

Inaugural Lecture Series 182

**THE MAN, THE MYTH, THE MOULD
AND THE MICROBE**

by

Oyeku Akibu Oyelami
Professor of Paediatrics & Child Health



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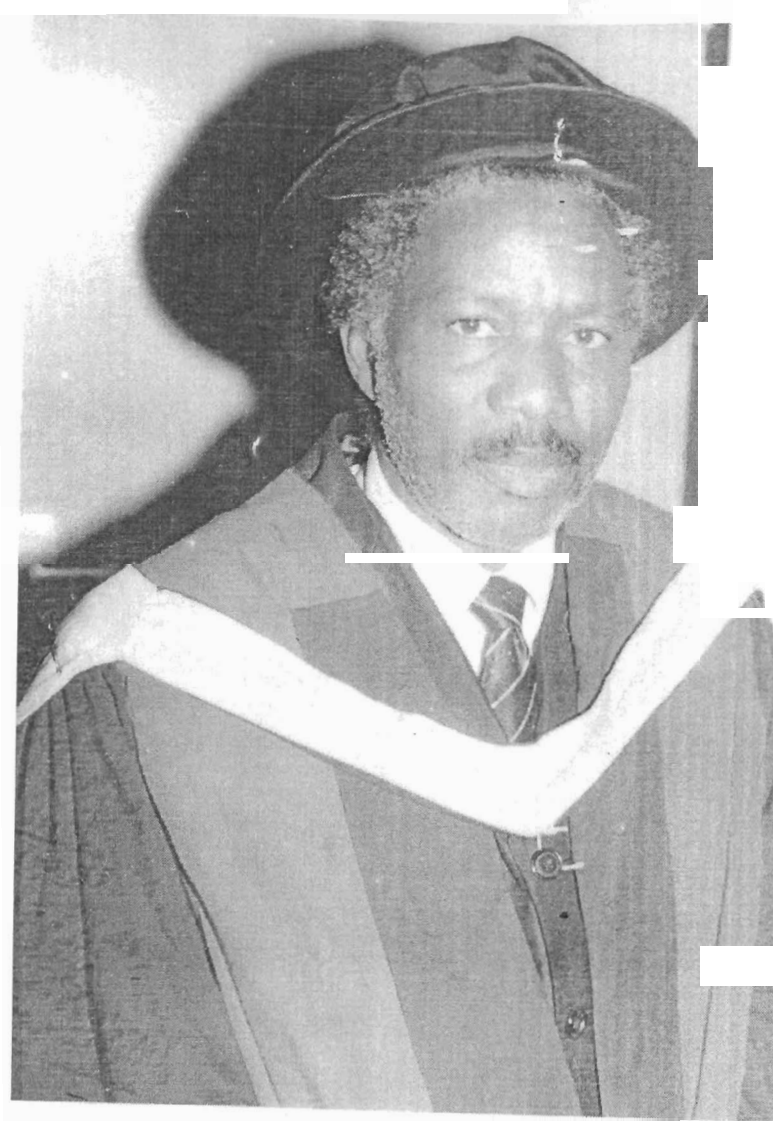
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INTRODUCTION

Mr. Vice-Chancellor, Sir, colleagues and friends, ladies and gentlemen, I consider it a rare privilege to stand before you today to give this lecture, marking my inauguration as Professor of Paediatrics and Child Health in the College of Health Sciences of this great University. It is an opportunity for me, just like in any other inaugural lecture, to expound on my area of specialisation, in very simple terms to the university community and the general public, as well as highlight my contributions to knowledge.

Man as used in this text, apart from its alliterative colouring of the topic, is meant to connote *Homo sapiens* simply put; Human Beings. In this era, where there is much gender sensitivity, I need to apologise to our female folks for using Man to encompass all human beings.

MAN

Man is a complex creature, and various disciplines which include anatomy, physiology, biochemistry, psychology, paediatrics, geriatrics, gynaecology, dentistry etc, have been devoted to its study either when young or old, man or woman, or in health or diseases. Yet the study of man is like the parable of The Blind Man and the Elephant as narrated by John Godfrey Saxe (1816-18867). Six blind men encountered an elephant for the first time: The first touching its side, exclaims "The Elephant is very like a wall". The second, touching its trunk explains "The Elephant is very like a spider". The third, touching its tusk explains "The Elephant is very like a snake". The fourth touching its leg explains "The Elephant is very like a tree". The fifth touching its ear, explains "The Elephant is very like a fan". And the sixth, touching its tail exclaims, "The Elephant is very like a rope". Each blind man remains convinced that he alone knows the nature of the elephant. However, the study of man is like the study of proverbial Final Black Box. Each time a new tool was discovered, it allowed scientists to open what they thought was the final black box, but amazingly the scientist would discover another previously unknown black box inside that had to await further tools' to be opened.¹

From the time of Hippocrates up to the nineteenth century, medicine did not focus much on why something worked. Medicine focused mostly on finding out what worked through inspiration, trial-and-error treatment and observation. When something worked, it was written down and thus medical knowledge accumulated over the centuries and occasionally passed between cultures.

The Scottish physician James Lind is credited with eliminating scurvy, which used to be the scourge of the British navy, by prescribing the mandatory consumption of citrus fruits among sailors. Yet Lind had no idea why the citrus fruits eliminated scurvy and only came up with his "discovery" after reading that the Dutch navy had done this for hundreds of years. The Dutch probably picked up the practice from some other culture with abundant citrus during their great exploration in the fifteenth through seventeenth centuries.¹

MYTH

Myth is the story, handed down from olden times, especially concepts or beliefs about the early history of a race or explanations of natural events. It can also be said that myth is the way a particular culture or age or discipline tries to express the truth of life as perceived, experienced and observed. The people of any current age never regarded their truth as myths. It is usually the people who lived after them who having observed the inadequacies of their ancestors theories, call their explanations myth.² Therefore, just as we regard the scientific discoveries of yester-years as myths, so also will the next generations regard our so called scientific truths as myths and possibly laugh at our naiveté. Our modern scientific mind is very quick to condemn to the refuse-bin of unreality the sayings of previous generations. We, ignorantly, tend to regard myths as products of primitive minds and uncivilised intellects. However, behind every myth is an enduring truth, and to a truly scientific mind, this truth is what really matters.²

The vehicle for conveying myth from one generation to the other is through the language of the people. Language not aggressively supported by her speakers through use, one by one, disappear from lack of use. Unfortunately knowledge fades as languages die. The

Yoruba of yore will say "*Orisa ti a ba fi sin re han omo pi parun lo un parun*" i.e. if the art of worship of a particular deity is not often demonstrated to upcoming children, the Deity will fade into nothingness. A language is said to be culture and it contains the history and all the knowledge they passed down for generations. What do we have in Nigeria today? A collection of elites who are ashamed to speak their mother tongues to their children. In fact educated Yoruba seem to take it as a mark of achievement that their children can not speak their mother tongue even when those children are not brought up abroad. Unfortunately, this dangerous trend is percolating down to children from middle and lower classes especially in the cities.

Ignorantly, most parents do not understand that the grasp of another language can only be greatly enhanced by the deep understanding of one's own mother tongue. A child is in the best position to learn many languages at birth since that is when he has the highest number of cochlear neurons that facilitate this process. An average child can cope with learning five different languages below the age of five! As he grows older, the cochlear neurons degenerate and learning new languages become cumbersome as some of the members of this audience must have noticed among their friends who are not indigenes. A healthy language is one that continues to acquire new speakers, particularly children. In this way the myth of the culture can be preserved.

FASCINATION WITH KWASHIORKOR

The term protein-energy malnutrition was coined to describe a spectrum of pathological conditions ranging from kwashiorkor to marasmus. (Figs. 1 & 2). The cardinal feature of kwashiorkor is the presence of oedema but the degree of body wasting varies greatly. The main biochemical feature is a low plasma protein concentration. The textbook explanation for the differences between kwashiorkor and marasmus is that the former arises from ingestion of a diet rich in energy but lacking in protein, whereas the latter is due to an inadequate intake of dietary proteins in what otherwise would be a balanced diet.³ This view conflicts with the recorded observations of others, including myself, who in clinical practice observed that

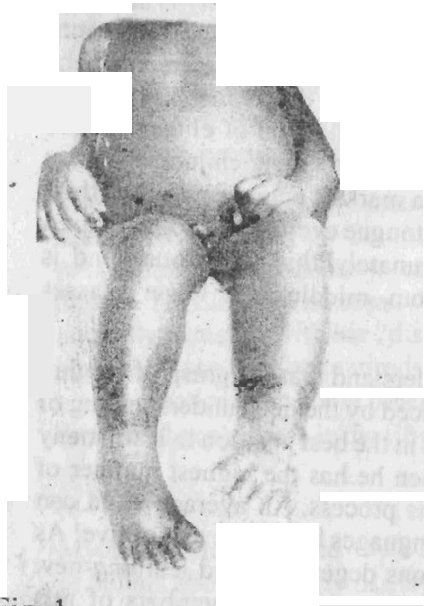


Fig. 1



Fig. 2

mothers often crammed more and more food into children developing kwashiorkor. In 1986, a cousin of mine was brought into our paediatric unit because she developed kwashiorkor after an attack of measles. I had the privilege of playing the role of that of the doctor and that of the parent. I bought lots of required food and drugs; this patient got better during the first week of admission but by the second week she lost one eye to xerophthalmia (vitamin A deficiency Fig. 3) despite administration of several units of vitamin A, she lost the other eye by the third week and because of the hopelessness of the condition my uncle got her discharged by the fourth week. It was this humiliating experience that convinced me that the concept of kwashiorkor being purely a dietary energy inadequacy is too simplistic and probably wrong.

The word kwashiorkor is a vernacular name for the syndrome in the Ga language which is generally accepted to mean "the sickness the older child gets when the next baby is born". Cecely Williams introduced, the word kwashiorkor, into medical lexicon in the 1930s

when she was working as a doctor in Ghana.⁴ The term kwashiorkor has stuck, ever since and it remains useful to describe this particular syndrome because it does not imply a cause. Various hypotheses have been advanced to provide alternative explanations for the difference between kwashiorkor and marasmus to account for the confusing clinical features of kwashiorkor. These include dietary protein deficiency; niacin deficiency; anti-diuretic hormone like action of excess free ferritin; dysadaptation to a protein diet; hormonal dysadaptation; aflatoxicosis; and recently an imbalance between the production of free radicals and their safe disposal.⁵

IS KWASHIORKOR CHILDHOOD AFLATOXICOSIS?

Ralph Hendrickse⁴ first mooted this idea in 1982. His findings, with those of others, provided firm evidence that children in Africa are exposed to aflatoxins in their diet and these toxins can be detected in the serum and urine of a high proportion of the population of young children. Hendrickse also pointed out there is remarkable similarity between the geographical and seasonal prevalence of kwashiorkor and aflatoxins contamination of food.

What are aflatoxins?

Aflatoxins are secondary metabolites of the mouldy growth (fungi) *Aspergillus flavus* and *A. paraciticus* when growing under conditions of high temperature (27 °C) and high humidity, which normally prevail in tropical and subtropical countries. Under these conditions, many staple food commodities are contaminated by aflatoxins, particularly maize, which is the dietary staple of most people in south western Nigeria, with many children being naturally weaned on this staple food. There are four major naturally occurring aflatoxins B₁, B₂, G₁, G₂, - and a number of derivatives such as M₁, M₂, and aflatoxicol. Animal studies have shown these compounds to have toxic, immunosuppressive, carcinogenic and teratogenic effects although susceptibility varies greatly among species.

In humans, aflatoxins have been incriminated in the aetiology of hepatocellular carcinoma, acute hepatitis, Reye's syndrome, cirrhosis in malnourished children and kwashiorkor. It is however, not all

“woes” with aflatoxins since it is known that aflatoxins suppress the growth of malaria parasites.⁴

AFLATOXINS AND KWASHIORKOR

My interest in possible association between kwashiorkor and aflatoxins started in 1990 when a veterinary doctor I met in Maiduguri gave me an article he authored, with others, on aflatoxicosis in Police Alsatian dogs in Enugu. The dogs were fed with mouldy rice and about 15 of them died serially of aflatoxicosis. The clinical symptoms and findings in them resembled those of kwashiorkor *viz.* peevish apathy, pedal oedema and even hypoalbuminaemia! Subsequently, the works we did in our units between 1991 and 1993 showed that children who died with kwashiorkor are likely to have potent aflatoxins in their organs.⁷⁻⁹ The Yoruba call kwashiorkor “*Ile-tutu*” i.e. a disease one has during the rainy season.¹⁰ Is it not interesting that we found the peak prevalence of kwashiorkor in our unit to be during the rainy season? (Fig. 4) If kwashiorkor were to be purely nutritional problem the peak season ought to have been in March i.e. end of dry season; but we found it to be in July. It is also known that children with kwashiorkor seem to be less susceptible to malaria than normal children, and in hyper endemic malarious areas, “kwashiorkor” rarely if ever develop cerebral malaria.⁴ It is interesting that nature produces lots of aflatoxins during the season when individuals are more prone to attack of malaria; since nature does not waste, it is conceivable that little ingestion of aflatoxins protects against malaria. But too much of it lead to other diseases.

WHY DO AFLATOXINS ACCUMULATE IN THE BODY OF THE KWASHIORKOR; AND THE WAY OUT?

Infections often precede the development of kwashiorkor. In our unit, recurrent diarrhoea is associated with its development in about two-thirds of cases and pneumonia is a common feature in the remaining one-third.¹¹ Morley¹² reported that measles precedes the development of kwashiorkor in about 25% of cases. When children do have diarrhoea or measles they are often given maize gruel (pap) which we have found out are likely to be contaminated with aflatoxins.¹³



Fig. 3

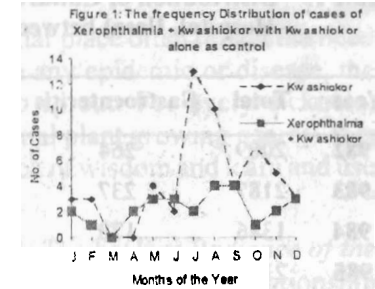


Fig. 4

Unfortunately, they are likely to be dehydrated during this period thereby limiting their ability to excrete aflatoxins. Glutathione is a 3-molecule (Glutamic acid-glycine-cysteine) liver enzyme that is responsible for metabolism of aflatoxins. In a situation where an individual eats a low-protein food, he may not be able to make enough glutathione for the metabolism of aflatoxins, hence their accumulation in the tissues.

In 1992, doctors and nurses in the Wesley Guild Hospital, Ilesa were trained on case management of diarrhoea diseases (including measles) especially with oral rehydration solution and giving of energy-dense, protein rich foods.¹⁴ In turn, this knowledge was transferred to mothers and care-givers in our hospital. Since then, we have observed a downward trend in the prevalence of kwashiorkor from about an average of 100 per annum to less than 15 (see Table 1). The reduction was remarkable during the first year after training when the number of cases of kwashiorkor dropped from 120 cases in 1992 to 61 cases in 1993.¹⁵

Table 1: Distribution of Children Admitted (into the Wesley Guild Hospital, Ilesa) between 1982 and 2002 by Disease Types.

Year	Total	Gastroenteritis	Measles	Marasmus	Kwashiorkor
1982	2009	264	167	24	24
1983	2187	237	146	35	75
1984	1386	178	76	34	148
1985	2110	249	272	24	101
1986	1604	154	68	39	80
1987	1825	199	121	56	92
1988	1955	200	88	42	75
1989	1919	189	35	53	94
1990	2054	176	143	26	137
1991	1846	122	28	35	86
1992*	1726	99	102	49	120
1993	1247	93	16	32	61
1994	1143	76	51	27	33
1995	1428	47	11	16	37
1996	1422	99	97	17	38
1997	1377	83	18	N/A	13
1998	1419	87	87	27	31
1999	1210	76	44	11	14
2000	1580	92	121	14	28
2001	1177	100	50	11	9
2002	1154	85	14	8	12

KEYS:* = Year of intervention
N/A = Not Applicable

YET ANOTHER MYTH

“The types of plants growing in a particular place often reflect the need or problem in that place. Shortly before any epidemic or disease, the plant which has the antidote begins to sprout. For every sickness, disease or lack, there is always a medicinal plant growing nearby. It is left for human beings to open nature's book of wisdom and learn and use them”.

This paragraph lifted from a recent book *The healing Radiance of the soul* written by Rev. Father Anselm Adodo, summed up the relationship between the red acalypha flowers and fungi infections in general. Red acalypha flowers otherwise known as *Acalypha wilkesiana*; it is an ornamental plant which is grown with effortless ease in our environment. It is a popular red-blotched-brown and pink foliated shrub of tropical gardens. It is also known widely as Jacob's Coat and as Match-me-if-you-can. It is said to be native to Polynesia, and usually reaches about three metres (ten feet) in height.

Fungi infections, particularly the superficial ones, are common in most tropical areas. The combination of hot climatic conditions and high humidity coupled with malnutrition and over-crowding make them particularly prevalent. The adoption of western lifestyle is even increasing the incidence. This is because the western lifestyle is leading to uncontrolled population growth, particularly in the cities. This growth is leading to inadequate provision of accommodation, unsanitary living condition and depressed economy of the citizenry. Living in the cities is also associated with some habits which promote the growth of fungi infections. City people are usually overdressed since most of the time they need to appear formal. Overdressing makes individuals to be unduly sweaty, the fungi thrive in sweaty, salty, sugary, humid environment and that is why the infection often abound in the armpit, perineum, underneath the breast and in-between the toes. Since our environment is hot; the ideal dress to wear in the tropics should be made of cotton. Interestingly, mother nature makes sure cotton thrives well in our soil.

So what has fungi infections got to do with red acalypha? Like most Nigerians aspiring to have a beautiful compound without much strain, we planted red acalypha shrub in front of our house. Passer-bys would

occasionally ask us for the leaves of the plant and we would readily oblige them since this would not cost us anything. I later got to know from them that bathing young children with the leaves cure them of various skin infections, notably superficial fungi diseases.

During a particular rainy season when the leaves of this flower were blossoming, my wife and I decided to harvest them, air dry and pound with local mortar. The pounded leaves were sieved and the powder extracted was mixed with Vaseline. This crude cream was applied to superficial skin infections of the children recruited into this experiment and it was heart-warming the response showed by the participants.

Since ideas, both good and bad float in the air, while we were carrying out this crude experiment, my colleagues in the Faculty of Pharmacy, OAU, were conducting scientific experiments with acalypha leaves. We did not have much problem in persuading them into preparing a standard red acalypha cream. We then used this cream in conducting a standard scientific test to find out the efficacy of red acalypha in treating fungi infections.

“In an open non-comparative study to evaluate the efficacy and safety of *Acalypha wilkesiana* ointment in superficial fungi skin diseases, 32 Nigerian patients with clinical and mycological evidence of superficial mycoses were recruited. Twelve patients defaulted and were lost to follow-up, while one patient withdrew because of intolerable excoriation at the site of the lesion. Of the 19 patients who completed the trial, clinical cure was achieved in 73.3% of the patients. The ointment was very efficacious in the treatment of *Tinea pedis*, *Pityriasis vesicolor* and *Candida intertrigo* where the cure rate was 100 percent in each condition. We then concluded that acalypha ointment can be used for treatment of these superficial mycoses”. It is even conceivable that the cure rate is higher as the defaulting patients could have improved and therefore felt no need for further consultation!¹⁶

Our findings would corroborate Father Adodo's statement, in the sense that a common problem i.e. superficial fungi disease, which constitute more than 30% of dermatological consultation will respond to such common remedy like acalypha leaves.¹⁶

IS IT TRUE THAT AN APPLE A DAY KEEPS THE DOCTOR AWAY?

This is one of the rhymes we learnt in secondary school even though we did not know what an apple was then. Apple is one of the cheapest fruits in Europe and it is felt no matter how poor an individual is he should be able to afford an apple a day. In Africa, particularly in Nigeria there are many fruits that can stand in for apple. It is really very interesting that the more a particular item is needed for sustenance of life the more readily available and cheaper it is. Air which is the most important element for sustenance of life, without which life will cease in less than five minutes is readily available at no cost. Water is also available cheaply and without it life will cease within a week. Unfortunately, as cheap as it is we do not really drink enough of it, instead we normally prefer to drink expensive dehydrating fluids. After water, fruits and vegetables are needed for sustenance of healthy life. Costly items like meat, eggs, wine can readily be done without and the body will still be radiating good health.

Why are fruits so important? Of recent it has been found that a large number of diseases are due to imbalance between free radical generation and their clearance.⁵ Free radicals, essential to many biological processes are highly destructive if not tightly controlled. The essential property of items or molecules that are free radicals is that they react energetically but relatively non-specifically to remove an electron (usually a hydrogen) from adjacent molecules.

At least 15 different nutrients Vitamin E, Vitamin A, Vitamin C, β -Carotene, Sulphur-containing amino acids, copper, zinc, manganese, iron, selenium, riboflavin, nicotinic acid, phosphorus, magnesium and thiamine are involved in ensuring adequate protection against an increase flux of free radicals. The interesting thing is that most of these nutrients are found in fruits and vegetables. Clearly, a compromised intake of some of these nutrients could profoundly affect the body's ability to withstand influx of free radicals. Excessive free radicals in the body has been incriminated in diverse conditions like ageing, cancer, even kwashiorkor which otherwise was thought to be due to inadequate protein intake. Excessive accumulation of

free radicals in Kwashiorkor patients is likely to be due to aflatoxin accumulation in them as well as infections they have prior to and during the stage of kwashiorkor. It is also likely that the unusual need for Vitamin A by patients with kwashiorkor is what makes them to be unusually prone to Vitamin A deficiency which clinically manifest in form of xerophthalmia (Fig. 3). In our unpublished work, virtually all (except one) the 22 cases of xerophthalmia seen in our unit in the Wesley Guild Hospital, Ilesa, between 1982 and 1992 had associated kwashiorkor.

Vitamin A is found in abundance in pawpaw, mangoes, palm oil and carrots just to mention a few. Vitamin A, apart from being an antioxidant is needed for good vision, strengthening and differentiation of epithelial lining of the gut and the airways. It is known that more than 50% of causes of death in our children in the tropics are due to infection of the gut and the respiratory tract.¹⁴ It is not surprising that W.H.O. recommends administration of prophylactic Vitamin A for our children. However, given the abundance of Vitamin A in our pawpaw, carrot, palm oil, it is insulting and it smirks of indolence on our part that an international agency should be giving our children Vitamin A.^{14, 17, 18}

However, the intention of the international agency is probably altruistic knowing fully well the importance of Vitamin A to children. Vitamin A is regarded as magic bullet in childhood survival; in a rural village in Bangladesh, it was found that administration of Vitamin A prophylactically will reduce mortality by 30% among the under fives. This is not surprising in the sense that more than 50 percent of deaths in young children is due to either diarrhoea or respiratory tract infections.^{14, 17}

Vitamin B complex is also generously available in fruits and green vegetables. Again, the fact that most people do not take enough is often manifested in the signs of its deficiency in pregnant and lactating women. One often sees lactating women in the market with angular stomatitis which is a clear sign of riboflavin (vitamin B₂) deficiency. Most Vitamin B nutrients are needed in making enzymes and co-enzymes for carbohydrate metabolism. A large amount of these vitamins are destroyed through cooking and exposure to light;

in a society where most vegetables are over-cooked and people rarely go out of their way to buy fruits, children and nursing mothers are bound to have overt or covert deficiency of these vitamins.

The name folic acid, another important Vitamin B, is derived from the word foliage and its deficiency causes anaemia. This form of anaemia is common in malaria infested area like ours since malaria parasites lead to breaking down of the red blood cells and folic acid is needed for rapid turn over of red blood cells. The patients with sickle cell anaemia whose red blood cells have short life span also need lot of folic acid. It is also recommended for women trying to conceive and of recent, it was found to help prevent strokes. A 20-year study by Tulane School of Health and tropical Medicine in new Orleans, USA, has found that taking this Vitamin B can cut the risk of stroke by 20 percent.¹⁶ Folic acid is found in beans, liver, some citrus fruits and leafy green vegetables. It helps to break down homo-cysteine, an amino acid that occurs naturally in the body and has been linked to artery wall damage.¹⁸

Vitamin E is another vitamin whose use to the body is becoming numerous as scientists keep on knowing more about the vitamin. This vitamin abound in fresh green vegetables, avocado pear, fish, nuts and wheat germ oil. It is known that the vitamin help reduce incidence of cancer particularly that of prostate. It reduces rate of miscarriage in women and give the skin extra lustre. It is also known to improve fertility in both sexes.

Fruits and vegetables also provide minerals for the body viz. sodium, potassium, calcium, zinc, selenium etc. of particular importance in our environment is calcium. We found out most children with rickets in our environment have the disease because of inadequate calcium intake and not inadequate exposure to sunlight because mothers are in Purdah, as previously taught to medical students.¹⁹ The need for calcium is particularly high during early childhood because of the rapid weight gain. The cheapest source of calcium is milk; unfortunately most of our children are weaned off breast milk before the age of 1.5 years instead of 2 years as advocated by Prophet Mohammed (May Peace Be Unto Him) over 1000 years ago.²⁰ These children rarely get milk to drink after weaning and even when they do

it is usually in “homeopathic” quantity. The disturbing news is that cow's milk is not a good source of calcium for human beings since the high load of casein in it can even chelate the calcium in the bone. Really, animals with the highest amount of calcium as evidenced by their huge bones viz. cows, elephants do not even drink milk after their infancy. I think the major problem is that our children are rarely given fruits that are rich in calcium viz. guava, coconut, okra, etc. Children are usually told not to eat guava because it is erroneously assumed its consumption will lead to appendicitis. In effect, to reduce rickets and other covert forms of calcium deficiency, there is the need to prolong the period of weaning since cow's milk is too expensive and of doubtful value. The children also need to be taking lot of coconut and guava. The richness of guava in calcium is why snails prefer it to other fruits because its shell needs lot of calcium to grow.

It is also important that fruits should be taken about an hour before food or more than two hours after food. When taken with food, some materials may form complexes with some agents in the food that may prevent the absorption of the minerals. For example, the phytate in cereal may complex with calcium or zinc (forming calcium phytate or zinc phytate) which are not readily absorbable from the gut. Hence, Muslims who break their fast with fruits are likely to derive maximal benefits from the intake if they wait for about an hour before taking the main food after the initial consumption of fruits.

Another immense usefulness of fruits and vegetables is that it supplies the body with abundance of fibres. Adequate intake of fibres and water enable an individual to empty the bowel regularly. When an individual is not constipated, he opens his bowel about twice daily and the stool is neither hard nor watery.

It is said that many people go through life taking chronic constipation causally, little realising how serious it is and what it can lead to. One Professor Elie Metchnikoff of the Pasteur Institute, Paris, once tagged the large intestine “murderer of men”.²¹ This is because when food remnants are not emptied from the bowel, the carbohydrate component ferments while the protein putrefies, releasing poisonous materials that are often carried to the blood. The mucus membrane that line the gut which form a kind of barricade, becomes inflamed

thereby allowing germs to pass. It is said this may be the beginning of the accumulation of bacteria in the kidneys and many other organs. Many other problems have been associated with constipation like appendicitis, diverticulosis, toxic megacolon, cancer of the rectum etc.

Good habits need to be fostered during childhood. It is said that habits develop into propensity and propensity ossifies into character; and the sage will warn “Your character is your fate”.

In Nigeria, we have many fruits and it should be the duty of the doctors particularly paediatricians to be encouraging children to be snacking on fruits instead of “junk” food.

ARE THE SEEDS OF FRUITS EQUALLY MEDICINAL?

A veterinary doctor came to buy rabbits from my wife, and his professional curiosity got him to be fiddling with those rabbits. He concluded they were worm-infested and he came to this conclusion because their furs were readily pulling off. This was an opportunity for my wife and I to experiment, having read somewhere that pawpaw seeds can be used as worm expellant. Since we have many pawpaw fruits in our backyard, we decided to be collecting the seeds. The seeds were dried, ground and mixed them with rabbits' food. Within weeks, the rabbits were more active and “eyeful”. We have since been experimenting with the seeds; we dry the seeds, grind and sweeten with honey. We found it acceptable to human beings in this form and the results we have been getting have been encouraging. This may be the reason why those who rear pigs, and knowing pigs for what they are, are told to give the pigs both the pawpaw fruits and the seeds together. The anti-helminthic (worm expellant) activity has been proven scientifically and it is due to a chemical agent known as benzyl isothiocyanate; this chemical is concentrated in the seeds of pawpaw, otherwise known scientifically as *Carica papaya*.²²

The seeds of avocado pear is also said to be good for relieving arthritis just like those of mangoes are said to be good for treating *Candida albicans* infection. Grape fruit seeds are said to be good for treating bacterial infections.

I have neighbours and close relations with diabetes mellitus and I used to buy grape fruits known scientifically as *Citrus paradise*, in basketful for them and myself. There is a slogan that “If it is good for the diabetic then it must be good for you”. So, I cultivated the habit of regularly taking grape fruit but invariably I would throw the seeds away. Then I read an article suggesting that grape fruit seeds do possess antibiotic property; my wife and I then thought it would be a worthwhile venture to be keeping the dry seeds of grape fruit.

We did not have problem on what to use the dry seeds for. My wife keeps rabbits. And when I think of those rabbits, I wonder whether they just deliver their babies to die, their young ones are susceptible to all sorts of ailments from diarrhoea to pneumonia and we thought the seeds would be the panacea to their numerous ailments. Rabbit’s meat is white meat and it is said to be low in sodium and cholesterol, so it is good for diabetics and hypertensives. However, rabbit meat is not highly priced and the animal is often seen as a big rat for which the buyer should pay a token or it should be given out as gift. Hence we did not feel any qualm about using them as guinea pigs for our newfound knowledge.

Surprisingly, the use of the dry grape fruit seeds reduced their mortality rate even though the preparation and the administration were cumbersome for my wife who looked after the animals. It was gratifying to have these results; it costs us next to nothing and, secondly, we did not have to spend money to buy drugs for the animals.

I was in this upbeat mood concerning this successful trial when I was consulted by a patient. This man works as a junior member of staff for our University and he was having problem with urination. He would spend more than ten minutes to urinate at a go and he was urinating several times a day. In fact, the act of urinating seemed to be the main work he was doing daily; luckily for him there was general strike in the University. Unfortunately, however, he had no money since the institution was not paying as a result of the strike.

What happened? I asked. He confessed he caught a gentleman’s disease (gonorrhoea) and he had used several antibiotics; he would initially obtain some relief after the use of antibiotic only for the problem to relapse after a few days.

I knew I had a perfect guinea pig with me that I could try the grape fruit seeds on. Guinea pig in scientific parlance is an animal on whom one tests the efficacy of a new drug as well as its side effects. Apart from animals, fit adult males are the next highly-priced guinea pigs. Children are not normally used since they are still growing while young females may be pregnant and one is usually fearful of adverse effects of drugs on the growing foetus. Menopausal women are not suitable since they are normally a “bucketful” of complaints during menopause and these can readily be mistaken for the side effects of drugs. My patient had no money and he was not interested in my “sermon” about ethical issues of trying the seed on him. He told me “*Ta lo fe ku*” i.e. who wants to die? So, I collected the urine for microbiological test before embarking on the trial. *Klebsiella* species was isolated from the urine. He started chewing the seeds on eight hourly basis. After five days he came to me bubbling with enthusiasm that he was no longer experiencing the pain and I prevailed on him to chew the seeds for two weeks after which his urine was re-examined. Re-examination showed the urine to be free of germs. More patients have since been tried on the grape fruit seeds and the experience has been reported in a scientific journal.²³

BEES ALSO MAKE MEDICINE FOR US

As if nature is not done with its benevolence towards us by providing us with fruits and their seeds; bees (*Apis mellifera*) that abound in our rich flora make honey from the nectar of flowers that is said to be useful for more than 100 different ailments.^{24,25}

Honey, along with water, lime and lemon form the quartet of solvents with which alternative medical practitioners dispense their drugs. While water is most commonly used, honey is the most preferred by patients, I guess because of its sweet taste. However, because of its high demand the commonest problem with honey is that it is often adulterated or out rightly faked. Therefore, in order to overcome these problems we decided to set up our own apiary.

When my spouse mooted the need to set up an apiary, I initially objected to it. Anyone who has been trained in medical school is bound to have mortal fear of bees because of what he has been taught bees sting can do to man. Possibly, only snakes can be thought to be as

dangerous if not more dangerous than the bees. However, in retrospect, I think it is uncharitable to compare bees to snake. It is said that the value of man is the quality of his gift and when one studies the organisation of the bees' colony it is not surprising that they are able to give such a priceless gift to humanity.

Bees are not as aggressive as we think and they rarely attack except when they are provoked. In fact, stinging is a defensive behaviour of bees due to frequent or slightest disturbance in form of odour, visual stimuli and/or vibrations. Hair and leather odours elicit the stinging response; darker colours also stimulate stinging. On noticing all these, the bees will move closer to the object and deposit the sting. It is very interesting that darker colour elicit stinging, hence, bee farmers wear white garment when they want to harvest honey. White actually stands for purity and one wonders whether it is coincidental that in order not to be stung by the vicissitude of life one has to be pure. Like I said much earlier, "Your character is your fate". It is also conceivable that one's proneness to attack by other animals may be related to one's inner purity. That may explain why hermits, saints can live in forest without being harmed whereas those of us living in fortresses are ready preys, not only to animals, but our co-human beings, who by becoming armed robbers are worse than lower animals.

During intrusion, one is likely to be stung by a bee initially and the story ends if one leaves immediately. However, if one stays more will follow. When a sting is deposited, alarm pheromones are released informing other bees of the enemy's existence and more bees, among those who are staying within, will come out to defend the hive.²⁴ Stinging must also be a painful experience to the bees since a bee that stings loses her life within a few hours because the sting from her body ruptures the intestine! Is this not the same experience with human being? When one stings or hates another human being, one is disturbed and the worriness that ensues leads the body to produce dangerous chemicals including free radicals and adrenaline. These chemicals damage healthy issues and adrenaline in particular shoot up the blood pressure. It is therefore not surprising that hypertension is like epidemic in an hatred-filled community like ours. Paradoxically, when bees sting other bees or insects, to adjust their behaviour, they rarely lose their stings, therefore, rarely die.^{24,25}

The patriotism of the bees is also admirable. They always guard their hive and if an intruder comes in, they are ready to pay the supreme price in the course of defending their colony. Can we say that of many human beings? If anything at all, most of us would rather fleece our country and possibly connive with external forces to defraud our nation. Bees have a lot to teach us about loyalty which is an earthly manifestation of heavenly purity.

There is also division of labour among the bees. They are not Jacks of all trades ending up as master of none. The honey-bees colony comprises of female castes the queen and the workers; and only one male caste - the drones.

The queen is the mother of the colony and can be recognised by her bigger size, long abdomen which extends far beyond the tip of her wings in the resting position. Only one queen is always found in a colony and where another queen emerges a royal battle will ensue terminating the life of the weaker one. The queen serves the colony by laying both fertilised and unfertilised eggs and also secretes stability pheromones required for the colony's social behaviour. A healthy queen can produce up to 2000 eggs per day if she is biologically efficient. Members of the colony are the queen's brood and they are taken care of as such but do our leaders take us as their brood? If they do, will they not pay more attention to justice? Will they be wasting money on trivialities while most people, particularly women and children are starving?

As the name implies, workers perform almost all the works in the colony ranging from brood rearing to comb construction, colony defence, foraging, thermoregulation, clearing exercise and many other tasks.²⁰ Workers are the smallest and most populous in the colony. A strong colony may have up to 80,000 to 100,000 workers.

If there exist a heavy honey flow season and the field bees are not enough to carry out the task, younger ones can be recruited as field bees to assist in food gathering. Apparently, the division of labour existing in the bee colony is not strictly based on age. If you remove the young bees from a colony, the field bees will assume the tasks and vice-versa. What a great lesson for human beings especially

Nigerians. How many of us will willingly do the work of our subordinate? The life span of a worker bee is 6 weeks but it can be up to 6 months during the raining season when there is little brood.

The drones are the only male caste of the honey bee colony. They are reared shortly before the swarming season begins and they emerge from unfertilised eggs produced by the queenless colony; workers whose ovaries have developed due to lack of inhibiting pheromones of the queen can also lay unfertilised eggs, because the worker is not mated, leading to the emergence of drones. Drones have no sting apparatus, cannot gather food but their biological function is to mate with queens. Even though they are many, the queen will not mate with more than seven to ten drones. The drone dies immediately after mating, because the male genitals break off during mating, damaging the abdomen. Out of mating season, the remaining drones in the colony will die of old age, neglect by the workers or starvation. At times, if there is shortage of food in the colony, the drones are no longer fed and are later expelled or thrown out of the hive. The life span of the drone is about 5 weeks.²⁴

There is so much to learn from the life of the bees. Most of us want to be queens and drones and few want to be workers. Many people want to be Presidents and Governors but few people want to work so as to support the leaders like the worker bees are supporting their queens. Since the weaker queen gets destroyed, most people meet their destruction in attempt to be leaders they are not qualified for. Drones are also treated with contempt once they finished their job of mating. This tallies with the philosophical saying, "Man is a working being. If he is not, then he is nothing". It is said that there are three ways of making money viz. through stealing, begging and working. In a community like ours, where there are too many thieves and beggars, the workers are likely to have little. Hence, we need to emulate the bee colony where most people will be contended to be workers, the drones will be few and the queen will be much fewer still. The end result will be generous production of honey, a product of inestimable value which can remain unspoilt for centuries if kept in its natural state.

USES OF HONEY

When viewed against the impeccable organisation that goes on in the bee colony, it is not surprising that honey, its product, has many uses. The myth of honey will take more than an earth life of a researcher to unravel. The bee farmer seems to be the first beneficiary in the sense that cancer, arthritis and heart diseases are less commonly found among them because of their regular consumption of honey.^{24, 25} The occasional stings they experience from bees are also said to be therapeutic. Specifically, the venom they are injected with is said to be beneficial to the hypertensives and it also protect against attacks of malaria.²⁴ Honey is said to be useful to ageing individuals since it is rich in enzymes and ageing limits the ability to produce required enzymes in the body.²⁵

However, our experience in our unit is limited to external application. We found it useful in burns; a condition that represents about 5% of admission into our Paediatric Unit.^{26, 27} We studied twenty seven children with comparable second degree burns. They were randomly allotted into treatment groups of dressing with either Silver Sulphadiazine (SSD) or crude undiluted honey. Clinical condition of the burns site were examined on the 1st, 3rd, 7th and 21st days for sloughs, exudates, eschars, granulation tissue and epithelialisation. We found that honey-treated wounds demonstrated quicker healing with faster wound granulation and epithelialisation. The duration of hospital stay was significantly shorter in patients with honey treatment than those with SSD. SSD was at least 9 times more costly than honey. There was no significant side effect with the use of honey other than its being more painful, initially, on application and some of the children licked their wounds.²⁸ We also found that honey is more superior to EUSOL in the dressing of abscess wounds and much cheaper. EUSOL (Edinburgh University Solution of Lime) is the traditional solution that is often used for wound dressing in our hospital.²⁹

ALOE VERA: PLANT OR MAGIC?

Aloe Vera is a succulent, almost sessile, perennial herb. The leaves are 30-50 cm long and 10 cm broad at the base, pea-grey coloured but white spotted when young. The bright yellow tubular flowers,

25-35cm long are arranged in loose spikes. It is found naturally in southern and eastern Africa but introduced to North Africa, the Arabia, China, the Mediterranean countries and the West Indies. Rarely native but has been introduced to the West African coast including Nigeria where it is grown in flower pots.

The healing properties of this succulent plant have been known for thousands of years. *Aloe vera*, as an herbal preparation, was said to have been mentioned in the papyrus no fewer than 12 times. *Aloe vera* was well known not only to Egyptians but also to the Romans, Greeks, Arabs and Indian cultures. In fact many famous physicians of those times including Dioscorides, Pliny the Elder and Galen considered to be the father of modern medicine included *aloe vera* in their therapeutic armouries.³⁰

Myths and legends surrounding the use of *Aloe vera* in ancient times suggest that it was an important part of the beauty regime of the Egyptian Queens, Neffertiti and Cleopatra. Legend had it that, in 333BC, Alexander the Great was persuaded to capture the Island of Socotra in the Indian Ocean, famed for its supply of Aloe which he needed to heal his wounded soldiers.

The aloe plant being a cactus plant is between 99 and 99.5 percent water and that is why it needs lot of water to blossom. The average pH is 4.5. The remaining solid material contains over 75 different ingredients including vitamins, minerals, enzymes, sugar, anthraquinones or phenolic compounds, saponins, steroids, amino acids and salicylic acids. The medicinal uses of *Aloe Vera* include wound healing, skin care, insect stings, bruises care, allergic conditions, pruritus vulvae, eczema etc. When ingested, it is said to be useful for those suffering from diabetes mellitus, hypertension and chronic constipation. It is believed that there is synergistic action between all the component ingredients in the gel, giving a result, which is greater than the sum of the individual actions. In allopathic (orthodox) medicine, the practice is to isolate in a chemically pure form, the biologically active substance of the constituent ingredients; these extracted drugs must be uniform in their composition in order to demonstrate consistent physiological effects. However, an ayurvedic text, from India stated that "Extracting drugs from a part of the plant

is like taking out intelligence and throwing away the wisdom". Whole plant preparations, though less potent, are generally considered to be safer with fewer side effects.

My wife, just like many Nigerian women, has a small plantation of *Aloe vera* in front of our house. Some years ago, like most doctors normally experience, patients were brought to my house with scabies. Since it is a highly infectious skin disease, both children and the parents would normally have the disease. I would prescribe the traditional Benzyl Benzoate lotion for them but my wife would ask them to use *Aloe vera* gel. Since she was offering her own free, the patients would prefer to use *Aloe vera* gel and surprisingly the lesions were getting cured; this prompted me to liaise with Dr. ?nay?mi (and others) the dermatologist and we then did a trial on *Aloe vera* gel. We recruited 30 patients for the study; these included 12 male adults with scabies from the Nigerian Prison Services, Ilesa and 18 patients from the Children Welfare Unit of the Wesley Guild Hospital, Ilesa who had clinically proven cases of scabies. They were randomised for treatment with either *Aloe vera* gel or benzyl benzoate lotion. Among the 14 patients allocated to benzyl benzoate lotion, 2 were lost to follow up but none of the 16 allocated to *Aloe vera* defaulted. After the full course of treatment, 3 out of the 12 remaining patients on benzyl benzoate group were still itching in contrast to just 2 patients among the 16 patients on *Aloe vera* group. However, there was clearing of scabietic lesions in the two groups. We therefore concluded that *Aloe vera* may be a preferred drug for the treatment of scabies especially since it can be grown effortlessly and its use was not associated with significant side effects.³¹

NIGERIAN ALOE, ALOE SCHWEINFURTHII: IS IT JUST AS GOOD?

I discussed our findings with Professor Anthony Elujoba of the Faculty of Pharmacy. He then offered to make the job easier by preparing *Aloe vera* soap, at no cost to me for similar experiment on the condition; that we included the soap of *Aloe schweinfurthii* in the same trial. According to him, *Aloe schweinfurthii* is indigenous to Nigeria and unlike *Aloe vera*, little work has been done on it. Since the Yoruba of yore would say "*Eni ti o maa gba eko awin, a gbe omo*

elekojo i.e one good turn deserves another; I readily agreed. He then prepared 3 pairs of soap (A, A₂, B₁, B₂, C₁, C₂). The first series is soda-based soap for bathing and the second series involves incorporation of the medicinal plant into the black soap for rubbing unto the affected part.

We recruited 30 patients made up of 25 male prison inmates, 4 male children and a 72 year old diabetic woman, each of whom had either superficial fungal infection or scabies. They were treated with batches of soaps made from the leaves of *Aloe vera* (Batch A) and *Aloe schweinfurthii* (Batch B) separately. The third batch of soaps (Batch C) representing the control, was prepared similarly but without incorporating any plant material. Twenty one patients had superficial infections while only 9 patients had scabies. The administration of the soaps lasted 4 weeks but the effectiveness was observed as from the second week of treatment. All the patients, especially the prison inmates, benefited from the use of the medicated soaps (Batches A and B) while the lesions did not clear in any of the patients on the control soap (Batch C). Complete resolution of the lesions was observed in virtually all the patients placed on *Aloe vera* and *Aloe Schweinfurthii* soaps. (Table 2) We also found these soaps to be good for lesions due to pityriasis versicolor as well as an unusual skin lesion known as warty epidermal naevi.³²

Table 2: Outcome of Treatment of Skin Lesions with Different Soap Samples

Type of Skin Lesions	Aloe schweinfurthii Soaps (B)	Treatment outcome		Aloe vera soaps (A)	Treatment outcome		Control soaps	Treatment Outcome	
		R	NR	Total	R	NR	Total	R	NR
SCABIES	2	2	0	3	2	1	4	4	0
TINEA (Corporis, Cruris Pedis)	8	7	1	8	7	1	5	5	0

R = Lesion(s) cleared at the end of 4th week
 NR = Lesion(s) not cleared

CONCLUSION

Mr. Vice Chancellor sir, ladies and gentlemen, as I bring this lecture to a close, I need to emphasise that we must uphold the only process that guarantees progress i.e. self-reliance and self-strengthening. According to one Dr. Abudu of Ghana, "The animals, birds, trees and other forms of life in West Africa do not depend on what similar forms of life in Europe or elsewhere can do for them. Yet, they thrive very well and probably better than those in these distant places". So, why must our own be different. My question is "How much of the myth can we turn into realities so as to assist our people to have the upper hand in their daily confrontation with the moulds and the microbes?" The challenge is both mine and yours.

I thank the Almighty God for guiding me to this stage of my career. I also appreciate the contributions of my colleagues, co-workers and friends both within and outside the Department of Paediatrics and Child Health, Obafemi Awolowo University, Ile-Ife and those who have travelled from far and wide to witness this occasion. I am particularly indebted to my wife, the mother of my children and my silent co-researcher.

Mr. Vice Chancellor, distinguished ladies and gentlemen, I thank you for your generous attention.

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