-

- Complete history with eye witness account of the attacks.
- Complete clinical neurological evaluation.
- Blood test – CBC, serum electrolytes, Liver functions tests, LP if CNS infection is suspected.
- ECG – Rule out cardiac arrhythmias, valvular diseases.
- EEG – Epileptiform recording – spike or sharp waves – suggestive of epilepsy. (EEG is supportive investigation, normal tracing in inter ictal period in epileptics is seen)
- CT scanning of head - MRI – Hipocamla sclerosis, ganglio gliomas, cavernous mal formatin. Etc.

Initiation of Drug therapy:

Two unprovoked seizures during period of 6-12 months. (rule out common precipitating factors – febrile convulsions, alcohol withdrawal seizures).

Objectives:

- Eliminate or reduce the frequency of seizures.
- Avoid chronic drug related adverse effects.
- Assist in maintaining normal vocational and psycho social life.
- Management approach should be multidisciplinary.

Drug treatment:-

Choose the right drug for epileptic syndrome.

Start with single indicated drug, 70%-80% responds to single drug.

Slow increase of drug to therapeutic level.

If seizures fail to respond then select another single alternative drug.

If they still fail to respond then add "add on drug".

Most of the side effects are drug related.

Drugs used in treating different types of seizures.

Primary generalized seizures: Valproate, Carbamazepin (CBZ), Phenytoin and lamotrigen.

Absence seizures: Ehtosuximide, valproat, lamotrigen

Myclonic seizures: Valproate, clonazepalm.

Tonic seizures: Valproate, clonazepalm.

Secondary generalized seizures: CBZ, valproate, phenytoin, lamotrigen as add on drug.

Simple and partial complex seizures: CBZ, valproate, phenytoin, lamotrigen as add on drug.

Indication for plasma monitoring of the drug level:

- It is often overused.
- Patient on phenytoin / polytherapy where dose adjustment is necessary / poor control of the seizures/ dose relate toxity.
- People with learning disabilities – clinical toxicity difficult.
- Patient with renal, hepatic impairment.
- Pregnant women and suspected poor compliance.

Side effects of Anti-epileptic drugs:- (CBZ, phenytoin, phenobarb).

- Dose related toxicity: Increase blood concentration-sedation, drowsiness, nystagmus, ataxia, dysarthria and confusion.
- Valproate: Not associated with neurotoxicity but gastric irritation very common.
- Acute idiosyncratic toxicity: CBZ and phenytoin – c=maculopopular eruption, fever, lymphadenopathy and hepatitis. With CBZ marrow aplasia-but rare. To avoid this reaction start dose building slowly to very slowly.
- Chronic toxicity: Prolong use of AED – Cognitive impairment, behavioral disturbances, hirsutism, liver enzyme inductions, magaloblastic anemia, and thrombocytopnea. Gum hypertrophy. And decrease thyroid functions.

- Teratogenicity:- All anti epileptic drugs are teratogenic. Common malformations are hare lip, cleft palate, cardio vascular abnormalities. Risk increase with poly pharmacy. Neural tube defect associated with Na Vlaproat use.
- Pregnancy and epilepsy:- Planned conception – discuss the risks and benefits of discontinuing or continuing drugs e.g. relapse and teratogenicity.

Unexpected pregnancy:-
Consider discontinuing the therapy if before 17 days.
After 2 months: Decisions are not urgent.
Immediate start nutrients: That is Folic acid daily.
Discontinue other non essential treatment namely of sub therapeutic dose.
Seek specialist opinion.

How long to continue Anti Epileptic drugs in General:
In majority of patients seizures control is achieved with single drug and should continue for 24 months to 36 months.
Consider for discontinuing drugs if seizures are primary generalized with childhood onset, no cerebral disorder with normal IQ, normal EEG; History of non compliance without relapse, low dose of medication at the time of discontinuation and no seizure for at least for two years.

Psychiatric disabilities among epileptic patients:-
Psycho social problems higher than in general populations – stigmatization – unemployment, job related problems, higher neurotic problems, anti social conduct.

Cognitive difficulties – due to disease process, frequency of seizures and use of drugs, memory difficulties, slowed speech, impaired attention and concentration, impaired in verbal and non verbal tasks.

In Temporal lobe epilepsy severe personality deterioration, impulsivity, irritability and out burst of rage.

Personality change in epileptics – religiosity, suspiciousness, paranoid attitude and moodiness.

Sexual disorders – hypo sexuality, perversion of sexual interest, and impotence.

Crime and epilepsy – Criminal tendencies in latent epileptics, epileptics have higher probabilities of being committee to the prison than general population.

Prolong post ictal confusion; inter ictal psychosis, schizophrenia like psychosis among chronic epileptics and affective disorders are more common among epileptics.

Suicide rates are higher among epileptics 2-3 times.

I am thankful to Director General of Health and Social Welfare for allowing to quote Psychiatric Out patient clinic statistics in this article.

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