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GERIATRICS AND AGEING

EDITION

A PEER REVIEWED JOURNAL OF THE UNIVERSITY OF IBADAN MEDICAL STUDENTS' ASSOCIATION



1977 Graduating Class of the College of Medicine, University of Ibadan

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AND AGEING

EDITION

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GERIATRICS AND AGEING

The world's population is rapidly ageing, and the health and wellbeing of the elderly population is becoming a major public health concern. This is particularly noticeable in many developing countries where the population is ageing faster than it was for the developed countries. Also, this demographic transition is happening against a backdrop of poverty and poor health conditions in such countries and with the poor health infrastructure and lack of policies geared towards the committed care of the older adults' population in these settings, the elderly tend to suffer significant morbidity and disability burden. In the light of the above and the existing information gap in describing the health and wellbeing of older adults in most developing countries, including Nigeria, this issue of DOKITA, Geriatrics and Ageing, brings to the fore an array of informative reviews discussing several aspects of the health and wellbeing of the older adults' population.

P. Osuji provides an overview of low back pain in the elderly, with emphasis on the barriers to communication and variability of pain experience and stressing the need for physicians to adopt creative communication styles when evaluating elderly patients with low back pain. F. Elugbadebo and A. Ojagbemi employed a case-based approach in discussing the unusual and variable clinical presentations of vascular dementia in comparison to other dementias while E.B. Olusoji and C.L. Nwosu present a review of depression in the elderly with notes on the epidemiology, aetiology, clinical presentation, diagnosis and management.

The pathophysiology of the ageing heart and the epidemiology of heart failure are discussed by A. Oladimeji and O.S. Ogah in Heart Failure (HF) and the Elderly, with an overview of important HF clinical trials that have specifically looked at the elderly population. These authors also discussed specific grey areas in the management of Isolated Systolic Hypertension, a common clinical condition in the elderly age group. G.O. Oyeyinka and O. Adekanmbi in their respective articles Immune system and Ageing, and Ageing and Infectious Diseases discussed the need for the understanding of immunological changes associated with ageing and the implications for the development of therapies aimed at enhancing and rejuvenating immune response in the elderly. Special mention was also made of ageing and infectious diseases in developing countries, with specific notes on HIV/AIDS, Tuberculosis and Malaria.

With these and more, I hope the readers of these articles find them educative and informative in the sphere of care of the elderly persons.

On behalf of the entire editorial team, I wish to appreciate the Board Chairman, Professor Akinyinka Omigbodun; the Faculty Adviser, Dr M.A. Salami; all Editorial Consultants and past Board members for their guidance and support throughout this Board year. I also wish to express our heartfelt gratitude to the supervisor of this edition, Professor Oye Gureje, NNOM for his time and support in making this edition of DOKITA a success.

Ibrahim Olukunle

Editor-in-Chief (2015/2016)

FOREWORD

AGEING AND HEALTH IN A CHANGING WORLD

In low and middle-income countries (LMIC), there is often a tendency to pay insufficient attention to the health and general wellbeing of the elderly. This may at least in part, reflect the fact that the growth in the population of the elderly is largely unnoticed. For example, and in contrast to the more advanced countries of the world where the proportion of the persons 60 years and over has increased from about 12% in 1950 to about 23% currently, the proportion in out part of the world has remained at about 5-6%. But the population of the elderly is growing world-wide, including in LMIC. In 1950, there were 205 million persons aged 60 years or over in the world. By 2012, the number of older persons increased to almost 810 million. It is projected to reach 1 billion in 2020 and double by 2050, reaching 2 billion. The majority of this population currently resides in LMIC and these countries will contribute a larger proportion to the projected growth than high-income countries.

The ageing of the population has considerable public health importance and impact. While it is undoubtedly true that the worldwide increase in life expectancy is due to improved nutrition, sanitation, medical advances, healthcare, education and economic well-being, there is also the paradox that with increasing age come higher risks of chronic and degenerative diseases. Ageing is particularly associated risks of non-communicable diseases and of disability. Indeed, along with higher disposable income and changes in lifestyles, demographic changes are the main drivers of the rise in the global scourge of non-communicable diseases (NCDs). Important factors responsible for these demographic changes are increasing population of elderly persons and general increase in life expectancy. Other than the well-known burden due to hypertension and diabetes, globally, the major causes of health problems and disability in old age are memory loss, with dementia being the main condition, depression, immobility, most commonly caused by arthristis, ischaemic heart disease, and stroke. Uncorrected visual impairment and hearing loss are also important causes of disability and dependency. In sub-Sahara Africa (SSA), the increasing burden of NCDs is complicated by persisting burden of communicable diseases.

In this issue of **DOKITA**, authors have focused on various health conditions that commonly affect the quality of life of the elderly. Health problems such as hearing loss and back pain are discussed. But attention has also been given to health issues that may not often be frequently talked about, but are nonetheless of substantial impact on the wellbeing of elderly persons. An example of this is erectile dysfunction. On the whole, this issue of **DOKITA** addresses the health challenges affecting a growing but commonly neglected segment of our communities. The papers deal with issues that every doctor should be well informed about if they are to remain relevant to the needs of a society undergoing fundamental demographic and epidemiological transitions.

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SYNOPSIS OF THE PRACTICE OF GERIATRIC MEDICINE IN NIGERIA: THE IBADAN STORY

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INTRODUCTION

The rise in the elderly population globally has implications on the social and health fabrics of the society. Demographic transition has indicated that the developing nations including Nigeria are experiencing the fastest rate of growing elderly population. With the largest population in Africa and the ninth in the world, it is estimated that by the year 2025 the population of Nigerians aged 60 and above will constitute 6% of the entire population.

Characteristically, ageing is associated with multimorbidity. Geriatric medicine as a specialty evaluates and manages the unique healthcare needs and treatment preferences of older persons. It is an emerging medical specialty in Nigeria. Geriatric medicine has achieved a modest growth in Nigeria in terms of practice and interest from Non-governmental organizations (NGOs), Nigerian Universities Commission (NUC) and the Postgraduate Medical Colleges.

Practice

There are few Geriatricians in the West Africa sub region, with Nigeria being among the only five countries (others- Benin, Burkina Faso, Senegal and Ivory Coast) that can boast of 1 to 4 Geriatricians. Nigeria is a signatory to the Article 13 of the ECOWAS document on gender equality where care of older persons was highlighted. Article 24c further mandated the 15 member states to put in place accessible and free health care programs for older persons before 2012.

In Nigeria, most nation-wide programmes are rather one-off with annual events been implemented in a small number of selected communities. NGOs before now have been in the fore-front of advocacy for the care of the elderly. At the governmental level, the Draft National Economic Empowerment and Development Strategy II (2008-2011) provided for social protection of older persons through the establishment of a retirement benefit scheme for informal sector workers. However, the legal framework is yet to be in place to implement many of the policies. The "Older persons' bill" is yet to be passed into law.

The practice of geriatric medicine in Nigeria took a major leap with the establishment of the Chief Tony Anenih Geriatric Centre (CTAGC), University College Hospital, Ibadan which was commissioned on the 17th November, 2012 by the then Minister of Health, Professor Onyebuchi Chukwu. This first purpose-built Geriatric Centre in Africa by the UCH management is a product of the unparalleled passion and vision for the care of older persons by the current Chief Medical

Director- Professor Temitope. O. Alonge. The management of patients (senior citizens aged 60 years and above) commenced on the 13th December, 2012. Since inception, the Centre has been pursuing her vision to be '*the flagship Centre for the care of older persons in West Africa contributing to the realization of the vision of a world where older persons live a long and enjoyable life as well as contribute their quota to society, through active partnerships with community and government services*'.

Services are rendered in nine areas at the CTAGC tailored to the needs of elderly patients. These are: the outpatient service, in-patient service (ward), physiotherapy, dietetics, surgical (theatre), dental, specialty, medical social work unit (recreational day unit) and health and safety unit.

The Centre has been a beehive of activities since inception. It is an all-inclusive facility which allows the elderly patients to have easy access to health care service through a smooth flow of activities within the same compound. Commendably, key services like physiotherapy, electrocardiogram, consultation, registration, bed fee and procedures are done at about 50% of the main hospital charges. The Centre has registered more than 9,000 new elderly patients. The daily turn-out is between 80 and 110 elderly patients of which 10 – 15 are newly registered elderly patients.

Social Health Insurance Scheme (SHIS) is in place at 18,000 Naira per annum per patient. It covers most

aspects of health care cost up to 500,000 Naira per annum. Indigent elderly patients are placed on the SHIS through the “Adopt an Older person” program with contributions from well-meaning citizens.

Training

The federal government through the NUC sponsored 24 gerontologists from 12 universities for training in the United States of America (USA). Approval was also given to these Universities to start Masters program in Gerontology. Such exposure hopefully will be extended to geriatric medicine in the near future. However, geriatric medicine was introduced to the MBBS curriculum as far back as 2010. The National and West African postgraduate medical colleges are currently considering formal training in geriatric medicine.

The CTAGC, UCH, Ibadan has pioneered training in geriatric medicine in Nigeria. It held a 2-week maiden basic certificate course in geriatric medicine for medical doctors in March 2016. Participants came from across the different geopolitical zones of Nigeria and were exposed first hand to geriatric care with resource persons drawn from within and outside Nigeria. The Centre has provided a platform for training other health professionals – nurses, physiotherapists, medical social

workers, dietitians and clinical psychologist at undergraduate, internship and postgraduate levels. Training and re-training of the staff of the Centre for optimal care has been ongoing. Two consultant physicians including the Director of the Centre have undergone geriatric specialist training in South Africa.

Research

The volume of research work in geriatrics has been on the increase in the West African sub region. PUBMED search revealed that only 260 papers were published in the sixties when the first papers of geriatric medicine were published. The last decade (2004 – 2014) however witnessed a surge in geriatric research with 10,852 publications from West Africa. The largest volume of publications came from Nigeria (10,953).

Locally, the CTAGC have been actively involved in research within the short period of its operation. At least ten published articles in reputable local and international journals have emanated from the Centre. Five resident doctors have completed their research studies for the fellowship examinations of the postgraduate medical colleges, while other interdisciplinary, collaborative studies are ongoing at the Centre.

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KEYWORDS

*Ageing, Geriatrics,
Immune, Infection,
Senescence*

ABSTRACT

The global population of people aged 65 years or older is on the increase. The elderly are at increased risk of morbidity and mortality from infectious diseases because of multiple factors including weakening of their immune system, decline in protective physiologic functions and an increase in number of diagnostic and therapeutic healthcare interventions. The clinical presentations of infectious diseases in the elderly differ significantly from those of younger adults. A subsequent delay in diagnosis taken together with poorer treatment response contributes to worse outcomes in this population. It is important that clinicians understand the peculiarities of infectious disease in the geriatric population as it is likely that they will form a growing portion of many a clinician's practice. As the understanding of age-related changes in immunological function advances, it is hoped that therapies targeted to complement an ageing immune system can be developed to fight infectious diseases.

INTRODUCTION

In the last half-century, significant gains have been made in life expectancy globally. As a result of this, there has been a ballooning of the number of the elderly people living around the world. In 1900, 1% of the global population was aged greater than 65 years, in 2000 this had increased to 10% and by 2050, this is expected to increase to 22% of the global population. In absolute numbers, this translates to 15 million in 1900, 605 million in 2000 and a projected 2 billion by 2050¹.

Demographic ageing is now well established, and the elderly population (age >65 years) will exceed 1 billion persons in 2030².

This phenomenon of demographic ageing is largely due to advances in public health and modern medicine, which have resulted in drastic reduction in childhood mortality from infections and prolonged survival for the elderly in the last century and have led to a greater life expectancy. Increases in the elderly populations have been well documented in industrialized countries but are also being seen, albeit to a lesser extent in the developed world but also plays out in the developing world. According to the World Bank, average life expectancy at birth in the United States of America was 79 years in 2014, an increase from 70 years in 1960. In Nigeria, average life expectancy at birth in 2012 was 53 years as compared with 37 years in 1960³.

Infectious diseases remain a major cause of morbidity and mortality worldwide among the elderly though largely overtaken by chronic, non-communicable diseases in some parts of the world⁴. The elderly

are particularly at risk for acquiring infections and the very old (aged greater than 80 years) are at a very high risk of developing serious complications or even dying from these infections⁵.

Many infectious diseases have a higher incidence in the elderly than in younger individuals⁶. These include urinary tract infections, lower respiratory tract infections, bacterial meningitis, skin and skin structure infections, blood stream infections and tuberculosis (TB)⁷. These and other infections in the elderly differ from those in younger populations in a number of ways including, the spectrum of aetiologic agents, the clinical manifestations, responses to therapy and invariably, the outcomes.

Biologic Factors that Predispose the Elderly to Infections

There are several physiologic changes associated with the ageing process that facilitate the acquisition of infections or reactivation of latent infections in the elderly.

Immune senescence

Immune senescence refers to a gradual decline in the ability of the body's immune system to protect it against infection and develop immunity after vaccination. An intact immune system protects the body against foreign pathogens, neoplasms and autoimmune diseases. Hence the decline in immune function with age is responsible for higher rates of infection, malignancies, and autoimmune conditions in the elderly⁸. Haematopoietic stem cells (HSC) have been shown to have a decline in function with ageing. Functional studies that compared young and

old bone marrow transplanted into the same patient showed that old bone marrow had a lower capacity to generate hematopoietic progenitor cells, which are precursors of cells responsible for key components of the immune response⁹. Recent studies have described an age-related alteration in number and function of natural killer (NK) cells, which form a significant component of the innate immune response to infection^{10, 11}.

Adaptive immunity (specifically, B cell development) is affected by decreased production of long-term immunoglobulin-producing B lymphocytes and loss of immunoglobulin diversity and affinity with advancing age¹².

The thymus is the primary site of immunocompetent T cell development and chronic thymic atrophy is a hall-mark of ageing¹³. The precise impact of age-related thymic changes on immune, specifically, T cell function remains under scrutiny.

The consequence to the elderly of all of these is an impaired ability to fight infections, infection by unusual organisms, such as *Listeria meningitis* in the elderly as well as more frequent and severe infections when they do occur.

The lower rates of development of protective antibody titers following immunization seen with immune senescence, leave the elderly vulnerable to development of vaccine preventable disease such as influenza even if they have been vaccinated. Reactivation of latent infections such as TB or herpes zoster also result from decline in immune function that is associated with ageing.

Inflamm-ageing

Ageing is now believed to be associated with increased inflammation mediated by pro-inflammatory cytokines⁹. The term 'inflamm-ageing' has been coined to describe this phenomenon and is thought to be responsible for many chronic inflammatory disorders seen more commonly in the elderly such as diabetes and atherosclerosis^{14,15}. Inflamm-ageing is hypothesized to be as a result of constant antigenic challenge and reduced capacity for down-regulation of inflammatory cytokines once the antigenic challenge has been contained and cleared. There is thus believed to be an on-going low-grade inflammatory state in the ageing individual and it has adverse effects on both immune and non-immune cells¹⁶.

This chronic low-grade inflammation is believed to be beneficial early in life when it is better regulated but becomes more harmful later in life (when it becomes poorly regulated) due to its longstanding deleterious effects on the immune system¹⁷.

Reduction in Effectiveness of Protective, Physiologic and Cognitive Function

Basic physiologic functions like the cough reflex are protective in clearing the airways, preventing aspiration and protecting the lower respiratory tract. The cough reflex eventually weakens with age and is a contributing factor to the higher incidence of aspiration pneumonia in the elderly. The elderly also may experience a reduction in circulation especially at the microvascular level. This may aid the development of pressure ulcers and lead to delayed wound healing and wound infection.

Cognitive impairment delays diagnosis because of the inability to express symptoms and initiate an evaluation. Taken together with muted clinical signs of infection in the elderly and other gaps in physiologic functions, the elderly are significantly more predisposed to infection than other adults.

Co-morbidities

There is a higher prevalence of chronic illnesses and conditions associated with infection such as diabetes mellitus, obstructive uropathy and chronic obstructive pulmonary disease (COPD). Diabetes mellitus places the elderly at a higher risk of infection for a variety of reasons. In addition to this, as people age, they may find it more challenging to control their diabetes making it more likely to develop infectious complications. Obstructive uropathy leads to stasis of urine in the bladder and increases the risk of urinary tract infection. The long-term use of inhaled and systemic corticosteroids for the treatment of COPD has been documented to increase the risk of lower respiratory tract infection¹⁸.

Social Factors that Predispose the Elderly to Infections

In western societies, care of the elderly has fallen increasingly on long-term care facilities and nursing homes. A nursing home population with a higher (than the general population) prevalence of infectious disease could serve as a reservoir for efficient transmission of infection within that communal setting. Poor hygiene and sanitation due to physical limitations or financial constraints predispose to diarrheal disease and skin and soft tissue infections.

Malnutrition is a known risk factor for infection². It is also well known, that the elderly often suffer malnutrition either as a result of physical, financial or cognitive limitations and this increases their vulnerability to infection. The elderly may also have difficulty accessing care and may be socially isolated. These factors make it difficult to receive prompt attention for early detection or management of infections.

Healthcare Associated Interventions Predispose to Infection

As modern medicine evolves to tackle problems that plague the elderly such as cancer and heart disease, many therapeutic interventions also carry with them an increased risk of infection. For instance, cancer chemotherapy agents have side effects that include prolonged neutropenia and mucositis, which increase the risk of certain kinds of infection. Therapeutic immunosuppression from irradiation, systemic corticosteroids and other immune modulators also predispose to a broad range of infections.

A pacemaker, prosthetic heart valve, prosthetic joint or any non-native material implanted in the body could serve as a nidus for infection in the future. Endotracheal intubation is a life-saving intervention that can predispose to ventilator-associated pneumonia. Likewise, bladder catheterization (especially if long-standing) leads to asymptomatic bacteriuria and possibly (but to a lesser extent), urinary tract infection (UTI).

The Impact of Ageing on Clinical Syndromes in Infectious Diseases

Elderly patients tend not to have typical presentations of infectious disease. They may present with confusion or delirium as the major presenting sign to a significant infection¹⁹.

In evaluating an elderly patient for infection, a key point to note is that many physiologic responses to infection are muted or at least diminished in the elderly. For instance, as many as 25% of the elderly fail to demonstrate a febrile response to infection, even in instances of severe or life-threatening infections²⁰. This could result in delayed diagnosis because these subtle clinical manifestations may be overlooked or unrecognized by relatives and even healthcare providers.

Reduced physiologic reserve leads to poorer outcomes. Malaria, meningitis and bacteremia are more associated with mortality in elderly patients²¹.

Inability to tolerate therapy also leads to poorer outcomes. The elderly are often at higher risk of adverse drug events. Clinical deterioration in an infected elderly patient may be presumed to be due to worsening of the underlying illness but could actually be due to an adverse drug event from one of the newly introduced antimicrobial medications. There are some features of common infectious disease syndromes that in the elderly are different from the general population:

Urinary Tract Infection

There is a higher prevalence of asymptomatic bacteriuria in the elderly. Studies have shown no survival benefit in treating this finding. UTIs are more common in women than men when younger but as they age, the frequencies of bacteriuria become similar in both sexes^{22,23}. Asymptomatic bacteriuria in and of itself is not considered a true infection in most cases but can be harmful when a healthcare provider treats it with antibiotics (sometimes repeatedly), and encourages the development of multi-drug resistant organisms. The use of indwelling urethral catheters also predisposes to infection and makes culture data difficult to interpret.

Pneumonia

Community acquired pneumonia is much more common in the elderly than the young, 50 times more in those aged >75 years than those aged 15-19 years²⁴. Symptoms of pneumonia, including cough and fever may be absent or mild. Pneumonia is more likely to be fatal and also to be caused by non-bacterial causes such as human metapneumovirus and respiratory syncytial virus (RSV) in the aged. Risk for gram negative or *Staphylococcus aureus* pneumonia is increased in the elderly²⁵.

Meningitis

In evaluating an elderly patient for meningitis, nuchal rigidity is much less specific for meningitis than it is in the general population. In the elderly, it could be a sign of degenerative osteoarthritis of the cervical spine. In general viral meningitis is uncommon in the elderly.

A Clinician's Approach to an Elderly Patient with an Infectious Disease

A high index of suspicion is needed to diagnose any infectious diseases as the elderly do not show typical signs and symptoms of infection. Signs such as a high fever, laboratory findings such as marked leukocytosis and other clinical symptoms which easily point to infection in younger patients may be

absent in the elderly. They often present with non-specific symptoms such as malaise, anorexia and confusion. However, some of them may have these symptoms at baseline making it difficult for providers who are unfamiliar with a particular patient to determine which clinical features are acute and which are longstanding.

Infection control is especially important in any communal setting such as nursing homes. Infections such as TB, diarrheal disease and infestations such as scabies and lice are easily transmitted from resident to resident or via caregivers between the facility residents. There is frequent use of antibiotics at these facilities, some of them broad spectrum and this can drive the development of multi-drug resistant organisms that again can easily be transmitted between residents of these facilities.

The importance of good nutrition in preventing and fighting infection and promoting overall well-being of the elderly cannot be over-emphasized. It is important for healthcare providers to promote the benefits of good nutrition.

Vaccination, while it is less effective in the elderly should still be used when indicated, to provide some benefit. This is particularly true of the influenza vaccine. It has been found to be less effective than in younger populations but is still protective. The herpes zoster vaccine is targeted primarily at the elderly and has been found to be both safe and effective. Certain vaccines like the yellow fever vaccine have been associated with more severe adverse events and delayed immunologic response in the elderly and so should be used with caution ⁶. Antimicrobials should be prescribed with caution to the elderly because of diminished renal function and sometimes hepatic insufficiency. Metabolism and excretion of drugs are thus delayed and could result in drug toxicity. There is an increased need to monitor drug levels in the elderly because of unpredictable pharmacokinetics ⁶. It is important to consider co-morbidities, poly-pharmacy and potential drug-drug interactions when prescribing antibiotics to this group.

Ageing and Infectious Disease in Developing Countries

Managing the health of the aged in developing countries is a growing problem and is bound to place a strain on already weak health systems. HIV is widespread in Sub-Saharan Africa and with the advent of Highly Active Antiretroviral Therapy

(HAART), people infected with HIV are living longer, resulting in a 'greying' of the epidemic. HIV and AIDS also affect the elderly in the developing world indirectly. They often have to function as caregivers to their HIV infected adult children and guarantee the upbringing and education of their orphaned grandchildren ². For the elderly that do get infected, there is a faster progression to AIDS than in younger populations ².

TB is endemic in some developing countries and is often as a result of reactivation of latent infection acquired at a younger age. It results from declining cellular immunity seen in the elderly. The presentation of TB in the elderly is different from presentation in younger adults sometimes resulting in delayed diagnosis. The elderly present with less cavitory disease, more disseminated TB and lower lobe pulmonary disease. Use of corticosteroids which may be increased in the elderly for treatment of inflammatory disorders raises the risk of reactivation TB. Poor nutrition status also places the elderly at risk for TB.

The extended family remains important for social support in some parts of the developing world and grandparents are often tasked with the role of caring for grandchildren. This provides ample opportunity for transmission of tuberculosis from an infected grandparent to a grandchild if there is delayed diagnosis.

Malaria in the elderly is more severe and associated with a higher parasite load and poorer outcomes ²⁶.

CONCLUSION

Ageing is not an independent risk factor for infection. There are several elderly individuals in the society that continue to lead independent, productive and healthy lives. There is increasing evidence that nutrition, immunization, exercise, social engagement and involvement in productive activities keep the elderly healthy (and by extension less susceptible to infection) for longer.

There is no doubt that ageing weakens immune function and as such the elderly are different from the younger patient in many ways. This must be borne in mind when evaluating or managing older patients suspected to have an infectious disease. A better understanding of the precise changes that occur in the immune system with ageing will provide opportunities for development of therapies targeted at enhancing immune response in the elderly which

is a key feature in fighting not only infections but also cancers and autoimmune conditions in our ageing populations.

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AGE RELATED EYE DISEASES: A MAJOR HEALTH CHALLENGE IN THE ELDERLY

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KEYWORDS

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ABSTRACT

Background: Age related eye diseases (AREDS) are a major health concern in the elderly. Older adults who are visually impaired are most likely to have an increased risk of falls and fractures, another major health concern in geriatrics. There is an increasing prevalence of ocular diseases amongst elderly population in many developed countries. This article delves further into the key features of both the normal ageing process of the eye and the common age related eye diseases in our environment such as cataracts, glaucoma, age-related macular degeneration and diabetic retinopathy that affect the elderly.

Methods: Literature search was carried out on common AREDS and their impact on the lives of the elderly using online platforms such as PubMed, AJOL, Medline and Research Gate.

Results: The impact of AREDS on the elderly and the society is enormous. Developed countries with effective health care system recorded high economic expenditures on the management of AREDS in recent years. Studies also revealed that depression and social isolation were common in elderly individuals who had some form of visual impairment.

Conclusion: There is paucity of recent data on AREDS in the elderly in Nigeria. There is need for public health awareness of these ocular conditions and appropriate steps must be taken to detect these diseases early and provide treatment promptly. Adequate care must be provided for the increasing elderly population in our environment who are visually impaired.

INTRODUCTION

The ability to see is integral in understanding and communicating with the environment. However, it is often underappreciated until a significant loss of visual function occurs. The World Health Organisation (WHO) defines the elderly as individuals who are 65 years and older. However, this cut-off does not conform to the traditional African definition of an elder which corresponds to a chronological age of 50 years and older and may vary depending on the country or region¹. Despite the controversies, 60 to 65 years has become acceptable worldwide and is still being used as the age limit for defining the elderly¹.

In 2014, 285 million people were estimated to be visually impaired, 256 million with low vision and 40 million were blind globally². About 65% of those with visual impairment and 82% of those who were blind were over 50 years². The Nigeria national blindness and impairment survey conducted between 2005 and 2007 reported the prevalence of blindness in persons over 50 years to be 6.5% and age related causes accounted for 73.2% of blindness and 75.9% of severe visual impairment³. The survey also showed that the prevalence of blindness increased significantly with increasing age from 0.8% at 40-49 years to 23.3% at 80 years. Approximately about 4.25 million Nigerians, 40 years or older were suffering from visual impairment

or blindness. This was expected to increase in subsequent years after the survey³.

Furthermore, recent hospital-based studies conducted in Ibadan, a South-western city in Nigeria reported that older adults within 60-79 years constituted the largest group of blind persons at 44%⁴. The prevalence of visual impairment was also found to increase remarkably from 22.2% in persons aged 60-64 years to 50% in ages 80 years and above⁵. Some documented studies from other countries have also shown an increased prevalence of ocular problems in the elderly^{5,6}.

Eye diseases in the elderly are a large economic burden in most developed countries. They reduce the ability of an older adult to function or live independently. A study in 2003 reported that about 11% of the elderly who were visually impaired had a positive history of a fall within a 12 month period compared to the 4.4% of those with normal vision^{2,6}. In Australia, Hong et al also conducted a study on an elderly population and reported a short to mid-term association between unilateral visual impairment and fractures over a 5 year period⁷. However, another study carried out in Nigeria amongst Yoruba-speaking elderly persons found no association between visual impairment and the risk of falls. This was reported to be as a result of visual impairment being underreported and inability to conduct an objective

eye examination⁸. Elderly persons with eye diseases may also develop psychosocial disorders like depression, social isolation and suffer from one or more comorbid conditions compared to those with normal vision^{9,10}.

Age related eye diseases commonly found within the elderly population include: age related cataract, age related macular degeneration, glaucoma, retinal vascular occlusion, diabetic retinopathy and ischaemic optic neuropathy^{6,10}. However, the prevalence of these ocular diseases may vary in different regions and ethnicities. Studies conducted in various geo-political zones in Nigeria have shown that the common ocular conditions in the elderly include: presbyopia, refractive errors, glaucoma, cataract, age related macular degeneration, diabetic retinopathy, pterygium, retinal vascular occlusion, ischaemic optic neuropathy, conjunctivitis and corneal opacities^{3,4,11}. Some diseases develop due to the physiologic or pathogenic changes that occur in the ageing eye while others may occur as a result of pre-existing health conditions such as diabetes mellitus. Management and treatment modalities for these eye diseases will depend on their clinical presentation and aetiology and is specific for each disease¹².

Relevant Anatomy of the Eye

The eye architecture remains unchanged throughout all ages but undergoes physiologic changes that may affect its function with advancing age. The major anatomical structures of the eye include the cornea, the iris, the pupil, the conjunctiva, the sclera, the lens, the retina, the ciliary body, the optic nerve, the anterior chamber angle and the trabecular meshwork. These are shown in Figure 1.

Anteriorly, the cornea is the outermost structure and the major refractive component of the eye. It is a clear, avascular, transparent tissue and has a smooth shiny surface. It forms the anterior one-fifth of the eye globe and its converging power is twice that of the lens. The anterior chamber of the eye is filled with aqueous humour which is produced by the ciliary body. Adjacent peripherally to the cornea is an opaque, rigid, whitish, tough tissue called the sclera. Overlying the sclera is a thin vascular tissue called the episclera and the conjunctiva^{13,14}.

The anterior border of the posterior chamber is formed by the posterior iris while the anterior lens forms the posterior border. The iris is a muscular tissue that regulates the amount of light entering the pupil. The suspensory ligaments keep the lens in place and are attached to the ciliary body. The vitreous humour forms

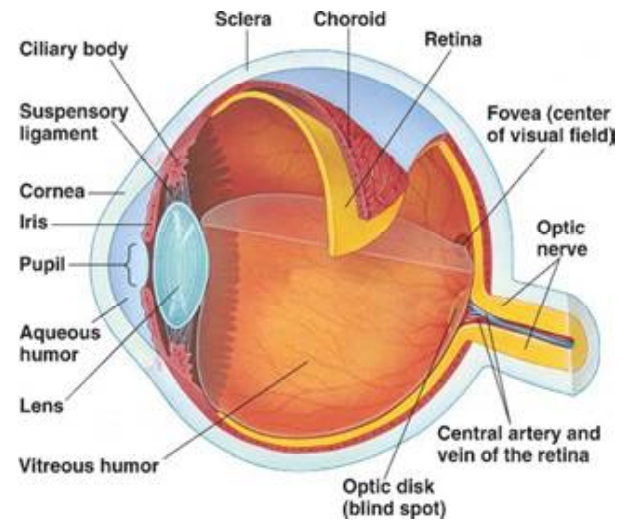


Fig. 1: The anatomy of the eye

Adapted from: Chader GJ, Taylor A. The Aging eye: Normal changes, Age-related diseases and Sight-saving Approaches. Investigative Ophthalmology and Visual Science 2013 Vol. 54:ORSF1-ORSF2

behind the lens. The inner lining of the sclera is made up of the retina and the choroid. The retina is a thin transparent membrane and extends from the optic disc to the ciliary body. The central part of the retina, the macula is the maximum point of visual acuity^{13,14}.

Physiology of the Ageing Eye

Normal changes that occur in the ageing eye may include a reduction in contrast sensitivity, presbyopia, colour vision, and visual field loss without loss of visual acuity. Many older adults will have a good visual acuity at least in one eye up to the seventh or eighth decade¹². With increasing age, the eye undergoes significant physiologic changes that predispose the elderly to various ocular pathologies.

Ageing results in the laxity of the eyelid due to changes in the skin, orbicularis and levator muscles and the tendons. This may eventually cause lower eyelid eversion (ectropion) or inversion (entropion) and aponeurotic ptosis of the upper eyelid. The cornea gradually becomes thicker as a result of increased collagen deposition and light scatters more easily. It subsequently becomes more vulnerable to hypoxic stress due to loss of endothelial cells. A whitish ring known as arcus senilis is also formed due to the cholesterol deposits and ageing of the peripheral cornea¹⁵.

There may be Meibomian gland dysfunction which may result in increased tear evaporation, tear film instability and inflammation of the ocular surface; major features of dry eye disease. Tear production from the lacrimal glands is decreased in advanced age. This may eventually lead to corneal ulceration due to dryness of

the eyes. The pupils are smaller in older adults and this causes a reduction in the amount of light entering the posterior segment of the eye. The lens grows thicker from deposition of cortical lens fibres and may also become yellowish or discoloured. It may also lose its elasticity resulting in loss of accommodation which is termed presbyopia. Also, there may be a gradual opacification of the lens with ageing known as cataracts. The vitreous gel may also condense and liquefy with ageing, manifesting as floaters. Separation of the vitreous gel and the retina can occur and may be complicated by retina tears and detachment¹³⁻¹⁶.

There is reduced blood circulation to the eye due to atherosclerosis and narrowing of the retinal vessels which is commonly associated with increasing age. The intraocular pressure in the eye may increase in advanced age and can lead to progressive loss of optic nerve fibres as seen in glaucoma. There is gradual loss of cells in the ganglion layer, loss of retinal pigment epithelial cells and photoreceptors¹³. Also, the nerve fibres of the optic nerve and retina decrease with advanced age^{12,16,17}. On an average, the retina of a 95 year-old individual contains about half as many ganglion cells as that of a 25 year-old¹⁸. The thickness of the retina nerve fibre layer decreases by about 3mm per decade which corresponds to loss of 60,000 ganglion cells¹⁸. The number of retinal pigment epithelial cells is reduced resulting in an accumulation of phototoxic waste products and debris known as lipofuscin which may destroy the cell membrane and induce chronic inflammation seen in age related macular degeneration^{12,16,17}.

Common Age Related Eye Diseases

Presbyopia

Presbyopia is not an ocular pathology but a common clinical condition that occurs due to the normal ageing process in the eye. However, it is worth attention because it contributes to the increasing prevalence of visual impairment in the elderly. The term, 'Presbyopia' is derived from the Greek word *presbus* (old man) and *opia* (eye) meaning ageing eye. In presbyopia, the elasticity of the lens and ciliary body tone is reduced due to ageing. This results in the loss of accommodation for near and distant vision and ability to focus images on the retina¹⁵.

Presbyopia usually occurs around 40-45 years of age. Patients may complain of blurring of vision while reading or doing tasks that require near vision especially at nights or in poor lighting conditions and may need to hold small objects further away from the eye to see clearly. The condition may occur earlier in persons with

hypermetropia than in myopic patients and individuals without any refractive error. Other risk factors include: drugs such as anti-depressants, geographic location (the tropics and equator areas), near vision jobs, diabetes mellitus and trauma to the eye^{6,14,15}.

Treatment options for presbyopia include reading glasses, bifocal or multifocal glasses and contact lenses. However, as ageing progresses, the human's lens will continue to change and new and stronger corrections will be needed. Surgical options to treat presbyopia such as conductive keratoplasty are readily available in some countries^{6,14,15}.

Cataract

Cataracts are simply defined as the opacification of the normal crystalline lens of the eye. It is the most common AREDs and the leading cause of blindness worldwide^{6,19}. It was found to account for approximately two-thirds of cases of visual impairment in individuals above 50 years of age in rural areas in a South-Eastern state in Nigeria²⁰. Similarly, a study conducted in rural dwellers in South-Western Nigeria reported that over 44% of cases of ocular diseases were cataracts⁴. A community-based study in Singapore also recorded that about 80% of the elderly population in Singapore had cataracts¹⁹. It is estimated that about 50% of older adults between the ages of 65-75 years will develop cataracts and this may rise further by 20% after the age of 75 years²¹.

Therefore, it is not far-fetched to state that advanced age is a major risk factor for the development of cataracts. Other important risk factors that may increase its incidence include trauma, smoking, alcohol, oxidative stress and prolonged exposure to ultraviolet B radiation (UVB) as highlighted in table 1.

Table 1: Risk factors for cataracts

Antecedent history of trauma to the eye
Smoking
Diabetes Mellitus
Ultraviolet B radiation/ Exposure to sunlight
Family history
Uveitis
Steroid therapy e.g glucocorticoids

Adapted from: Loh KY Ogle J. Age Related Visual Impairment in the Elderly. Med J Malaysia 2004;59(4):562-569.

There are three types of cataracts depending on the anatomical location of the lens opacity. They include: nuclear sclerotic cataracts located in the centre of the lens, cortical cataracts with radial spokes that start from

the periphery and posterior subcapsular cataracts found in the posterior cortical layer and across the central visual axis⁶.

Elderly individuals with unilateral or bilateral cataracts may present with reduced visual acuity by assessing visual acuity using the Snellen's chart and gradual painless central vision loss. Vision is blurry as shown in figure 2, comparing normal vision with vision in a person with cataract, halos are seen around light and there



Fig. 2.1: Normal eye vision

Adapted from: [Lodwick OD. Richard K. The Aging Eye. The Williamsburg Eye care ppt]

may be double vision. Night vision is grossly impaired and light from car lamps may appear extremely bright causing a "glare". This makes driving at night or in the dark difficult for patients with cataracts. Reading and near vision are equally impaired.

Cataracts are treatable but easily go unrecognised. A proper evaluation of patients with impaired vision must be made to diagnose cataracts. Surgery is the mainstay of treatment for cataracts. Surgical options may include extracapsular cataract extraction with intraocular lens insertion or phacoemulsification. Visual outcome after cataract surgery is reported to be significant with success rates over 98%²².

Age Related Macular Degeneration

The Macular Disease Society defined Age related macular degeneration as a "primary disease of the retinal pigment epithelium with secondary effect upon the overlying retina and underlying choroidal vessel"²³.

Age related macular degeneration (ARMD) is a leading cause of bilateral central vision loss or low vision amongst elderly population in industrialised countries and third commonest cause of blindness globally. There is a high incidence of the disease amongst Caucasians than other racial groups^{23,24}. A clinical based survey conducted in Owerri, Nigeria reported that 1 in 200 persons aged 50 and above had a form of ARMD in one or both eyes²⁵. This was also similar to a retrospective study done in Onitsha where the incidence

of ARMD in the elderly was reported to be 3.2% from 1997-2004²⁶. A slight female predilection was also reported in both studies.

The clinical hallmark of ARMD is the presence of "drusen" on fundoscopic examination²⁷. Drusens are white to yellowish pigments that may be found within and below the retinal pigmented epithelium and are associated with the pathogenesis of ARMD. It may be



Fig.2.2: Vision in a person with cataracts

characterised as either soft or hard. Soft drusen is often due to large accumulation of cholesterol deposits^{23,27}.

There are two types of ARMD; Dry and Wet ARMD. Dry ARMD, also known as non-exudative or non-neovascular ARMD is the commonest type and accounts for over 85-90% of ARMD²³. It is less severe and progresses more slowly than the wet type. In dry ARMD, the retinal pigmented epithelial cells are destroyed and gradually undergo both atrophy and hypertrophy. The end-stage of the disease is termed "geographical atrophy"²². Wet ARMD known as the exudative or neovascular type accounts for about 85-90% ARMD-related visual impairment⁶. It is characterised by neovascularisation of choroidal vessels. These new vessels are weak and eventually leak blood and fluid into the macula. A fibrovascular membrane is formed at the affected area of the macula and results in severe irreversible vision loss. Its end-stage disease is described as the contraction of the fibrovascular membrane into a disciform scar. Conversion rates from dry to wet type of ARMD are about 2% per year^{6,19,22,28}.

Genetic and environmental factors play a major role in the development of ARMD. The ABCR gene has been linked to the formation of the disease. Study has shown that first degree relatives of patients with the wet type are three times at risk of developing the disease. Cigarette smoking has been linked with both dry and wet ARMD and may worsen the features of a pre-

existing ARMD⁶. Other contributory factors are highlighted in Table 2.

Table 2: Risk factors for age related macular degeneration

Advanced age
Genetic factors
Complement factor H, Try402His variant
LOC387715/ARMS2, Ala69Ser variant
History of smoking in the past 20 years
White race
Gender: Women are at a greater risk than men
Obesity
Prolonged exposure to sunlight
High dietary intake of vegetable fat and Low dietary intake of antioxidants and zinc

Adapted from: Jager RD, Mieler WF, Miller JW. Age-Related Macular Degeneration. *N Engl J Med* 2008;358:2606-17

Clinical features may include: painless central vision loss that may be gradual or sudden, straight lines may appear curved and blurred vision. With progressive central vision loss, as shown in Figure 3. Patients begin



Fig. 3: Vision in a person with ARMD

Adapted from: [Lodwick OD, Richard K. *The Aging Eye. The Williamsburg Eye care ppt*]

to lose their ability to perform simple and complex tasks of daily living. This reduces their quality of life and makes them more dependent on their loved ones for survival. Sudden vision loss may have psychosocial implications on the elderly and their family members. The Amsler grid in Figure 4 is clinically used for the evaluation and screening of patients with symptoms suggestive of Age related macular degeneration. It consists of straight black lines that form boxes measuring 0.5mm. Waviness of the grid lines, metamorphopsia and central scotomas strongly suggests wet ARMD¹¹.

There are limitations to the management of ARMD and most patients usually require low vision rehabilitation

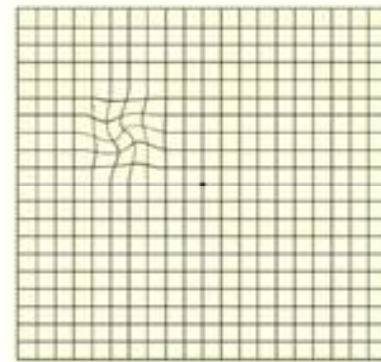


Fig. 4: Amsler grid

Adapted from: Jager RD, Mieler WF, Miller JW. Age-Related Macular Degeneration. *N Engl J Med* 2008;358:2606-17

devices. Low vision rehabilitation therapy is a subspecialty that cuts across ophthalmology, optometry, occupational therapy and sociology. Rehabilitation involves using magnifying lenses and other common visual aids such as low vision filters to promote the improved function of retinal preferred loci²⁴. There is no curative treatment for dry ARMD. Cessation of smoking and proper dietary choices such as foods rich in antioxidants and omega-3 fatty acids is usually recommended^{19,23,28}. Laser photocoagulation and photodynamic therapy were the first treatment options for wet ARMD. They have been proven to reduce the risk of the damage caused by choroidal neovascularisation and prevent sudden vision loss in patients with the disease. Recent advancement in treatment involves the production of anti-Vascular Endothelial Growth Factor (anti-VEGF) drugs such as ranibizumab (lucentis), bevacizumab (avastin), or aflibercept (Eylea). These have replaced the previous therapies and have become the “gold standard” for the management of ARMD^{6, 19,28,29}.

Glaucoma

Glaucoma is described as a chronic progressive form of optic neuropathy that eventually leads to the damage of the optic nerve fibres and peripheral vision loss known as “tunnel vision” as illustrated in Figure 5. It is frequently associated with raised intraocular pressure however, not all patients with glaucoma experience raised intraocular pressure. The prevalence of glaucoma is approximately 2-3% of the global population and it is a common cause of irreversible blindness worldwide. The incidence of glaucoma tends to increase with advancing age after 40 years^{6,17,22}. In Nigeria, a community-based study also reported glaucoma as an important cause of blindness amongst the elderly³⁰.



Fig. 5: Vision in a patient with glaucoma

Adapted from: [Lodwick OD, Richard K. *The Aging Eye. The Williamsburg Eye care ppt*]

According to the Nigerian National Blindness Survey in 2007, glaucoma was the second most prevalent cause of blindness in the elderly³.

Glaucoma popularly known as the “silent thief of sight” is a spectrum of optic nerve diseases and is grouped into the following types: primary open angle glaucoma, narrow angle glaucoma, acute angle closure glaucoma and secondary glaucoma. Primary open angle glaucoma is the commonest type accounting for over 80% of cases of glaucoma in the elderly population³¹. It is a chronic progressive disorder, frequently bilateral but may be asymmetric. Primary open angle glaucoma occurs when the outflow of aqueous humour through the trabecular meshwork at the angle between the iris and the cornea is slow. This results in the build-up of fluid in the anterior chamber thereby increasing the intraocular pressure. The elevated intraocular pressure damages the optic nerve fibres and retinal cells causing a gradual painless visual field loss. However, glaucoma may still occur in certain elderly persons despite normal intraocular pressure, this is called normal tension glaucoma. Therefore, increased intraocular pressure is regarded as a risk factor and diagnosis is primarily based on the presence of a functional damage to the eye and optic nerve atrophy. Primary open angle glaucoma is frequently associated with increasing age, a family history of glaucoma, high myopia, hypertension, and diabetes^{6,17,22,31} as highlighted in Table 3.

Primary open angle glaucoma may be asymptomatic during the early stages because it is a chronic lifelong disease that may progress for many years without any significant visual loss. Visual loss is usually gradual and painless except in the presence of an inflammatory process.

Funduscopy finding of optic disc cupping is usually suggestive of the disease. Tonometry can also be done to measure the intraocular pressure (IOP). Normal IOP ranges from 10-21 mmHg. Gonioscopy is done to assess the angle between the iris and the cornea while a perimetry test may be carried out to examine the patient’s visual field. The thickness of the cornea can also be assessed using a pachymetry³¹.

Table 3: Risk factors for open angle glaucoma

Advanced age
Race: Commoner in people of African, Asian, and Hispanic descent
Family history of glaucoma especially in first degree relative
High myopia
High hyperopia
History of ocular trauma; blunt or penetrating
History of uveitis
Diabetes mellitus
Prolonged steroid therapy

Adapted from: Loh KY, Ogle J. *Age-Related Visual Impairment in the Elderly. Med J Malaysia* 2004;59(4):562–569

The visual field loss in glaucoma is known to increase the risk of falls and disability in the elderly population¹⁹. There are no preventive measures for the development of glaucoma but early detection and appropriate treatment may improve the prognosis of the disease. Medical therapy is the first-line in the management of open angle glaucoma. Drugs include Beta blockers (timolol), prostaglandin F₂ analogues (latanoprost), alpha₂ adrenergic agonists (epinephrine or apraclonidine), carbonic anhydrase inhibitors (acetazolamide or dorzolamide), and parasympathomimetic (pilocarpine). Surgical options available include trabeculectomy and laser trabeculoplasty^{22,31}. Treatment is not curative but helps to slow down the progression of the disease thereby improving the quality of life of the patients. Therefore, screening should be accessible and readily available for individuals at risk for glaucoma¹⁹.

Diabetic Retinopathy

Diabetic retinopathy is a chronic complication of long-standing poorly controlled diabetes mellitus. It is also a common and an important cause of vision loss in the elderly population suffering from diabetes mellitus¹⁹. According to a research in Australia, it is the third commonest cause of vision loss in the elderly³². A study carried out by See, *et al* reported that diabetic retinopathy was the leading cause of preventable blindness in Singapore³³. Another study done in Onitsha,



Fig. 6.1: Normal eye vision

Adapted from: [Lodwick OD, Richard K. The Aging Eye. The Williamsburg Eye care ppt]



Fig. 6.2: Vision in a person with diabetes mellitus

Nigeria documented diabetic retinopathy as the second commonest retinal disease in the elderly after ARMD¹¹. More so, Nigerian National Blindness Survey also reported that diabetic retinopathy was one of the treatable principal causes of visual impairment and blindness in the elderly³. The incidence of diabetic retinopathy tends to increase with increasing age because its major risk factor is a chronic duration of diabetes mellitus¹⁹.

Diabetes retinopathy can be broadly classified into two groups – non-proliferative and proliferative retinopathy. Presence of retinal dot and blot haemorrhages, retinal exudates, and micro aneurysms are features of non-proliferative diabetic retinopathy. Diabetic maculopathy which includes macular oedema and macular ischemia may occur if these changes involve or extend to the macula. It is a common cause of moderate visual loss in non-proliferative diabetic retinopathy. Type I diabetes mellitus is associated with aggressive retinopathy than type II diabetes mellitus while both can cause maculopathy. In the proliferative type, neovascularisation occurs in the optic disc, retina and the iris (rubeosis iridis). These vessels are usually friable and may leak and bleed easily. Bleeding may extend into the vitreous and retinal detachment may occur^{6,17,19}.

Diabetic retinopathy may be symptomless in early stages hence the importance of screening patients with diabetic mellitus. A sudden onset of reduced vision and objects appearing black, grey or blurred occur in later stages due to the extensive retinal damage. This is illustrated in Figure 6.

Management of diabetic retinopathy involves adequate glycaemic control, strict dietary monitoring and proper health education of the patient and their family members. Pan retinal laser photocoagulation may reduce neovascularisation and prevent vision loss by 50%^{6,19}. Prevention strategies entail a comprehensive ocular examination for patients recently diagnosed with diabetes mellitus. Routine funduscopy should be done during every follow up visit in the diabetes clinic and an annual visit to

the eye clinic for other investigations and review by an ophthalmologist is highly recommended⁵.

CONCLUSION

The ability to see is a divine gift. Age related eye diseases pose a huge socioeconomic burden on the elderly, caregivers and the community they live in. These ocular conditions may exist with other comorbidities associated with ageing thereby significantly worsening the prognosis of the disease and reducing the quality of life of the aged. Annual eye examination is advocated and should become more frequent if systemic disease is present. Early detection and active management of AREDs are also very crucial in the prevention of blindness in the aged. The psychosocial implications of vision loss are daunting and overwhelming for the elderly. With the ever increasing population of the aged in the society, there is an urgent need to ensure that better health policies are put in place to prevent and manage these diseases. Furthermore, the government needs to remain committed to achieving the set goals in the “Right to Sight Initiative” and Global Action Plan created by the World Health Organisation in conjunction with the International Agency for the Prevention of Blindness (IAPB).

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ERECTILE DYSFUNCTION IN THE ELDERLY: A REVIEW

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ABSTRACT

Erectile dysfunction in the elderly increases with advanced age. It is of great concern to men and their partner and worsens in the presence of aging related medical conditions. Thorough evaluation of these men and emerging sound treatment options with acceptable satisfactory outcome has improved the burden of this problem on the elderly.

INTRODUCTION

Erectile dysfunction (ED) is the persistent inability to obtain and maintain an erection sufficient for satisfactory sexual intercourse. It is a common disease that affects elderly men and its prevalence increases with advanced age¹. It is a source of concern in elderly men as it may cause marital disharmony at the time couples ought to enjoy their retirement and aging period. It could be so disturbing that it leads to loss of self-esteem. This may result in depression and withdrawal from routine activity as well as social inactivity². In sub-Saharan Africa, men with erectile dysfunction are so withdrawn that they are often too shy to discuss their problems openly or with the medical practitioner because of the fear of being labeled as impotent³.

Historically, erectile dysfunction was first recorded on the Egyptian papyrus in 2000 BC. ED is natural when the man is incapable of accomplishing the sex act and supernatural ED occurred when evil charms and spell is adjudged to be responsible for this condition. Hippocrates noted that Scythians who rode on horseback tend to have ED. He therefore concluded that the poor citizens were not affected because they travelled by foot. Aristotle described three nerves as being responsible for penile erection; two nerves carrying spirit and energy to the penis and the third nerve encouraged influx of air thus causing penile erection (Brenot, 1994). Leonardo da Vinci (1504) noted large amount of blood in erect penis of hanged men. Ambroise Pare (1504) described the penile anatomy

and the concept of erection; that the penis is composed of concentric coats of veins, arteries and nerves, two ligaments which are the corpora cavernosa, a urinary tract and four muscles. This description by Ambroise Pare is similar to the current anatomy of the penis. Currently, nitric oxide (NO) is the major neurotransmitter in the penis and phosphodiesterases (PDEs) are responsible for detumescence⁴.

Erectile dysfunction is classified based on the onset as primary or secondary when there is an identifiable cause. It may also be classified based on the aetiology as vasculogenic, neurogenic, endocrine, psychogenic or medication related⁵. Erectile dysfunction in the elderly is often secondary to an underlying disease or related to the use of medications prescribed for treating age related medical conditions such as diabetes mellitus and hypertension^{2,6,7}.

This review aims at describing the relevant anatomy and physiology of erection, epidemiology, and the risk factors associated with ED. The available treatment options and the outcome of such treatment will also be discussed.

Epidemiology

The Massachusetts Male Aging Study (MMAS) in a random sample of men 40–70 years interviewed at home since 1987 reported that the probability of complete ED triples from 5% in 40 year old men to 15% in 70 years old men. In men between 20 and 80

years, using International Index of Erectile Function (IIEF-5) Questionnaire, ED was present in 26% (20–30 years) and increased to 71.2% in those between 71 and 80 years⁸.

In the Cologne male survey of 8000 men with a response rate of 56.1%, the prevalence of ED was 19.2% and 53.4% in the elderly. 71.3% of the elderly enjoyed regular sexual activity compared to 96.0% in the younger age group⁹.

In the European Male Aging Study (EMAS), that investigated ED in men aged 40-79 years in eight European centers, the prevalence of ED was higher in the elderly particularly 70 years and above¹⁰. The incidence of erectile dysfunction in community based studies increases with advanced age but in a recent hospital based review in Ibadan, ED in elderly men accounted for only 4.5% and 65.2% in men less than 44 years. This is possibly because the younger age groups were more concerned and active while the elderly may not have relatives around to convey them to the hospital for treatment in the sub-Saharan African region¹¹.

Relevant Anatomy of Erection

The cross section of the penis from without to within reveals three layers; the skin, the superficial (Dartos) fascia and the deep (Buck's) fascia which completely encircle the three cavernous tissues. On the dorsal aspects are the two corpus cavernosum (corpora

cavernosa) surrounded by the firm tunica albuginea. The corporal cavernosa are filled with spaces called the sinusoidal spaces that are surrounded by smooth muscle innervated by sympathetic nerves¹². The tunica albuginea is made up of two layers of fibrous tissues; the inner circular and outer longitudinal layers that extend into the corporal cavernosa (Figure 1). Repeated micro-trauma to the tunica weakens the integrity of the tunica and may result in ED in the elderly.

The arterial supply to the penis is from the internal pudendal artery which divides into three; the cavernous artery (right and left), the bulbar artery and the dorsal artery. Diseases such as diabetes mellitus and arteriosclerosis may constrict arterial lumen and thus contribute to erectile dysfunction¹³. The venous drainage follows the arterial distribution. However, the subtunical veins, emissary veins, circumflex veins drain into the deep dorsal vein that eventually drain into the internal pudendal veins (Figure 1). It is the compression of these veins draining the cavernous tissue that contributes to one of the phases in penile erection. Abnormality of these venous systems may result in vasculogenic erectile dysfunction.

The innervation to the penis is derived from the autonomic (sympathetic and parasympathetic) and somatic (sensory and motor) nerves (Figure 2). In man, the sympathetic nerves originate from the tenth thoracic to twelfth lumbar spinal segment and travel through the lumbar sympathetic ganglia to the sacral and caudal

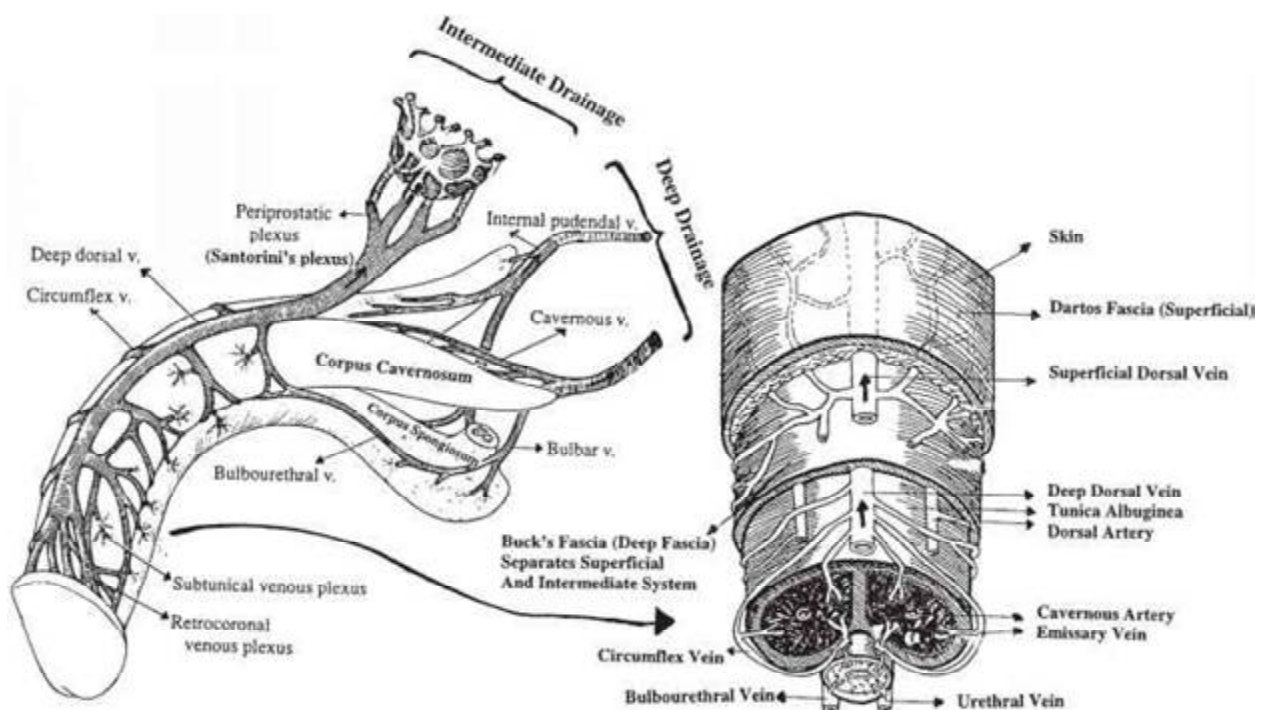


Fig. 1: Artist's cross-sectional drawing of the penis, depicting the tunica albuginea, the arterial supply and venous drainage of the penis. (Adapted from: Google image)

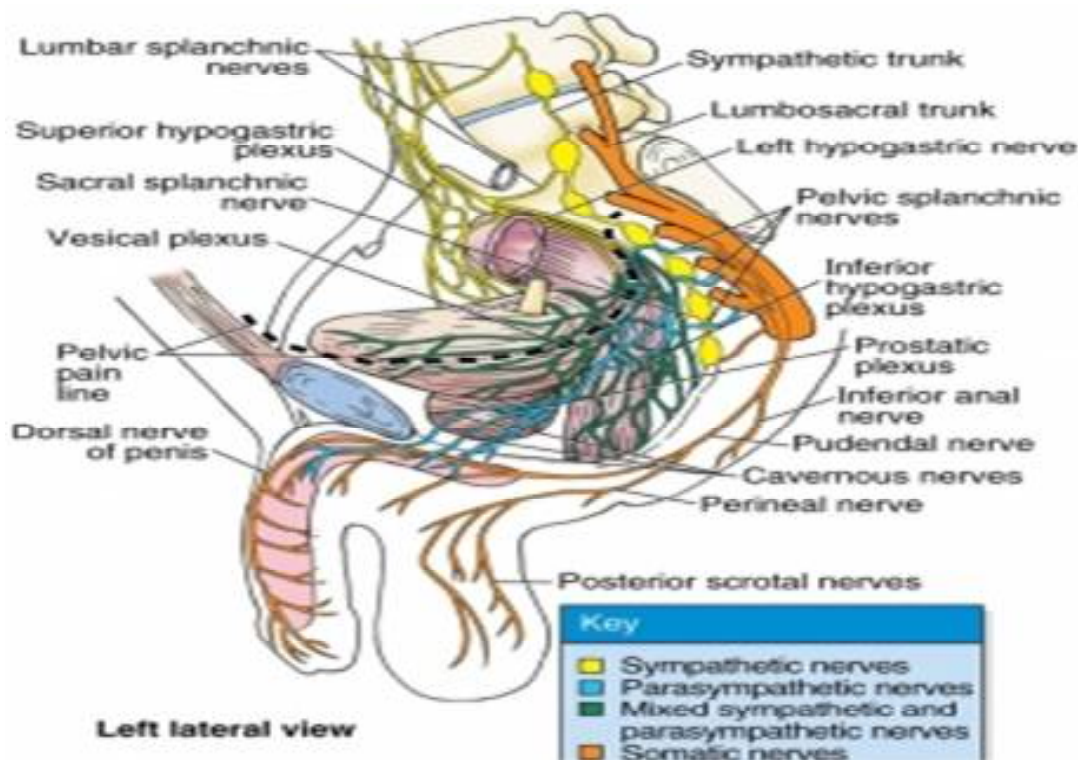


Fig. 2: The sympathetic and parasympathetic innervations of the penis. (Adapted from Google image).

segment eventually joining the parasympathetic fibres in the pelvic nerves. The parasympathetic pathway, originates from the neurons in the intermediolateral cell columns of second to fourth sacral spinal cord segment. They then travel in the pelvic nerves to the pelvic plexus. The pelvic nerves also innervate the rectum, urinary bladder and prostate. Thus, any surgery around these organs will result in iatrogenic erectile dysfunction. The cavernous nerve is a merger of the parasympathetic and sympathetic nerves that innervate the penis to initiate the neurovascular processes that leads to erection and detumescence¹⁴.

The stimulation of the sympathetic nerves results in detumescence and stimulation of the parasympathetic nerves leads to erection (Figure 3).

The nucleus onuf, located in the second to fourth sacral segment is the center for somato-motor innervation to the penis. These nerves innervate the ischiocavernosus and bulbo-spongiosum muscles whose rhythmic contraction results in rigid erection and ejaculation¹⁴.

Relevant Physiology and Mechanism of Erection

Penile erection in the elderly is a neurovascular process that causes vasodilatation of the cavernosal smooth muscle and increased blood flow into these tissues and venous compression¹². The thought of sex, the sight of a sexual stimulus and the touching of the penis are coordinated toward the stimulation of the parasympathetic nerve, and non-adrenergic non-cholinergic nerves (NANC) resulting in release of acetylcholine (ACH). The ACH binds to muscarinic receptors in endothelial cells promoting activation of

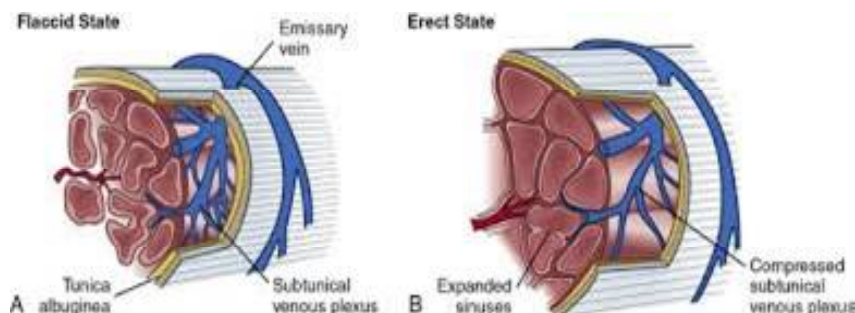


Fig. 3: The flaccid and erect phases of penis. (Adapted from: Google image)

three isoforms of nitric oxide synthases (namely neuronal NOS, inducible NOS and endothelial NOS) that eventually lead to the production of nitric oxide (NO) which is the main neurotransmitter^{15,16}.

The stimulation of the penile nerves also causes calcium influx which promotes eNOS and nNOS activation thus increasing NO production. The NO binds to soluble guanylatecyclase inside cavernous smooth muscle catalyzing conversion of guanosine triphosphate (GTP) to cyclic guanosine monophosphate (cGMP). The high levels of cGMP and cAMP both result in vasodilatation of cavernosal arteries with distension of the sinusoidal spaces of the corpus cavernosum in addition to decreasing intracellular calcium concentration thus leading to penile erection. Figure 4 shows the sequence of events that results in penile erection. Phosphodiesterase type 5 (PDE-5) causes the rapid depletion of cGMP thus causing detumescence. Any abnormality in the central nervous system, or the sacral

elderly¹⁴. There is a 2-fold increase of ED in hypertensive men. This is related to hypertension as it affects the endothelium as well as the effects of antihypertensive medications such as propranolol and thiazide diuretics^{17,18}.

In a population based study in a cohort of 2,115 Caucasian men, aged 40-79 years, randomly selected from Olmsted County, Minnesota, the association of smoking and ED was assessed with the Brief Male Sexual Function Inventory questionnaire. The incidence of ED associated with smoking was higher in the sixties (relative odds 1.70, 95% CI: 0.82, 3.51) and declined in the seventies (relative odds, 0.77, 95% CI: 0.27, 2.21)¹⁹. There is a high incidence of ED in men with obesity and overweight. This is directly related to the effect of these factors on blood vessels and testosterone. There is also elevation of the pro-inflammatory cytokines and C-reactive proteins that further destroy the endothelium^{20,21}.

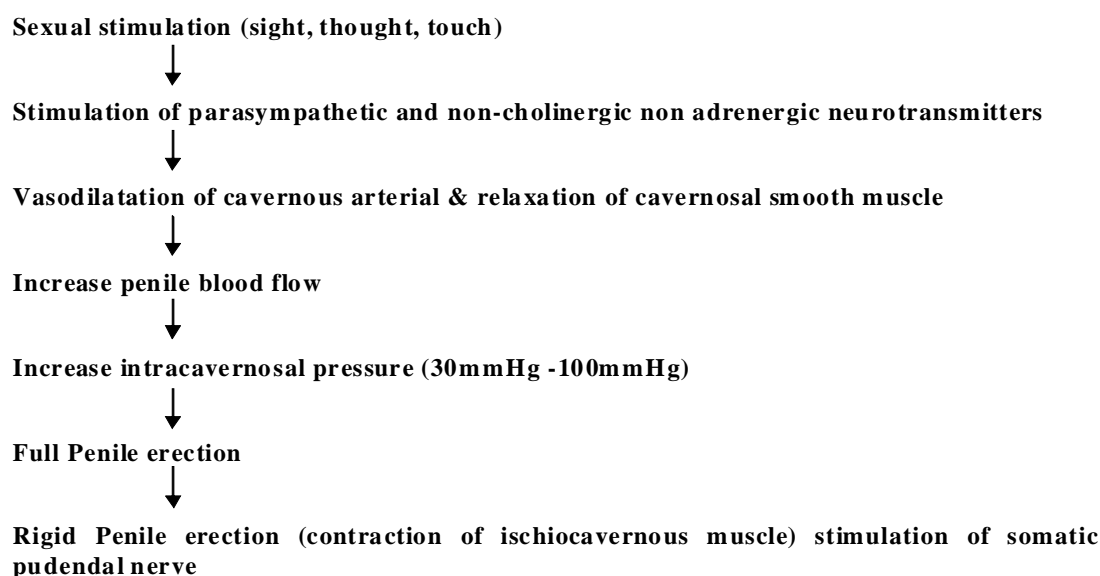


Fig. 4: Sequence of events for penile erection

segment that may affect the penile nerve stimulation, and the presence of arteriosclerosis are all contributory factors to ED in the elderly men. The inhibition of PDE-5 is utilized in the treatment of ED in elderly men¹⁶.

Risk Factors

The risk factors for ED in the elderly are related to any abnormality of the anatomy and physiology of micturition. Any condition that disrupt the central nervous system's function such as head injury, Alzheimer disease, Parkinson's disease, and spinal cord injury may cause ED.

Diabetes mellitus and cardiovascular diseases that affect the vascular integrity contribute to ED in the

The incidence of ED in elderly men with depression is two-fold. The presence of hypogonadism and depression further worsen ED in the elderly due to the decline in circulating androgens that have a permissive effect on erectile function^{22,23,24}.

Evaluation of ED

The aims of the evaluation are to determine the cause of the ED in the elderly and to assess the degree of severity by using various scales. The anthropometric statistics is assessed, general physical appearance, the external genitalia and rectal examination is performed. Is it organic or psychogenic ED? The presence of nocturnal tumescence that occurs during deep sleep

three to four times at night, imply that the elderly has no organic disease. Evaluate the man for history suggestive of diabetes mellitus, hypertension and cardiovascular diseases as well as psychiatric illness and medications administered.

The body mass index is calculated from the height (m) and weight (kg). Tallness, abdominal obesity, gynecoid pelvis and small testes suggest hypogonadism. Confused elderly man with loss of memory and abnormal gait may suggest Alzheimer's and Parkinson's disease. Facial palsy, hemiparesis, hypertension, and urinary incontinence may suggest cardiovascular disease.

The penile abnormality that may contribute to erectile dysfunction in the elderly include abnormal penile curvature with palpable plaques (Peyronies disease). Penile length should be measured, normal average resting penile length is 8.4cm and the stretched length is 12.4cm.

Investigations will include full blood count. A derangement in the serum electrolytes and creatinine are evidences of renal impairment. The abnormal serum levels of cholesterol, triglyceride, high density lipoprotein (HDL) and low density lipoprotein (LDL) are suggestive of hyperlipidaemia. Hormonal levels of prolactin, testosterone, luteinizing hormone (LH) and follicle stimulating hormone (FSH) should also be measured. Penile ultrasound for presence of plaques which would suggest Peyronies disease and scrotal ultrasound for testicular atrophy will be suggestive of hypogonadism. Abnormal elevated fasting glucose and two- hour post prandial glucose are consistent with diabetes mellitus. The severity of ED is categorized into mild, moderate, or severe based on the use of various validated questionnaires. These include the International Index of Erectile Function (IIEF), the Male Sexual Health Questionnaire (MSHQ) and the International Prostate Symptom Score (IPSS). The IPSS is used in men with lower urinary tract symptoms (LUTS) and ED²⁵. The most commonly used questionnaire are the IIEF-15 and IIEF-5.

Others are the Brief Male Sexual Function Inventory (BMSFI), the Center for Manual and Sexual Health Functioning Questionnaire (CMSHFQ), the Changes in Sexual Functioning Questionnaire (CSFQ), and Erection Dysfunction Inventory of Treatment Satisfaction (EDITS)²⁶, Erection Hardness Grading Scale (EHGS)²⁷, Self Esteem and Relationship Questionnaire (SEAR)²⁸, Quality of Erection Questionnaire (QEQ)²⁹, and Sexual Experience Questionnaire (SEX-Q)³⁰.

Treatment

1. Life Style Modification

The men with ED who were encourage to reduce their weight, improve quality of diet, and increase physical activity had an improvement of 36% to 56% at the end of 2 years^{31,32, 33}

2. Medication Change

Elderly men with ED due to antihypertensives such as clonidine, alpha-methyl dopa, and propranolol may change their medications to angiotensin-converting enzyme inhibitors and calcium channel blockers that have a safer profile³⁴.

3. First Line Treatment

3.1. Oral agents

The introduction of phosphodiesterase 5 inhibitors (PDE5-I) in 1998 revolutionize the treatment of ED. These drugs evolved from sildenafil to vardenafil to tadalafil and recently avanafil. The success rate is 60% to 70%, although, there might be an initial slow response but with psychosexual advices men gradually become more responsive. They have a very safe profile and ease of use particularly with elderly men who often practice polypharmacy^{11,35-37}.

3.2. Vacuum Constriction Device (VCD)

VCD is effective in achieving satisfactory erection in 67%-90% of men. It is easy to use and achieve rapid safe satisfactory erection. The ring band must be removed immediately after intercourse to prevent ischemic injury to the root of the penis³⁸.

3.3. Hormone Therapy

Testosterone administration as injection in doses of 200mg every 2weeks or 300mg every 3 weeks is effective in improving erectile function in men with hypogonadism. However, regular digital rectal examination and serum prostate specific antigen (PSA) must be checked to exclude concomitant prostate cancer that is common in the elderly. Testosterone has an atherogenic effect on coagulation and fibrinolytic profile. Pre-treatment full blood count must be checked³⁹.

4. Second Line Therapy

4.1. Intracavernous Injection (ICI)

The use of intracavernous injection in triple combination of papaverine, phentolamine and prostaglandin E1 achieved a success rate of 94.6% in men who had post-radical prostatectomy ED⁴⁰. ICI has an acceptable patient satisfaction rate as well as high drop out rate due to complication with priapism, ecchymoses, hematoma formation, and penile fibrosis⁴¹.

4.2. Transurethral therapy

Medicated urethral system for erection (MUSE) using alprostadil was effective in achieving in-clinic erection for intercourse in 65.9% of 996 men and 64.9% men experienced erection with satisfactory intercourse at home. The initial trial dose should be given in the clinic because of the risk of hypotension in 3% of patients⁴².

5. Third Line Therapy

Penile Prosthesis (PP) is an effective device that is surgically implanted within the corpora cavernosa of the penis for the treatment of resistant ED. It provides the highest levels of patient and partner satisfaction of 97% compared to other options for treating ED⁴³⁻⁴⁵. There are two main types of PP: the semi-rigid (malleable and mechanical) devices and inflatable devices⁴⁵. The inflatable penile prostheses are of two types: the 2-piece-inflatable device and the 3-piece-inflatable device. Both work under the principle of hydraulic pressure-fluid transmission. The inflatable cylinders filled with saline are placed in corpora cavernosa, a pump is placed in the scrotum for patient-activated-inflation/deflation, and a reservoir placed in the retropubic space which stores the fluid. The device functions satisfactorily for 10 years before requiring revision⁴⁶.

CONCLUSION

The effective management of erectile dysfunction in the elderly is based on a sound understanding of the relevant anatomy, and physiology of erection. The comorbid diseases of aging and medications used by the elderly are contributing factors to developing ED. The treatment has evolved over the years with satisfactory outcome of treatment.

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HEART FAILURE IN THE ELDERLY

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ABSTRACT

The prevalence of heart failure (HF) generally increases with age. In high income countries of Europe and America, HF is generally a problem of the elderly. On the other hand, it is a disease of middle aged and young individuals in Africa. Recent advances in the management of HF were based on data gleaned from clinical trials that often excluded the elderly. Therefore, the impact of these therapies on outcome in the elderly is generally not clear. This is because the prescribing patterns and potential benefits of these agents are strongly affected by multiple prescriptions and co-morbidities which are common in this age group. The benefit of treatment option in the elderly who are often frail must be weighed against the quality of life of the patient. The goal remains on improving the well-being of the patients, maintenance of their independence and delay of institutionalization or movement to a hospice. In this review, we present the epidemiology of HF in the elderly and the pathophysiology of the ageing heart. We also explored the clinical characteristics, treatment and prognosis of HF in this age group. Finally, we highlighted the gaps in the management as well as possible future directions.

INTRODUCTION

Recent data from the Global Burden of Disease study shows that about 17.3 million people died from cardiovascular (CV) causes in 2013. This constitutes about 41% rise from the number of deaths attributable to CV diseases (CVD) 23 years ago¹. Non-communicable diseases (NCDs) such as HF now plays an important role in the pattern of diseases in low and middle income countries as a result of the emerging epidemiologic and demographic transition in the countries².

Heart failure (HF) is the final common pathway of various cardiac disorders. It is the most rapidly growing CV condition worldwide^{3,4}. HF is now regarded as a global public health problem⁵. The global prevalence is estimated at 37.7 million people with the condition^{5,6}. Data from the United States of America (USA) shows that hospitalizations due to HF tripled from 1.27 million in 1979 to 3.86 million in 2004⁷. In the year 2011, there were about 5.7 million people with the diagnosis of HF in USA and about 870,000 incidental cases¹.

EPIDEMIOLOGY

Our present understanding of the epidemiology of HF is based on information gleaned from data from high income countries of North America, Western Europe and Japan. The global incidence of HF ranges from 100-900 cases per 1000,000 person years depending on population and diagnostic tool used⁸. (Table 1)

The global prevalence is estimated at 37.7 million people⁶. In high income countries of Western Europe and North America, about 1-2% of the adult population have HF⁹. In these countries, the age adjusted incidence and prevalence of HF is reducing. However, the absolute number of people with the condition is on the rise due to increasing aging population, rising burden of CV risk factors such as diabetes mellitus and improvement in the case management of people with HF.

GLOBAL SOCIO-DEMOGRAPHY OF HEART FAILURE

More than half of patients hospitalized for HF in high income countries are older than 70 years¹⁰. The prevalence of HF has been shown to double with each decade of life. In these countries, the prevalence is less than 1% for those who are under 40-years of age and 10% for those aged 80 years and above. The lifetime risk of developing HF is about 20% for those aged 40-80 years¹¹.

Recent advances in the medical management of risk factors for HF have helped in delaying the onset of this condition in high income countries. This has also prolonged the lives of those who develop the condition. HF is more common in people of lower socio-economic class and three times higher in Africa Americans in the USA¹.

HF has been described as more "malignant" than cancer due to the comparatively low 5 years survival rates¹². In 1991, it was reported that HF mortality rates

Table 1: Incidence of heart failure in some landmark studies

Study	Year of publication	Country/countries	Incidence	Remarks
Atherosclerotic risk in Communities(42)	2008	USA	915,000	
Framingham study(14)	2002	USA	420/10 ⁵ person years in 1950 327/10 ⁵ person years in 1999	
Olmsted county cohort(13)	2010	USA	315.8/10 ⁵ person years in 2000 219.5/10 ⁵ person years in 2010	Data was sex adjusted. 37.5% decline over a 10year period observed (29% in men and 43% in women)
Multiethnic study of atherosclerosis(43)	2008	USA		Incidence highest in Blacks and lowest in Chinese Americans Differences due to difference in burden of risk factors such as hypertension and diabetes and socio-economic factors.
PREVENT cohort study(44)	2013	Netherlands	384.4/10 ⁵ person years	34% of HF due to HFPEF
Swedish Administration Register(45)	2013	Sweden	380/10 ⁵ in 2010	An absolute reduction of 90cases compared to their 2006 national health data
PURE study (46)	2014	Three high Income countries, 10 middle income countries and 4 low income countries	271/10 ⁵ person years	156,424 individuals recruited and followed up for 4years Among African patients hospitalized for CVD, acute decompensated HF is the most common diagnosis

was 11% higher than the corresponding rates for gastrointestinal malignancies¹². Recent data suggest that mortality associated with HF is falling in advanced countries due to improvement in care of HF patients as well as the risk factors¹³⁻¹⁵. There is limited understanding of HF in the elderly. This is because they are excluded or under-represented in most clinical trials¹⁶.

HEART FAILURE IN THE ELDERLY

There is no consensus definition of the elderly. In high income countries, traditionally 65years is considered the conventional cut-off for older age since this is taken as the age of retirement in many of these countries. In Nigeria, therefore, 60 years and above is considered as elderly since this is the retirement age from public service.

The definition of the elderly is largely affected by the population life expectancy. Thus, recent studies from high income countries defined the elderly as those aged 70-80 years and very elderly as those older than 80-years. (see Table 2)

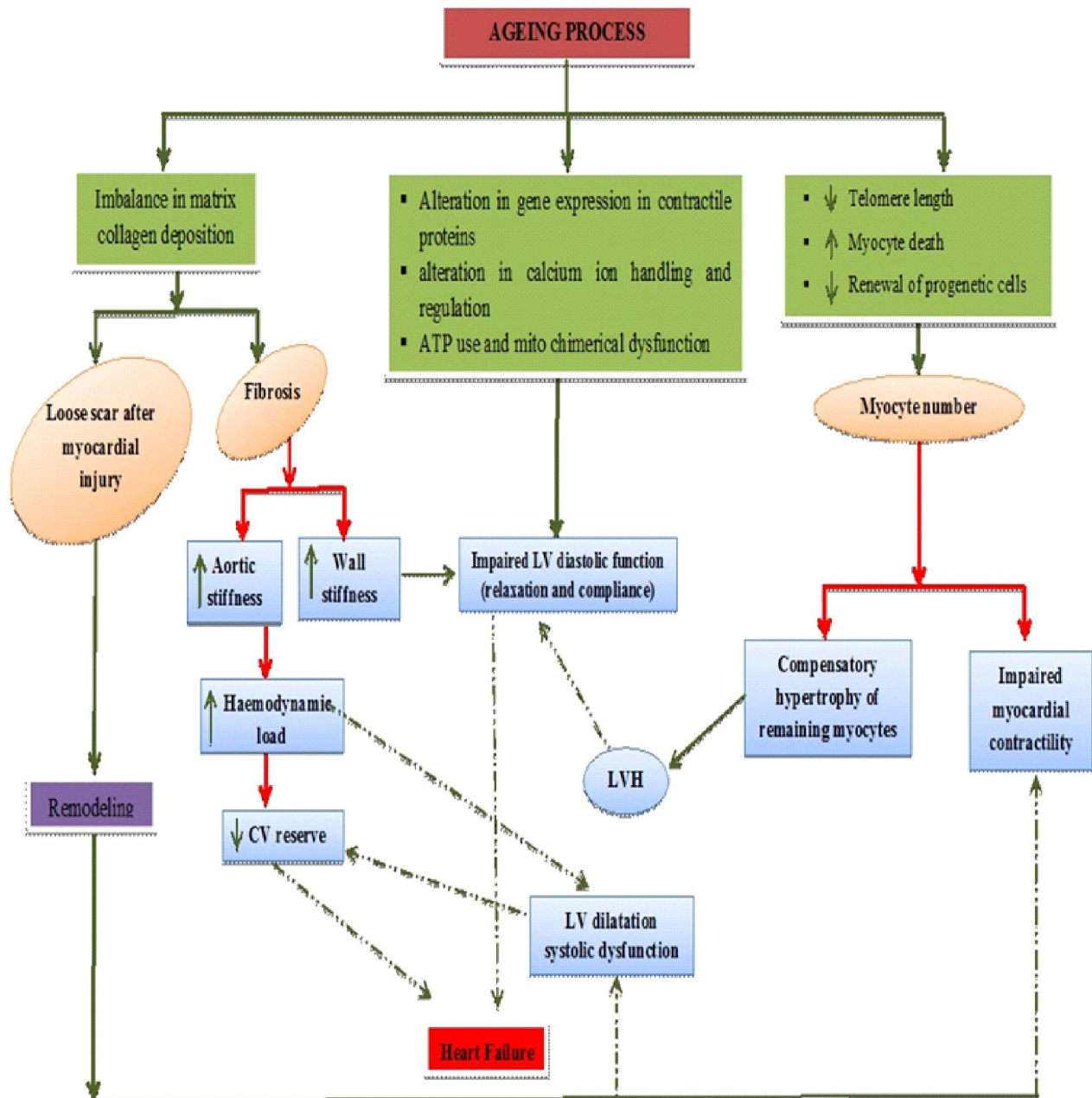
As stated earlier in this paper, HF is essentially a problem of elderly in high income countries. On the other hand, it is the disease of middle age in most low and middle income countries. HF in elderly patients is characterized by “distinctive pathophysiological features, complex comorbidity profile and unique issues of medication tolerance”. The reasons for the high prevalence of HF in this age group include the high life expectancy, longer exposure to CV risk factors as well as age related alteration in elderly. The improvement in the management of acute conditions and comorbidities are other reasons. On the other hand, the effects of disease modifying therapies are less evident in elderly leading to poor outcome in this age group^{5, 8, 14,17, 18}. The elderly therefore is a poor prognostic factor in several models for mortality in HF⁵.

CARDIAC STRUCTURAL AND FUNCTIONAL ALTERATION IN THE ELDERLY

Old age is associated with decrease in the number and function of myocytes¹⁹. This is due to enhanced necrosis and apoptosis²⁰. There is also reduction in the regenerative capacity of cardiac progenitor cells²⁰. Thus in setting of myocardial injury there is impaired

Table 2: Definitions of senility⁴⁷

Organization	Definition
World Health Organization	>60 years
Americans	>65 years
Gerontologists	i. Young old people- 60-74 years ii. Older-older people-60-74 years iii. Very old people- >80 years
Clinicians	Two groups: i. 60-80 years ii. >80 years Defined so because of the considerable decreases in physical and mental efficiency and multi-organ disorders that occur after 80 years.

**Figure 1:** Pathophysiological model for the development of HF in the elderly (Adapted from Lazzarini et al)

reparation for myocyte loss²⁰. This loss is compensated for by the hypertrophy of the remaining cardiac cells²⁰.

Several mechanisms which have been demonstrated to be unregulated in HF promote myocardial fibrosis. These include up regulation of the renin-angiotensin-

Table 3: Cardiovascular and some other changes associated with ageing^{21, 48, 49}

<ul style="list-style-type: none"> ▪ Increase in systolic blood pressure ▪ Increase in pulse pressure ▪ Increase in LV mass and higher risk of arrhythmias and ischaemic heart disease ▪ Decreased ability to increase cardiac out-put in response to stress (i.e. reduced ability to achieve; ✓ early diastolic filling pressure ✓ maximal heart rate ✓ maximal cardiac output ✓ maximal oxygen consumption ✓ exercise induced increase in ejection fraction ✓ beta-adrenergic stimulation or endothelium released vasodilators ▪ Loss of elastic fibre of the vessels ▪ Enhanced fibrosis and calcification ▪ Broader lumen and thicker intima of the blood vessels leading to increased rigidity ▪ Elevation of the pulse wave in the peripheral vessels ▪ Endothelial dysfunction resulting in decreased NO generation resulting in decrease vasodilation of the peripheral and coronary vessels. ▪ Reduced vascular response to beta-agonists and beta-adrenergic inhibitors 	<ul style="list-style-type: none"> ▪ Alteration in extracellular matrix of the myocardium resulting in: <ul style="list-style-type: none"> ▪ increase in collagen content ▪ greater diameter of the myofibrils ▪ decreased elastin content ▪ elevated fibronectin levels ▪ Increased myocyte apoptosis and reduced myocyte function ▪ Collagen deposition in the ventricles and altered extra-cellular matrix leading to LVH ▪ Decrease in the number of myocytes and disorders in the myosin structure ▪ Disorder of calcium uptake resulting in longer systole and diastole ▪ Loss of elasticity and compliance of the myocardium due to amyloid and lipofuscin deposits. (This is a characteristic feature of the senile heart) This is the mechanism of diastolic dysfunction in elderly. ▪ Decrease in the number of sinus node cells in the atrium (from fibrosis and collage deposition) This contributes to the development of sinus node dysfunction and atrial fibrillation. ▪ Increased amount of collagen, decrease in the amount of elastic tissues and calcification around the A-V node or bundle of His leading to conduction abnormalities. ▪ Decrease in the number of dopaminergic receptors leading to: <ul style="list-style-type: none"> ▪ Weaker baroreceptor reflexes 	<ul style="list-style-type: none"> ▪ Decreased response to physiological stressors ▪ Increased parasympathetic stimulation of the CNS ▪ Decrease in lean body mass ▪ Decrease in total body water ▪ Relative increase in body fat ▪ Decrease in volume of distribution ▪ Higher plasma concentration of hydrophilic drugs ▪ Reduction in plasma concentration of lipophilic drugs ▪ Decrease in metabolic capacity of the liver which impairs first pass mechanism. ▪ Decreased hepatic clearance of some medications ▪ Decrease in renal function leading to decrease in clearance of many drugs ▪ Decreased tolerance to physical exercise ▪ Increased catabolism ▪ Deficiency of anabolic hormones ▪ Insulin resistance ▪ Nutritional disorders (due to poor appetite) ▪ Change in body composition (due to decreased muscle mass)
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Some of the functional changes in myocytes associated with ageing include impaired cardiac metabolism and regulation leading to alteration in myocyte contraction and relaxation. There is also a change in the contractile protein²¹. Furthermore, ATP utilization has been shown to be inefficient in the ageing heart. Shortening of telomeres seen in ageing heart is also associated with the development of HF²⁰. With the development of compensatory myocyte hypertrophy there is subsequent imbalance in the extracellular matrix metabolism leading to increase in myocardial collagen content and development of fibrosis²².

aldosterone²², oxidative stress²² and increased inflammatory activity²³. Thus the ageing heart is prone to LV hypertrophy and diastolic dysfunction. The ageing process also affects the vascular system. There is “arterial wall fibrosis thickening and stiffness”²⁴. This further increase cardiac workload and worsen cardiac hypertrophy. All these would lead to the HF, development of typical HF with preserved ejection fraction (HFpEF); symptoms of which worsen during physical activity.

Elderly people also have reduced exercise capacity. This is due to the poor heart rate response to exercise,

impaired LV relaxation (leading to stroke volume that is preload dependent), as well as increased afterload and LV end-diastolic pressure due to vascular stiffness²¹. (Figure 1)

Co-morbid condition such as atrial fibrillation which is also very common in the elderly can easily precipitate HF in this age group.

PECULIARITIES OF HF IN THE ELDERLY

Elderly individuals admitted for acute HF are typically females, tend to have higher LV ejection fraction and higher prevalence of Heart Failure Preserved Ejection Fraction (HFPEF) compared to younger patients^{25, 26}. Co-morbidities such as hypertension, stroke anaemia, malignancies, atrial fibrillation, chronic obstructive pulmonary disease are common^{25, 26}.

On the other hand, data from high income countries indicate that coronary artery disease and diabetes mellitus are less common in the elderly. This may be due to shorter life expectancy in the people suffering from the diseases.

Hypertension and acute pulmonary oedema are a common finding with HF in emergency room probably due to the vascular abnormality common in the elderly. Symptoms and signs of HF in the elderly patients are often atypical and onset is gradual. Loss of appetite and decrease in body mass is common while classical symptoms of HF such as shortness of breath may be absent. Co-morbid conditions such as osteoarthritis and lung disease may confound the symptoms. These are less likely to be referred to specialists. Table 4 shows the differences between HF in middle aged and elderly patients.

PROGNOSIS OF HF IN THE ELDERLY

Due to lack of uniform definition for the elderly, it is difficult to draw inference from prognostic models as regards HF in the elderly. There are different prognostic values of several variables for different age groups, hence the need to have an elderly specific model. For instance, it is well known that lower ejection function has poorer prognostic value in the general HF population. This appears not to hold in the elderly HF group. Thus, HFPEF must be treated properly in the elderly patients, although there is presently no effective treatment modality for this HF phenotype.

Atrial fibrillation is associated with poorer prognosis in the elderly. It has also been proposed that better risk stratification of elderly HF patients will include the total

co-morbidity burden and other conditions such as cognitive impairment and disability.

THE ELDERLY AND HF CLINICAL TRIALS

Earlier landmark HF trials excluded elderly patients which makes it difficult to apply findings from these trials to this group of patients. The mean age of these trials ranges from 60-69 years¹⁶. However more recent studies²⁷⁻²⁹ have focused on the management of HF in the elderly. The reasons for the under-representation of the elderly in clinical trials will include; elderly are less likely to be referred to the specialists (cardiologists) for better management, the inclusion criteria for clinical trials have often excluded the elderly; trials often exclude individuals with co-morbidities such as renal dysfunction which is common in this age group; most trials focused on individuals with reduced EF (HFpEF is common in the elderly) and selection bias by the investigators.

HF trials in the elderly or sub-group analysis of some trials that specifically looked at the data on the elderly include;

- a. *SENIORS study*: This is a randomized trial to determine the effect of nebivolol on mortality and CV hospitalization in congestive HF patients aged 70 years and above²⁷.
- b. *PEP-CHF (Perindopril in elderly people with congestive HF)*: The study compared the effect of perindopril versus placebo in patients aged 70 years and above with the diagnosis of HF and preserved ejection fraction (HFpEF) on composite of all-cause mortality and unplanned HF related hospitalization²⁹.
- c. *Sub-group analysis of the CHARM study*: About 22.8% of participants in the CHARM study were aged 75 years and above. Similar benefits were reported about Candesartan on primary endpoint of CV death and HF hospitalization in the elderly sub-population compared to the general cohort³⁰.
- d. *Sub-group analysis of CARE HF (cardiac resynchronization -HF study)*: CRT reduced the risk of primary endpoint of all-cause mortality or CV hospitalization in both younger (<66 years) patients. However, only 40 patients were 80-90 years and none were aged 90 years and above³¹.
- e. *Sub-group analysis of the SHIFT study*: The study evaluated the effects of ivabradine on heart rate, CV outcomes as well as adverse events (especially bradycardia). In the age specific analysis, it was found that Ivabradine (2.5-7.5mg twice daily) reduced heart rate in all the age groups. Combined end-point of death and HF hospitalization were significantly reduced in all the age groups³².

Table 4: Differences between HF in the middle aged and the elderly

Clinical feature	HF in middle aged	HF in the elderly
Prevalence of HFpEF	6%	40-80% . Twice more common in women
Typical symptoms of HF	Common	Less common or usually masked. Rather depression, insomnia and palpitation are common
NYHA classification	Useful	Less useful
Usefulness of BNP/NT-ProBNP	Useful	Less useful. BNP generally higher in elderly patients who are not even in HF.
Treatment	ACEI, beta-blockers, spironolactone, vasodilators	ACEI, ARBs. Diuretics, beta-blockers and vasodilators must be used with caution
PTCA/CABG	Complications less common	Complications common

ACEI= Angiotensin converting enzyme inhibitor, BNP= Brain natriuretic peptide, CABG= Coronary artery bypass graft, NT-ProBNP=N-terminal pro-brain natriuretic peptide, PTCA= percutaneous

ISSUES IN THE MANAGEMENT OF HF IN THE ELDERLY

Clinical evaluation of elderly patients is same for standard evaluation of a HF patient. However, there must be a high sense of suspicion as symptoms and signs are often atypical. The physician must also bear in mind that metabolic problems in this population e.g. thyrotoxicosis may present in atypical way.

Current and guideline directed treatment of HF is largely based on studies in a relatively younger population (based in high income countries demography). Although neuro-hormonal modulation is both beneficial to all classes of HF patients, there is insufficient information as to the management of co-morbidities common in the elderly. **Table 5** shows the performance of different medications for HF in the elderly.

Physiologic changes in the elderly suggest modification of therapy in this age group. Elderly patients have reduction in their lean body mass and total body water as well as a relative increase in their body fat. The consequence of this is lower volume of distribution and higher plasma concentrations of hydrophilic drugs and reduction in the plasma concentration of lipophilic drugs. The metabolic capacity of the liver is reduced resulting in impairment of first pass metabolism. This leads to either increased or reduced activation of drugs. Renal dysfunction is also reduced in the elderly. This coupled with the liver dysfunction affects the clearance of many medications.

In view of the huge burden of co-morbidities in the elderly, they are prone to conflicting treatment recommendations and guidelines³³, polypharmacy including those that may precipitate or worsen HF e.g. NSAIDs or increase the risk of drug-drug interactions

such as antidepressants and anti-arrhythmics, antibiotics and anti-coagulants³⁴.

Elderly HF patients are also prone to adherence problems. This may result from cognitive impairment, financial problem and social issues such as lack of care givers or limited access to health care³⁵.

Furthermore, the burden of disease, life expectancy and limited data has compounded the use of invasive procedures such as coronary angioplasty (PTCA), coronary bypass graft (CABG), intracardiac defibrillator (ICD) and cardiac resynchronization therapy (CRT) in this population³⁶⁻³⁸. The elderly with end-stage HF are also less likely to benefit from heart transplantation due to age and co-morbidities; even though “extended listing criteria” may be applied to them³⁹. This has made left ventricular assist devices (LVADs) a potential alternative. However, old age has been identified as a risk factor for mortality in patients with this device⁴⁰.

Disease management programme targeted at the elderly, palliative care and end-of-life care has been documented to be beneficial in the management of HF in elderly patients. Data supporting such programmes such as structured telephone support or non-invasive monitoring of chronic HF in the elderly exist⁴¹. Sufficient data is required to support a guideline recommendation. Although elderly patients were under-represented in HF clinical trials, available evidence suggests that neurohumoral modulation may have similar effect in young and elderly HF patients. There is still a gap in this area as studies in elderly subjects have not been well powered to suggest effectiveness of standard HF medications, worse still when they have huge burden of co-morbidities. Unresolved issues in the management of HF in this population are itemized in Table 6a. Table 6b summarizes possible future directions.

Table 5: Performance of different HF drug treatments in the elderly

Drug	Remarks
ACEI/ARB	Effective and well tolerated by the elderly. Initiation with small doses because of risk of hypotension and renal dysfunction
Diuretics	Over 90% of elderly HF patients are on diuretics. Thiazides often ineffective in the elderly due to decreased GFR. Lower absorption and bioavailability and increased renal excretion may be associated with delayed effects. Orthostatic hypotension and deterioration in renal function common. Hypokalaemia common with combined use of ACEI and aldosterone antagonists or NSAIDs or coxibes.
Beta blockers	Well tolerated in the elderly. Contraindications include bradyarrhythmias, conduction abnormalities and pulmonary diseases. Should be started with low doses and then titrated upwards. Dose reduction in renal impairment is not required. Most are excreted by the liver
Cardiac glycosides	Indicated in elderly HF patients with atrial fibrillation or those with severe LV systolic function who are receiving ACEI/ARB, beta-blockers, diuretics and spironolactone. Elderly HF patients are more vulnerable to side effects if digitalis. Low dose digoxin e.g. 0.125mg recommended.
Vasodilators e.g. nitrates, hydralazine	Should be used with great caution in the elderly due to risk of hypotension. Little data on the use in elderly patients

ACEI= Angiotensin converting enzyme inhibitor, ARB= Angiotensin receptor blocker, HF= Heart failure, GFR= Glomerular filtration rate, NSAIDs= Non-steroidal anti-inflammatory drugs

Table 6: Future directions in the management of HF in the elderly.

<p>a. Unresolved issues in HF management in the elderly</p> <ul style="list-style-type: none"> HF in the elderly differ from HF in relatively younger patients whose data were used in formulating guidelines and recommendations HFpEF is common in the elderly. Targeted treatment has not been found for this HF phenotype.
<p>b. Future directions</p> <ul style="list-style-type: none"> Future trials will have to provide for the inclusion of the elderly. Enrolment goal should take this population into consideration. Provision has to be made for pre-specified analysis for this group. Future trials need to include measurements of central blood pressure and aortic stiffness especially in the elderly Need for trial metrics that may assess exercise capacity cut-off and biomarker cut-offs Need for the evaluation of prognostic markers in the elderly as well as development of prognostic models. This has to include non-cardiovascular conditions that may affect HF in this age group. There is also need for a diagnostic algorithm for the elderly Appropriate referral guideline is also needed for the elderly Need for multidisciplinary and integrated HF program for the elderly The cost-effectiveness and risk benefit ratio of HF management strategies need to be studied prospectively.

CONCLUSION

HF in the elderly is common especially in high income countries and it is associated with high mortality rate. There is limited data for HF management for this population. The risk profile is huge in the elderly due to co-existing medical conditions. They are prone to

polypharmacy, drug interactions and side effects. Their care, therefore, require targeted and multi-disciplinary approach. Elderly HF population, therefore, require specific assessment strategies, risk stratification, treatment, education and follow-up programmes.

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DEPRESSION IN THE ELDERLY: A REVIEW

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ABSTRACT

Depression in the elderly is an important part of mental health in geriatrics. Most times, the symptoms of depression are denied because the elderly population are not expected to overtly express these feelings due to cultural beliefs, this makes the diagnosis of depression in the elderly difficult. The presentations of depression in the elderly are so peculiar, and so this has led to slight modifications in the management of depression in the elderly. The few times they present with the feeling of depression, the actions taken depend on their respective caregivers and the level of independence of the elderly. Due to all these peculiarities, a good knowledge of depression in old age among physicians would improve the quality of life of the elderly in Nigeria.

INTRODUCTION

The incidence of chronic non-communicable diseases and mental disorders have been noticed to be on the increase especially in the elderly since life expectancy has been on the increase in the 20th century and this has resulted in a major increase in the prevalence of age-related diseases and conditions.

Depression is one of the common mental health problems in the elderly¹. It is associated with functional impairment, decreased quality of life, and increased mortality. Most times the depressive symptoms are denied because the elderly people are actually not expected to show their feelings as a result of cultural beliefs and this adds to diagnostic difficulties.

Some of the factors associated with depression in the Nigerian elderly population are poverty, loss of status, abandonment, isolation, unemployment, bereavement, non-payment of pension, diseases and chronic conditions including stroke, cardiovascular disease, insomnia, type II diabetes mellitus, cognitive impairment, low quality of life, functional disability etc^{2,3}. Depression is regarded as a major public-health concern and projected to become the second most common cause of disability by 2020².

EPIDEMIOLOGY

The World Health Organisation (WHO) estimated that the number of elderly persons with depression will increase from 605 million to 2 billion between 2000 and 2050. This is due to the projection that the world population of older people will double from about 11% to 22%³.

The global health survey of the wellbeing of older persons ranked Nigeria in position 85 out of 91 countries with high prevalence of depression in the elderly³. Depression is more common among older women than men⁴. The risk of depression is higher in women who are widowed, separated/divorced, high socio-economic status, urban dwellers and advanced age².

In a community based study carried out by Uwakwe looking at the pattern of psychiatric disorder in older people in Nigeria, the diagnosis of depression accounted for 79% of the overall 23.1% prevalence of mental disorders observed in the sample⁵.

A study carried out in Ibadan by Gureje et al in 2007 among the elderly population showed the lifetime prevalence of depression to be 26.2 % and one year prevalence to be 7.1%². In another study carried out among elderly patients admitted to non-psychiatry wards in government teaching hospitals, depression was the commonest diagnosis⁶. In primary care facilities in Nigeria, the rate of geriatric depression was found to be 7.4%⁷.

AETIOLOGY

Several factors have been identified to be associated with depression in older adults. They include socio-economic status (female gender, race or ethnicity, widowhood, separated/divorced marital status, poor economic status, rural residence), poor/low educational background, stressful life events such as bereavement, unhealthy behaviour such as poor dietary habits and

lack of physical activity, disease and chronic conditions including stroke, hypertension and obesity, type II diabetes, arthritis, asthma, insomnia, cognitive impairment, functional disability and low quality of life^{2,8}. In Nigeria, some of the causes of the high level of depression in the elderly population are non-payment of pension, poor physical health poverty, loss of status, abandonment and isolation, unemployment¹.

CLINICAL PRESENTATION

Depression in the elderly sometimes do not classically present as the criteria described in DSM-IV-TR. Depressive illness in the elderly is usually under diagnosed as the presentation can be subtle. Furthermore, there is a cultural belief that depression is a normal process associated with ageing by both physicians and patients' themselves¹. Depression in the elderly can sometimes present with somatic symptoms similar to medical conditions and this often lead to misdiagnosis.

Depression is one of the most common causes of weight loss in the elderly. Other common symptoms of depression in the elderly include memory loss, pain, agitation, insomnia, fatigue, and decreased appetite and decreased libido. Depression in the elderly can also present with symptoms similar to hypochondriasis, suicidal ideation and cognitive impairment which in essence may look like dementia^{4,5}.

DEPRESSION AND CO-MORBIDITIES

The role of co-morbid illnesses in elderly patients with depression cannot be overemphasized as there is a two way relationship between depression and co-morbid illnesses. Some studies have shown that some chronic medical conditions predispose patients to depression while others show that depressed elderly patients have low immunity which predisposes them to other medical conditions. The medical illnesses associated with depression include Diabetes mellitus, cancer especially pancreatic cancer, stroke, coronary artery disease, Alzheimer's disease, Parkinson's disease, Huntington's disease, alcohol abuse and chronic obstructive pulmonary disease.^{1,3}

Depression and cognitive impairment frequently coexist in the elderly as there is a bi-directional relationship between them¹. Cognitive impairment sometimes occur in the course of depression⁸. Studies have shown have cognitive impairment is a risk factor for depression⁹ while others have shown that depression is a risk factor for developing dementia¹⁰.

Depression could present alongside or precede dementing illness. Depression in the elderly could affect

cognitive function and the degree of cognitive deficit depends on the severity of the depression¹¹. A dementia like syndrome (pseudodementia), a cognitive impairment reaching the severity of dementia but subsides with remission of depressive symptoms. It has been argued that the same underlying neuropathology could be responsible for both cognitive impairment and depression¹².

DIAGNOSIS

Depression is under detected in older people, with only one in six older people with depression discussing their symptoms with their general practitioner, and less than half of this receiving treatment⁴.

Obtaining a good history, thorough physical examination and mental state examination is essential in making a diagnosis of depression in the elderly¹. A good family and social history helps in identifying possible risk factors for depression. Some laboratory workup could be done to exclude co-morbidities especially those that mimic or are associated with depressive symptoms. Such investigations include thyroid function tests where necessary, a full blood count, serum electrolyte, urea and creatinine, fasting blood glucose, vitamin B12 and folate levels, chest radiograph and ECG. This will help in the diagnosis and treatment of depression and other co-morbid conditions if present¹³.

Barriers to Diagnosing Depression

A major barrier to diagnosing depression in the elderly is that often older people do not present with specific depressive symptoms but rather with somatic symptoms such as malaise, tiredness or insomnia which mimics other medical conditions. This can make it difficult to make the right diagnosis. Older people may have beliefs that prevent them from seeking help for depression, even after diagnosis, such as fear of stigma or that antidepressant medication is addictive. They may also attribute symptoms of major depression to 'just old age', ill health, isolation, loneliness or grief. Older people from black and minority ethnic backgrounds often do not see psychiatric services as appropriate, and in some cultures it is believed to that psychiatric conditions are often punishments from the gods or acts of some evil-doers¹⁴. This may lead practitioners to overlook psychological distress and focus solely on physical aspects of the presentation.

Primary care practitioners may lack necessary consultation skills or confidence to correctly diagnose later life depression or may see the symptoms as part of the ageing process. They may be wary of asking more questions in time-limited consultations and instead

treat presenting symptoms of patients without making adequate diagnosis^{14, 15}.

MANAGEMENT

The treatment of depression in the elderly involves both psychosocial and pharmacological interventions. This combination has been found to be more effective^{16, 17}. Treatment should also take into account the patient's preferences, treatment history and availability of treatment¹⁸.

Before treatment is initiated, it is important to clarify common patient concerns about side effects, and to reassure patients that dependence is not a realistic concern with antidepressants and that these medications will not inhibit normal emotional reactions such as bereavement¹⁹. Let the patient also know the common side-effects anticipated and how to go about their amelioration.

The treatment of depression in the elderly within a primary care setting will depend on many factors. These include: treatment of co-occurring medical, psychiatric, and substance use disorders, tailoring treatment interventions to the unique needs of each patient, close follow-up and frequent monitoring of both the side effects and the effectiveness of medications, consultation with mental health professionals for patients who have not responded to an adequate trial of pharmacological interventions or for those who prefer non-pharmacological treatment. Consultation is also recommended for patients with prominent psychotic symptoms, those with double depression (major depression superimposed on dysthymic disorder), and those with a complex or uncertain diagnosis. There should be emergency psychiatric referral for patients who are suicidal and for others who may require electroconvulsive therapy²⁰⁻²³.

Psychological Interventions

These interventions may include psychoeducation, supportive interventions, social intervention and psychotherapy.

Psychoeducation

The main goal is to reduce distress, confusion, and anxiety and to facilitate treatment compliance and reduce the risk of relapse²⁴. Elderly depressed patients may view themselves as being weak emotionally or as having character defects, and primary care providers play a vital role in helping them understand that depression results from a combination of biological vulnerability and accumulated psychosocial stressors. It should be explained that the presenting physical

symptoms can be a characteristic of depression and that effective relief of depression often makes chronic illnesses and physical symptoms more bearable. They should be informed of the high prevalence of depression among the general population in order for them to be encouraged and know that so many others are affected.

Psychosocial support

Primary care providers should introduce methods of reducing the symptoms of depression by providing support and counteracting feelings of helplessness and hopelessness. This could be achieved by encouraging patients to engage in relaxing or enjoyable activities every day and by identifying exaggerated negative or self-critical thoughts.

The objectives of these supportive interventions are to reduce the effects of depression and to improve general physical and mental health by facilitating expansion of available social support and improving nutrition and exercise, linking them to senior citizen centers where available, and encouraging participation in leisurely activities that are designed to match the special needs of the elderly²⁵.

Psychotherapy

This is a psychological method for the treatment of psychiatric disorders based primarily on verbal or non-verbal communication and interventions with the patient, in contrast to treatments using chemical and physical measures. Psychotherapy modalities include individual, couples, family, or group therapy²⁶.

Supportive psychotherapy

It is used primarily to reinforce the ability of the depressed elderly patient to cope with stressors through a number of key activities, including attentively listening and encouraging expression of thoughts and feelings; assisting in gaining a greater understanding of their situation and alternatives; improving self-esteem and resilience; and working to instill and regain a sense of hope. Generally, deeper examination of the individual's history and probing of underlying motivation is avoided.

Interpersonal therapy

This is an exploratory intervention with a primary focus on interpersonal roles and conflicts²⁶. It is practical, brief, and manual-based and is applicable in the treatment of the elderly in the acute phase of depression and in relapse prevention. It focuses on disturbances in patients' current relationships in the domains of role transition, role dispute, abnormal grief, and interpersonal conflicts. It is not intended to alter personality traits but to establish rapport and education, and it aims at

improving communication, expressing feelings, and supporting renegotiated roles in relationships and problem solving. Patients who have limited options to engage in new interpersonal relationships are encouraged to tolerate problematic relationships while working in therapy to find acceptable alternatives.

Cognitive behavioral therapy (CBT)

CBT includes challenging irrational or self-destructive thoughts, changing the way in which individuals process information, self-monitoring exercises, communication skills, problem-solving initiatives, increasing positive self-statements and experiences, and countering mistaken belief systems. The goals of cognitive behavioral therapy (CBT) are to examine and modify negative thoughts, excessive self-criticism, lack of motivation, and the tendency to view problems as insurmountable.

Mindfulness-based cognitive behavioral therapy

This is based on the mind-body interaction and practicing mindfulness meditation. Mindfulness meditation teaches how to focus on the present moment and act with purpose rather than letting judgments about past events or fears about what may happen in the future affect current feelings. Being focused only on the present helps patients respond positively to situations rather than react in a negative way. The use of mindfulness may better prepare elderly patients with depression to implement the changes in their negative thought patterns. The combination of CBT and mindfulness-based cognitive behavioral therapy can be an effective intervention in treating elderly depressed patients in whom CBT alone could not achieve its intended goals^{27,28}.

Family therapy

Depressive illness in the elderly is often complicated by enmeshed and “high expressed emotion” family relationships. Family therapy attempts to correct distorted communications and relationships^{25,29}.

Music therapy

This type of therapy is usually conducted by music therapists, and it has demonstrated efficacy; it may include listening to music, playing musical instruments, dancing, and singing. In the elderly, music therapy could lead to improvement in depression, decreased anxiety, and remission of agitation in addition to improved coping with cognitive difficulties²⁸.

Spiritual Interventions

The presence of physical illness, especially in cases of terminal illness, chronic pain, or disability, frequently

complicates or exacerbates depression in the elderly. The incorporation of religion and/or spirituality into the treatment of depression could lead to more positive religious-based coping, greater strength of religious faith, and greater collaboration in problem-solving styles³⁰.

Studies have shown that there is a high level of religion/spirituality among the elderly in the United States and a significant patient-reported desire to include such beliefs in the initial evaluation of depression in the primary care setting³¹. Personal beliefs and the presence of a composite of emotional supports through religious affiliation have all been reported to be significant predictors for depression recovery beyond the effects of the initial depression severity³².

Social Interventions

This includes community-based social support programs which may be particularly helpful for elderly depressed patients through the implementation of strategies that ease the burden of depression. These strategies may include: prevention of social isolation, education about dividing major tasks such as shopping, house chores, etc. into smaller prioritized tasks, minimizing difficult roles that require a great deal of responsibility from them, postponing major life decisions (especially financial choices) until the depressive symptoms are alleviated, setting realistic expectations and not expecting to feel better in a very short period of time, participating in activities that allow for relaxation and socialization, such as moderate exercise as physically tolerated including aerobic activities (e.g. walking, running, or bike riding) and anaerobic activities (e.g. weight training and stretching). Methods of relaxation are also encouraged such as muscle relaxation and diaphragmatic breathing, which decrease physical and mental tensions, and leads to improvement in depressed elderly patients, especially when their depressed mood is associated with anxiety^{29, 33}.

PHARMACOLOGICAL MANAGEMENT

Antidepressant medications are the most commonly used intervention for the treatment of depression in older adults. For some older adults, the combination of psychotherapy and antidepressant medications may be more effective than antidepressant medication alone³⁴. In the elderly, the average dose of antidepressants is usually one-third of the typical adult dose. Dosages of these medications should be increased gradually until response is seen to prevent the emergence of adverse effects³⁴.

Various classes of antidepressant medications can reduce symptoms of depression in older adults. They include:

Selective serotonin-reuptake inhibitors: The selective serotonin reuptake inhibitors (SSRIs) are most often used as first-line treatment as they are effective. SSRIs include Citalopram, Escitalopram, Fluvoxamine, Paroxetine, Fluoxetine and Sertraline^{33, 34}. The SSRI dosages in the elderly and side effects are summarized in Table 1. Common side effects with SSRIs include nausea, loss of appetite, agitation, insomnia and sexual dysfunction

Table 1: Adapted from Khouzam HR. Depression in the elderly: How to treat. Consultant: 2012; 52(4):268

GENERIC NAME	DAILY DOSAGE RANGE IN THE ELDERLY
Citalopram	10 - 30 mg
Escitalopram	10 - 20 mg
Paroxetine	10 - 30 mg
Sertraline	25 - 100 mg
Fluoxetine	10 - 30 mg

Serotonin- norepinephrine reuptake inhibitors: If patients do not respond to the SSRIs, the serotonin-norepinephrine reuptake inhibitors (SNRIs) are used for treatment. The dosages and side effects of the various SNRIs are summarized in Table2.

Table 2: Adapted from Khouzam HR. Depression in the elderly: How to treat. Consultant: 2012; 52(4):269

GENERIC NAME	DAILY DOSAGE RANGE IN THE ELDERLY
Effexor	37.5 - 150 mg
Duloxetine	10 - 30 mg
Desvenlafaxine	50 mg

Side effects associated with the use of SNRIs include nausea, dry mouth, constipation, headache, insomnia, decreased appetite, fatigue, drowsiness, increased sweating, dizziness, skin rash, blurred vision and erectile dysfunction. Research suggests that SSRIs may be more tolerated by frail elderly patients than SNRIs³³. An uncommon, but serious side effect associated with SSRIs and SSNRIs is Syndrome of Inappropriate Antidiuretic Hormone, SIADH which impairs the older adult's ability to excrete water, resulting in low body sodium and symptoms of confusion, weakness, decreased appetite, lethargy, seizures, and coma³⁴.

Table 3: Adapted from Khouzam HR. Depression in the elderly: How to treat. Consultant: 2012; 52(4):270

GENERIC NAME	DAILY DOSAGE RANGE IN THE ELDERLY
Bupropion	100 - 250 mg
Mirtazepine	7.5 - 10 mg
Trazadone	50 - 150 mg
Vilazodone	10 - 20 mg

A typical antidepressants: Elderly patients who do not respond to SSRIs or SNRIs could be treated with atypical antidepressants, which are summarized in Table 3. Bupropion may cause jitteriness and insomnia; it could be particularly useful in patients with lethargy, daytime sedation, or fatigue. It could also be used as an adjunctive treatment for tobacco cessation. Mirtazapine is associated with sedation, increased appetite, and weight gain thus it may be beneficial for elderly patients with insomnia or weight loss³³.

Tricyclic antidepressants: Tricyclic antidepressants (TCAs) are an older and sometimes less expensive type of medicine for depression. These drugs are effective, but may have side effects that can be particularly troubling in older persons such as increased falls due to a drop in blood pressure on standing, irregular heart rate, confusion, or urinary retention³³.

Table 4: Adapted from Khouzam HR. Depression in the elderly: How to treat. Consultant: 2012; 52(4):271

GENERIC NAME	DAILY DOSAGE IN THE ELDERLY
Amitriptyline	25 - 75 mg
Clomipramine	50 - 100 mg
Desipramine	25 - 75 mg
Doxepine	50 - 100 mg
Imipramine	25 - 75 mg
Protriptyline	15 - 30 mg
Trimipramine	25 - 75 mg
Maprotilin	50 - 100 mg

TCAs are more likely to result in anticholinergic side effects such as confusion, urinary retention, and delirium or serious cardiovascular side effects. TCAs also are more likely to result in death in an overdose compared to SSRIs³⁴.

Monoamine oxidase inhibitors: Monoamine oxidase inhibitors (MAOIs) are another group of older antidepressant medications that are rarely prescribed and only in situations when other antidepressants have failed. This class of antidepressants has a narrow therapeutic index and requires special dietary and medication restrictions^{33, 34}.

The elderly starts to respond to antidepressant medication between four to six weeks of starting treatment and the choice of antidepressants depend on the side effects, dosage and the potential drug interactions³⁴.

Management of Various Types of Depression

Minor depression: Patients who present with minor depression (fewer than five symptoms that persist for

fewer than 2 years) may respond well to close monitoring to determine whether pharmacological treatment is necessary. Some studies have indicated that pharmacological intervention may not be effective for treating mild depressive episodes^{21, 33}.

Depression and co-occurring psychiatric conditions: If a patient also suffers from anxiety, treating the depression first often relieves both problems¹⁶. More severe psychiatric disorders, such as bipolar disorder or schizophrenia, require specialized psychiatric treatment³³.

Table 5: Adapted from Khouzam HR. Depression in the elderly: How to treat. Consultant: 2012; 52(4):272

GENERIC NAME	DAILY DOSAGE RANGE IN THE ELDERLY
Isocarboxazid	10 - 30 m g
Phenelzine	15 - 60 m g
Tranlycypromine	10 - 30 m g

Depression and medical conditions: Depression can worsen many medical conditions and may even increase mortality from some disorders, such as myocardial infarction and stroke^{16, 33}. Thus, depression should be aggressively treated in any patient with a serious medical condition.

Depression and substance abuse: Treating depression in patients who abuse alcohol or drugs is important and can sometimes help patients stop substance use. However, abstinence from substance abuse is essential for the adequate treatment of depression³³.

THE CHALLENGES

In Nigeria, stigmatization is associated with depression and so depressed elderly are reluctant in seeking help from mental health specialist. Sometimes, the diagnosis may be missed as they present with co-existing symptoms of other illnesses in the elderly. For those without prior knowledge of depressive symptoms, it may be alluded to some spiritual components, thus leading to search for cure from less competent caregivers and subsequent exploitation. Due to ignorance of depressive symptoms, the burden of depression in the elderly is on the rise and a major public health challenge³⁵.

CONCLUSION

Depressive illness in the elderly is ultimately disabling, mostly under-diagnosed and associated with high morbidity. The prevalence of depression amongst the elderly in Nigeria is high. Health-care services need to invest in effective treatment programmes such as the Mental Health Gap Action Programme, mhGAP for

the training of primary health care workers in prompt recognition and appropriate management of mental illnesses including depressive disorder in the elderly.

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ABSTRACT

Geriatric trauma has an increased predominance in both developed and developing countries. The age-related peculiarities make trauma in an elderly patient more severe than in younger individuals. About 50% of trauma in the elderly patient is due to fall. Other mechanism of injury includes burns, motor vehicle collision, pedestrian accident and burns. The outcome of geriatric trauma is poorer than in their younger counterpart because of the changes in their physiology and anatomy. Also, the presence of co-morbidities such as hypertension, osteoarthritis and some other age-related diseases makes trauma more severe in this age group. Geriatric trauma victims demand comprehensive assessment, aggressive management, a high index of suspicion for occult instability, and a low threshold for laboratory and radiographic investigation to assess injuries. Emergency and trauma care providers accustomed to treating younger patients will need to make an important transition in both acute awareness and knowledge application regarding both general and specialty geriatric care.

INTRODUCTION

The proportion of people over 60 years of age is growing faster than any other age group in the advanced nations of the world, as a result of longer life expectancy and declining birth rates¹. As a result, more elderly individuals are presenting to the hospital following trauma². In addition, advances in the care of chronic diseases have increased the number of elderly people with active lifestyles, which predispose them to injury³. Although trauma remains a leading cause of morbidity and mortality across all ages, geriatric patients differ significantly from their younger counterparts in their greater number of co-morbidities^{4,5} and a higher risk of severe disability and death^{6,7}. Elderly patients are more susceptible to injury from minor impact forces and less able to compensate from any injury. To manage their chronic ailments, elderly patients are more likely to take multiple medications, some of which may impair their reflexes and make them more susceptible to trauma, blunt their response to the physiologic stress of trauma and increase their risk of complications⁸.

Geriatric care is beginning to receive a lot more attention because of the demographic transition as the population structure of the world is undergoing an ageing evolution in which it has been predicted that the elderly, who, estimated to be 10% of the world's population with about 605 million, are predicted to grow to about 2 billion by the year 2050, being almost the same size as children⁹. The incidence of traumatic injuries decreases

with age, and trauma is reported by studies to be between the 7th to 9th cause of death among geriatric patients (older than 65) which is less than it is in younger individuals^{10,11}. However, it is reported that these patients present with worse injuries and also have worse outcomes and that more than 50% of mortality from traumatic injuries are found in the elderly population^{12,13}. This is accounted for by frailty, decreased physiologic reserve, a higher incidence of pre-existing diseases, poly-pharmacy, etc. The peculiarity of the elderly patient has caused there to be a redefinition in the management criteria for trauma in this age group of patients. We start by reviewing the anatomical and physiological aspects and some other peculiarities of aging; the injury patterns and mechanisms of injury, and then end by reviewing the current management protocols for trauma in the elderly patient.

ANATOMICAL AND PHYSIOLOGICAL ASPECTS OF AGEING

Ageing is initiated by genetic and environmental factors that begin to operate from the time of birth. A number of physiological phenomena characterize aging among which are, cell death/loss, deterioration of tissue protein, hormonal changes, tissue atrophy, a decrease in BMR, reduction of body fluids and calcium metabolism abnormalities, among others. The effects of these events manifest in the various systems of the body, leading to several vital impairments such as cardiorespiratory, neurological, endocrine, immune, as well as motor function impairments.

THE CARDIOVASCULAR SYSTEM

The inevitable physiological changes that occur in the ageing cardiovascular system are associated with changes in the autonomic nervous system, resulting in reduced cardiac responsiveness to stress. Changes in the cardiovascular system are exhibited in arteries particularly and the arterial walls become thick and hard. Because of these anatomical changes, the heart functionally shows decreased diastolic compliance as well as increased pulse pressure. Although cardiac output in the steady state mostly remains unchanged, the maximum heart rate, maximum stroke volume, and circulating blood volume are reduced. Likewise, when the blood entering the arteries is decreased, it inhibits the activity of the baroreceptors so as a result, orthostatic hypotension is commonly found in elderly¹⁴.

CHANGES IN THE RESPIRATORY SYSTEM

Based upon the qualitative deterioration in both elastic fibres and collagen fibres, lung tissues become less elastic and expansible. Even if there are no changes in the number of alveoli, the amount of elastic fibres in the alveolar wall is decreased and the size of the alveoli is smaller with slight expansion of the alveolar ducts as well as the respiratory bronchioles. Thus, the elderly is at high risk of atelectasis and postoperative pneumonia owing to gradual reduction of arterial blood PCO_2 , an increment of dead space, a decrease of the expiratory volume and expiratory rate, airway cilia impairment, and defence mechanism dysfunctions. Additionally, the respiratory muscles and the thorax are also altered by aging. Weakened respiratory muscles and a stiff diaphragm are exhibited from the age of 55. This seems to be caused by aging-associated scolokyphosis, calcification of the intercostal cartilages, and spondylarthritis. The reduced diffusion capacity due to aging is induced from a decrease in the lung area owing to damage to the alveoli, an increase in thickness of the alveolar walls, and small-airways obstruction¹⁴.

CHANGES IN THE CENTRAL NERVOUS SYSTEM

Along with aging, the number of cerebral nerve cells is remarkably reduced with an approximately 20% decrease in cerebral blood flow. The size of the brain is then reduced slightly and some neurons are lost in some selected parts of the brain such as the locus coeruleus, substantia nigra, hippocampus, caudate nucleus, putamen, and cerebral cortex. However, there are no sufficient studies showing that the functions of the brain are markedly impaired due to aging. Even though the number of nerve cells is decreased, the rest of the cells compensate for the loss by generating branches. As a result, total dendrites of the cortex and

hippocampus are even increased until the forties to sixties. Afterward, the dendrites become reduced in number in the eighties and nineties. Memory, cognitive function, and intellectual functioning become impaired subjectively when people get old but noted abnormalities are not observed in the clinical examinations of elderly people as long as there is an absence of other diseases¹⁴.

CHANGES IN THE NEUROENDOCRINE SYSTEM

It has been well known that the loss of some neurons is accompanied in the neuroendocrine system by aging. If neurons are lost in the hypothalamus, it would have an influence in the broad range, from the pituitary gland to lower target endocrine organs. To the best of our knowledge, however, no studies have reported on the loss of neurons in the hypothalamus induced by aging so far.

Hormones are produced in hypothalamus, pituitary gland, thyroid, parathyroid, pancreas, adrenal, gonads (testicles for men, ovaries for women), and kidney. Of various hormones, female hormones are altered the most by aging. Aging causes not only reduction of sex hormones but also a decrease of production and secretion of renin in the kidney and aldosterone in the adrenals.

The levels of blood cortisol or corticosteroid-binding protein are not much changed in the elderly. This finding is in conflict with the *in vivo* result in rats which suggested that the concentration of cortisol was elevated as the rats aged. However, some hormones are released more as aging is preceded. A greater amount of parathyroid hormone is secreted as people become older and accelerates osteoporosis that occurs in the elderly population due to calcium release in the bones¹⁴.

CHANGES IN THE MUSCULOSKELETAL SYSTEM

The levels of calcium and protein are decreased in bones as people age thereby reducing bone mineral density. Cell degeneration occurs in a wide range of osteoblasts, and irregular bone deposition or resorption takes place due to the exposure of bone surfaces caused by destruction of osteogenic layers to bio-chemical changes. If the cell degeneration becomes worse, it terminates the communication between the cells and introduces lipofuscin in the cells and thereby necrosis occurs. Moreover, the nuclei in osteocytes are hyper-pigmented and become smaller in size. As people become older, the degeneration of cell organelles is more severe so that residual mitochondrial swellings, vacuoles,

and aging pigments are observed. Specifically, the cytoplasm swells and cell membranes are destroyed so that the lacunae are filled with the destroyed residuals of osteocytes. The aging-related cartilage degeneration is similar to degeneration in the osteocytes, with the exception that aging pigments do not appear and cell death is more frequently exhibited. Bone mass becomes decreased due to deficiency of the female hormones, reduction of osteocytes, and parathyroid hyperactivity caused by renal dysfunction, and lack of exercise by muscle weakness. The bottom of the radial bones, femoral neck, and spine are easily prone to fracture because of the reduction of bone mineral density by the decrease in bone mass. In addition, the articular cartilages in the joints become deteriorated and worn out, and the cartilages lose their elasticity¹⁴.

MECHANISM OF INJURY

Elderly patients sustain distinct pattern of injuries from causes that differ from those of non-elderly adults because of their unique anatomical, physiologic, and behavioural characteristics. Injuries in the elderly range from accidental to incidental; the majority of injuries fall within the accidental group and include: falls, injuries from machinery, injury from natural and environmental causes, and injuries from motor vehicle accidents. Incidental injuries include those from elderly abuse, suicide attempts, etc. Falls are the most common cause of injury in patients over 65 years and, as reported by a study, accounts for up to 75% of accidental deaths in those older than 75 years. The number of falls increases progressively with age in both sexes and all racial and ethnic groups. Motor vehicle collisions and pedestrian-related injuries involving the elderly also continue to increase with the growth of the geriatric population. A study done by Lyman *et al.* projects older-driver crash involvement would increase by 178% and fatalities to

increase by 155% by 2030. Elder physical abuse may account for the least percentage of elder trauma with a prevalence ranging between 0.2-0.4 percent¹⁵. This however may be under-reported. The following discussion puts the different patterns and mechanisms of injury into better perspective

FALLS

Numerous studies confirm that falls are the most common reason for trauma in the elderly¹⁶⁻²⁴. Low-level falls (falls from a standing height) are the most common reason for injury in geriatric patients. In some cases, it is debatable if an insufficiency fracture is responsible for the fall or the fall causes the fracture. Complications resulting from falls are the leading cause of death from injury in men and women older than age 65. The incidence of falls increases with age over 64 years and varies according to living status. Approximately 30% to 40% of community-dwelling seniors will sustain a significant fall in their lifetime. Approximately 50% of individuals living in a long-term care facility will sustain a fall, and this percentage climbs to 60% if there has been a fall within the previous year¹⁷⁻²⁰. Injuries sustained by geriatric patients from falls tend to be more severe than the injuries sustained by younger patients from similar falls. Injuries to the head, pelvis, and lower extremities are extremely common. Although elderly patients account for less than 15% of trauma admissions due to falls, they account for half of deaths due to falls. Overall mortality is about 11%²⁵. High-level falls (>15 feet) in the elderly are less common, but carry mortality rate approaching 25%^{16,26}. Increased morbidity is associated with increased disability, hospital admissions, and inpatient length of stay.

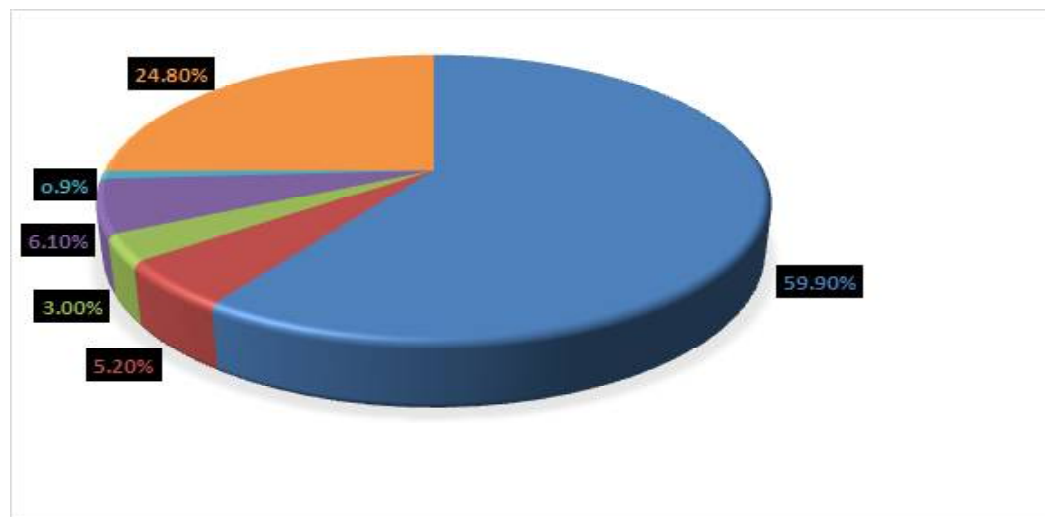


Fig. 1: Aetiology of trauma among elderly patients admitted for treatment of trauma injuries

Major risk factors for falls include; older age, female gender, history of previous fall, lower extremity weakness, balance difficulties, psychotropic drug use, and arthritis. Cognitive impairment “discovered” after injury may actually predate the index visit, and may contribute to the risk of falls^{24,27}.

Particular contributory factors to consider include vision impairment, medications, chronic medical conditions such as Parkinson’s disease or osteoarthritis, environmental hazards, acute medical conditions such as syncope, transient ischemic attacks, neoplasms, metabolic derangements, infection, and anaemia. Multiple risk factors for falls significantly increase the risk for subsequent falls. In one study, patients with four or more established risks for falls had a 78% risk of subsequent fall, compared with 27% in patients with zero or one risk factor¹⁷. When evaluating a geriatric patient who has fallen, all aspects of the incident should be reviewed. Complications of prolonged immobility such as rhabdomyolysis, dehydration, and infection need to be considered. Was the fall due to an environmental factor (rug, stairs, uneven ground, etc), acute or chronic medical conditions, trauma, or substance abuse? Can the patient function on the same level as before the fall? Can the patient ambulate, take care of their personal needs and manage at home?

MOTOR VEHICLE COLLISION

Although a significant amount of research has been done on falls in the elderly, there is only a modest amount of published research on elderly patients involved in motor vehicle crashes. The pathophysiology of aging and the presence of acute and chronic medical conditions that affect vision, reflexes, balance and cognition, place elderly persons at high risk for involvement in motor vehicle crashes. It is reasonable to expect that motor vehicle trauma involving elderly patients will continue to climb over the coming decades as the world population ages. Elderly patients have an increased severity of injuries from motor vehicle collisions when compared with nonelderly. However, the pattern of injury for geriatric patients in motor vehicular trauma appears quite similar to the pattern of injury for younger patients, except for an increased incidence (11%) of sternal fractures from seatbelts in patients over 65 years of age, compared with an incidence of 1.5% in the under 65 age categories^{28,29}.

PEDESTRIAN ACCIDENT

Pedestrians injured by automobiles represent some of the most seriously injured patients in trauma. The elderly is at particular risk for being struck as pedestrians, and make up a significant percentage of pedestrians who

have been struck by a motor vehicle^{28,29}. Slow ambulation, impaired reflexes, misjudgement, visual, auditory, and gait impairment appear to be involved, as elderly patients are frequently struck within marked crosswalks or walk directly into the path of an oncoming vehicle.

Sklar and colleagues specifically looked at elderly pedestrians who had been struck by a motor vehicle and found a significantly increased mortality rate. Fatal injuries tended to be from severe head injury or major vascular damage, with the majority of deaths occurring at the scene or in the Emergency Department (ED). Once hospitalized, patients died from complications of prolonged ventilation and infection³⁰. Patients struck by cars sustain twice as many lower extremity injuries as their younger counterparts. Recent data reveals that age plays a tremendous role in severity of injury in pedestrians struck. Injuries to the brain, spine, and thorax, as well as skeletal injuries increase dramatically with age, although injuries to the abdomen do not. Mortality is greater than 25% in patients struck as pedestrians over the age of 65³¹.

BURNS

Elderly patients constitute approximately 13% of all patients admitted to burn units. Total body surface area burned, mortality, and hospital length of stay are all higher in the elderly³²⁻³⁴. Physiologic changes associated with aging, acute and chronic medical conditions and social isolation are factors that increase the morbidity and mortality from burns in the geriatric population. In a study of life expectancy and living status of elderly patients surviving burn injury, overall in hospital mortality approached 50%, and mortality was 100% in patients over the age of 60 who had sustained a body surface area burn of 50% or greater³². As with other forms of trauma, burn treatment in the elderly is complicated by coexisting disease and impaired functional reserve. Despite increased morbidity and mortality associated with burns in the elderly population, no data is available suggesting changes in initial burn treatment protocols other than taking into consideration underlying medical conditions that may require additional care. However, liberal transfer to a burn unit is recommended, especially in patients with significant coexisting medical condition³⁵.

ELDER ABUSE

Elder abuse is an important public health problem. While there is little information regarding the extent of abuse in elderly populations, especially in developing countries, it is estimated 1 in 10 older people experience abuse each month. This is likely to be an

underestimation, as only 1 in 24 cases of elder abuse is reported, in part because older people are often afraid to report cases of abuse to family, friends, or to the authorities. Consequently, any prevalence rates are likely to be underestimated¹⁵.

Elder abuse is perpetrated by family members, other members of the community including in institutions like hospitals and elderly-care homes. Abuse of the elderly is in many forms, but specifically within the scope of this paper, the prevalence of physical abuse is put at 0.2-4.9%¹⁵.

MANAGEMENT OF THE GERIATRIC TRAUMA PATIENT PRE-HOSPITAL CARE

A particular challenge an emergency personnel faces at the trauma site is whether to 'scoop and run' or 'stay and play'. This is debatable across diverse boards, especially in areas with poorly developed emergency services which are characteristic in this region of the world.

It is also a difficult task for the emergency physician to determine if the geriatric patient will be safe returning to the home environment. The elderly may be reluctant or unable to provide accurate information regarding their home life, and deny inability to care for themselves. Even a loss of driving privileges or independent living means a loss of autonomy. A number of questions should be asked of pre-hospital providers. Does the patient live alone? Does it appear that the patient is unable to care for him or herself? Does it appear as if the patient has been on the ground for a prolonged period of time? Is there evidence of substance abuse? What medications are present and does it appear that the patient has been compliant? Is there a cane or wheelchair that the patient uses? Is the home a fall hazard (rugs, stairs, poor lighting) or a safe place for the elderly patient to live? Concerns expressed by pre-hospital providers over the safety of a patient living individually should be highly respected, and essentially seal a decision to admit the patient, transfer the patient to a skilled facility, or trigger prompt follow up for a comprehensive geriatric assessment.

TRIAGE

Studies show that patients who sustain serious injury are best managed in a trauma centre. Development of a state-wide trauma system led to improved survival for geriatric trauma patients³⁶. Standard triage criteria for trauma patients include age 0 - 55 is an important, although not absolute, determinant of trauma centre disposition in injured patients³⁵. At least one study

advocates trauma team activation for all patients over age 75³⁷. Some argue that triage of isolated injuries (i.e., hip fractures) to trauma centres overburdens the trauma system, while others support the concept of a team approach to all geriatric trauma³⁸. Hip and wrist fractures are the most commonly seen fractures in the elderly patient, especially following falls, and are many times insufficiency fractures. It is debatable whether they should be managed in dedicated trauma centres, importantly in the light that such trauma centres may lack personnel who can adequately manage co morbid conditions which are frequently encountered in the elderly patient. Once admitted to a trauma centre, trauma surgeons direct the patient's care, where management of coexisting medical issues and comprehensive evaluation of potential medical aetiologies for the injury may be inconsistent³⁹. Currently, many seriously injured patients, and most patients with less serious injury, will not be taken to a trauma centre. However, patients involved in motor vehicle accidents will necessarily need to be managed in dedicated trauma centres.

Injury scoring systems, including the injury severity score (ISS) have been examined in an attempt to better triage patients with major trauma. Studies in geriatric patients have been mixed. A case-control study of major trauma in geriatric patients found that the currently employed ISS, if age adjusted, performs adequately as an indicator of outcome for the older trauma patient⁴⁰. In another study, ISS was evaluated in elderly patients and not found to accurately predict survival⁴¹. This was thought to be due in part to the fact that ISS does not consider the impact of pre-existing disease. The validity of the ISS for geriatric patients involved in motor vehicle collisions is still at issue. The fact that the ISS cannot be sufficiently relied upon to triage geriatric patients raises a question of whether a special scoring system for geriatric trauma will need to be developed.

INITIAL EVALUATION AND RESUSCITATION

The triage assessment does not preclude a primary survey that goes hand in hand with initial resuscitation of the geriatric trauma victims and this should be guided by standard protocols, always keeping in mind that standard haemodynamic parameters, especially heart rate, are inadequate to determine the stability of geriatric patients. Patients who seem to be stable should still undergo intensive testing to uncover occult instability or injury. Arterial blood gases should be considered mandatory because they may reveal an increased base deficit, or an elevated serum lactate concentration,

which are harbingers of occult hypovolaemia or impending shock. While an increased base deficit is clearly a marker of serious illness, a normal base deficit does not rule out serious injury or risk of death in elderly patients⁴².

Patients who exhibit any evidence of impaired perfusion should undergo aggressive monitoring and resuscitation, as this has clearly been shown to improve outcome^{43,44}. In the absence of a pulmonary artery catheter, a central venous catheter and serial arterial blood gases (looking at the base deficit) or serum lactate levels are suggested to guide therapy⁴⁵. Non-invasive hemodynamic monitoring using bio-impedance technology has been gaining acceptance as a substitute for pulmonary artery catheterization, and has been shown in the elderly trauma patients to be reliable^{27,46}. A second determination of either serum lactate or base deficit, drawn between 30 to 45 minutes after arrival, should be strongly considered in all geriatric patients who remain in the ED. Persistently high results should alert the clinician to ongoing haemorrhage, inadequate resuscitation, or other complications such as compartment syndrome. The elderly is at increased risk for the development of hypothermia during resuscitation, and diligence should be exercised in maintaining core temperature using external warming devices^{47,48}.

Evaluation of the initial ABCs in geriatric trauma patients includes a number of important considerations. The elderly patient has decreased airway reflexes, and expeditious and deliberate management of the airway should be considered to prevent aspiration. Because the ventilatory response to hypoxia and hypercarbia are blunted in the elderly, occult respiratory insufficiency is common. Analysis of pH and arterial carbon dioxide tension is essential. Anatomically, the geriatric airway can be difficult to manage. Mouth opening may be impaired. Coupled with the need to maintain in-line stabilization of the spine, kyphosis, or impaired mobility in a cleared cervical spine, laryngoscopy may be difficult. Pharmacologic therapy for rapid sequence intubation in the geriatric patient also merits special consideration. Doses of nearly all sedatives, including barbiturates, benzodiazepines, and etomidate, should be reduced in the elderly to avoid hypotension. Doses of lidocaine and opiates, frequently used as premedication before intubation of patients suffering head injury, should also be reduced. Priming or administration of a defasciculating dose of a non-depolarizing neuromuscular blocker may abolish respirations prematurely, resulting in apnoea with inadequate relaxation. Doses of neuromuscular blocking agents should not be reduced⁴⁹.

PAIN IN THE ELDERLY

Pain, being an instigator of the metabolic response to trauma, needs to be adequately tackled in the elderly patient with adequate doses of analgesics, bearing in mind their ability to metabolize the drugs. One must also realise the importance of possible drug-drug interactions in these patients who frequently are involved in polypharmacy for all sorts of medical conditions. The incidence of dementia rises with increasing age hence these patients may not effectively communicate their pain. This may make pain assessment ineffective as

PATTERNS OF INJURY

Elderly trauma patients clearly have different patterns of injury. Such knowledge should aid the clinician in diagnosing injuries, and determining severity of illness.

CENTRAL NERVOUS SYSTEM

Several investigators have recommended liberal use of computed tomography for elderly people. Case reports and case series have shown that intracranial haemorrhage can result in elderly patients who sustain minor head trauma (no loss of consciousness) and who are neurologically intact on arrival to the ED²⁹. This incidence, while small, is further increased if the patient is taking warfarin and perhaps other anticoagulants or anti-platelet agents⁵⁰. In a subgroup analysis of the NEXUS derivation study, 12.5% of patients over 65 were found to have significant intracranial injury, versus 7.9% of patients under 65. Furthermore, elderly patients sustaining minor head injury had a high risk of significant intracranial injury despite no evidence of significant skull fracture, neurologic deficit, or altered level of consciousness⁵¹. Liberal use of CT is warranted in this population until better clinical decision rules are available.

SPINE

Elderly patient undergoing radiography of the cervical spine after trauma have at least twice the likelihood of cervical spine fracture than younger patients⁵². Interestingly, elderly patients who fall from low heights are at significantly increased risk of injury between the occiput and C-2, while patients in motor vehicle collisions and high falls are more likely to injure lower cervical vertebrae. Injuries to the cervical spine at multiple levels are common⁵³. In the Canadian C-spine rule, age greater than 65 was used as exclusion criteria, essentially mandating cervical spine imaging in all geriatric trauma patients. In contrast, the NEXUS clinical decision rule has been validated in a cohort of geriatric patients. The NEXUS investigators estimate that application of the decision rule could reduce the

need for cervical spine imaging by 14%. Of note, 15% of injured geriatric patients were considered intoxicated at time of evaluation⁵². Given the high incidence of injuries to the atlantoaxial (C1–C2) complex, a quite justifiable strategy is to CT the cervical spine of all elderly patients requiring CT of the head. Some centres have advocated CT of C1–C2 in all patients undergoing head CT for trauma, regardless of indications for imaging the cervical spine. As CT of the cervical spine has recently been found to be far superior to plain radiography for detecting fractures, and CT of the brain is likely to be indicated in nearly all elderly patients with trauma, CT should probably be considered the primary imaging modality of the cervical spine in most elderly patients, especially those over the age of 75⁵³. Cervical spondylosis predisposes to a syndrome of spinal cord injury in the absence of bony abnormality not uncommon in geriatric trauma patients. Mechanism for this phenomenon has been attributed to narrowing of the spinal canal, making the spinal cord more susceptible to compression when the neck is hyper-extended, resulting in either a central cord or Brown-Sequard like syndrome⁵⁴. Cases of spinal cord injury without bony injury frequently mandate emergent MRI to rule out acute disc herniation requiring decompression and to further delineate other causes of cord injury.

RIB FRACTURES AND OTHER THORACIC INJURIES

Rib fractures are both an important injury in and of themselves, and a marker of injury severity in the multiply injured geriatric patient. Elderly patients with rib fractures have nearly twice the mortality as younger victims, despite a lower ISS and higher Glasgow coma scale (GCS). In addition, mortality rises significantly with the number of rib fractures, from 12% inpatients sustaining one to two fractures, to nearly 40% in patients with seven or more fractures. Pulmonary complications including respiratory failure, pneumonia, and pleural effusion are more common in the elderly. Even the presence of a single rib fracture in the elderly carries significant morbidity and mortality^{55,56}.

ABDOMINAL TRAUMA

The abdomen is one region that is injured at a rate surprisingly similar to that of younger persons. The spleen is smaller in size from involution and apparently less prone to injury. Unfortunately, when solid organ injury is present, non-operative management of spleen or liver injury has been challenging. Extreme age was once considered an absolute contraindication to non-operative management of blunt solid organ injury. However, recent data suggest that age alone is not a contraindication to non-operative management, and an

expanded number of patients can now safely be observed⁵⁷.

Abdominal examination is traditionally considered less reliable in elderly patients, as evidenced by the lack of sensitivity for surgical disease in non-traumatic conditions. Liberal use of abdominal CT after trauma should be considered in all geriatric trauma patients.

MUSCULOSKELETAL SYSTEM

Fractures of the hip are the second most common (after wrist) fractures in elderly patients who sustain injuries after a fall^{58,23}. Patients sustaining isolated hip fracture have similar injury severity scores, and a similar incidence of severe complications, as the trauma population in general^{56,59}. Despite this, most patients with isolated hip fracture in the United States are seen primarily by an emergency physician and admitted to either an orthopaedist or to the patient's primary care physician. Although this practice has recently been questioned, it remains to be investigated whether outcome can be improved by triage of patients with isolated hip fractures directly to trauma centres, transfer of patients from community hospital EDs to trauma centres, or by the development of specialized hip fracture care centres⁶⁰.

A common presentation in the elderly is the persistence of hip pain despite negative radiographs. Such patients have a significant incidence of occult fracture. In a study of patients presenting to the ED with hip pain and negative plain films, 4.4% were diagnosed with fracture⁶¹. Over 90% of patients were over 65 years of age. MRI is superior to CT for the detection of fracture, and is more likely to reveal pathology not seen on CT. Fractures of the acetabulum can also easily missed on plain radiographs, particularly after falls. Periprosthetic fractures are relatively rare, but carry a high rate of complications including infection and non-union⁶². Vertebral fractures in elderly patients are common, even after minor or unapparent trauma. The prevalence of vertebral fractures in the general population increases dramatically with age. Patients present with pain at the level of fracture, and may or may not complain of radicular symptoms. Three types of fractures are common: anterior wedge, biconcave, and crush deformities. All elderly patients who present with back pain should undergo radiographs to evaluate for fracture. Even in the presence of negative radiographs, fracture may still be present. MRI or delayed bone scanning may be employed⁶³. Fractures of the pelvis carry tremendous morbidity in elderly patients. In one study of elderly ED patients, pubic rami fractures were the most common (56%), followed by acetabular fractures (19%) and ischium fractures (11%).

Multiple fractures were present in over half of patients, and mortality was nearly four times higher than in younger patients⁵⁹. In studies of major trauma patients, pelvic fractures in the elderly patients are more likely to haemorrhage and undergo angiography. Elderly patients are far more likely to suffer lateral compression fractures, as opposed to anterior compression fractures, are more likely to require transfusion, and are far more likely to die. Mortality in patients suffering pelvic fracture has been reported between 12% and 21%^{64,65}. Spontaneous osteoporotic fractures of the pelvis, also known as sacral insufficiency fractures, are a rare and infrequently diagnosed cause of low back, hip, and leg pain. Patients may present after minimal or minor trauma with symptoms suggestive of cauda equina syndrome and marked sacral tenderness. Plain radiographs are frequently normal. CT or MRI of the lumbosacral spine may be required to make the diagnosis⁶⁶.

OUTCOME

All geriatric patients who sustain multiple injuries will need to be admitted, however, isolated injuries may not need admission if after assessment it is determined that they are fit to go home. Geriatric patients involved in serious trauma have high admission rates to intensive care and correspondingly high morbidity and mortality rates⁶⁷; if the injuries are a result of a road traffic event attended by a casualty or are from a pedestrian-vehicular accident, it is mandatory that these patients are admitted. Even when the injuries seem minor, they need not be hurriedly taken out of the hospital/trauma centre. Most deaths occur in the first 24 hours of admission and survivors suffer a significant decline in function^{41,42,67}. Geriatric trauma patients have longer hospital stays, incur higher overall hospital charges, and require longer periods of rehabilitation^{44,68}. These patients also have a higher rate of complications, leading to worse outcomes.

Functional outcome after blunt trauma is predictably worse with increasing age, but outcomes between patients 65 to 97 years and patients over 80 years are remarkably similar⁴⁶. Recovery from injury can be prolonged, but with aggressive management over 90% of patients survive and many can return home⁴⁸. Prolonged intensive care unit stay is not associated with an unfavourable long-term outcome⁶⁹. Although no prospective randomized trial examining the outcome of transfer versus no transfer for geriatric trauma patients has been performed, evidence strongly suggests that multiply injured geriatric trauma patients are likely best served in a trauma centre⁷⁰. Patients requiring general surgical or neurosurgical intensive care or burn care

should be transferred once best attempts to stabilize the victim have occurred. Patients requiring repeat operation or particular orthopaedic or other surgical expertise should also be considered for transfer. Lengthy attempts at defining all injuries in the initial receiving hospital are not warranted if they will not significantly change management or will delay transfer for definitive care of more life-threatening injuries. Unfortunately, studies done by referring hospitals are frequently repeated at the receiving facility, increasing the costs of care⁷¹. Selected patients sustaining isolated injuries (usually after falls) may be considered candidates for discharge from the ED. Patients who presenting after a fall who report recurrent falls, have an abnormal mental status, or exhibit gait instability upon evaluation are poor candidates for discharge, and require a falls assessment by a geriatric specialist or team. Patients with lower extremity injuries are particularly high risk. Interestingly, assist devices such as canes and walkers have not been shown to reduce the risk of falls⁷².

Comprehensive geriatric assessment has become the “gold standard” of care for at risk elderly, and has been shown to reduce the rate of hospital admission, reduce repeat ED visits, and improve outcomes in patients discharged from the ED⁷³. A clinical prediction rule developed to assess fall risk in the elderly has shown that mental impairment (confusion, disorientation, or agitation), toileting difficulties, vision problems, and difficulty with transfer or mobility accurately predict falls in hospitalized patient⁷⁴. Presence of these in the ED likely puts the patient at substantial risk for subsequent falls.

EPILOGUE: THE NIGERIAN (SUB-SAHARAN) PICTURE

In an observational report it was noted that due to a lower life expectancy in the developing world, elderly patients make up a relatively lower proportion of those treated in accident and emergency (A and E) systems compared to other regions of the world⁷⁵. This important and accurate observation, however, fails to recognise a previously unnoticed demographic trend which has emerged recently, and it may significantly affect the delivery of A and E services in sub-Saharan Africa. A review of demographic patterns in published studies describing various A and E populations from Sub-Saharan Africa reveals a notable increase in the overall proportion of elderly patients over time, from a low of 1.7% in 1990 to the 27% reported in 2014⁷⁶.

The care of the elderly patient in emergency trauma situations with an added intricacy of pre-existing,

sometimes poorly controlled chronic diseases, a significant expenditure of resources will be required to provide adequate medical care in a sustainable manner⁷⁷. Nigeria, which like other regions within sub-Saharan Africa, is already operating at the limits of her resources, will need to develop and embrace healthcare innovation and multidisciplinary team approaches as part of the general strategy to better serve the fast-growing geriatric population segment⁷⁸⁻⁸¹. Facing acute workforce shortages, both primary care providers and specialists may need to flex beyond their primary areas of expertise to provide comprehensive care to those in need⁷⁶.

In order to achieve an improved healthcare of the geriatric population, an increased focus on primary healthcare with particular focus on public health education including topics such as preventive health, medication safety, and drug-drug interactions⁸²⁻⁸⁴. Identifying patterns of healthcare utilization specific to the geriatric population could be key in developing such targeted preventive and primary care coordination. The Nigerian health system will need to effectively manage increasing proportion of patients with chronic diseases (diabetes, congestive heart failure, mental health issues, chronic kidney, and pulmonary diseases)⁷⁶. Consequently, underdeveloped specialty areas such as critical care, medical/surgical subspecialties, geriatric care, and palliative services will inevitably come into focus⁸⁵⁻⁸⁷. Adequate and timely access to health care is important in reducing excess A and E utilization and improving health outcomes^{88,89}.

Trauma care in Nigeria and other Sub-Saharan regions will continue to evolve. Regionalization of trauma systems will likely be necessary to provide injured patients with optimal care, especially for those presenting with severe injuries in the setting of pre-existing medical conditions⁹⁰. This process will require the development of sustainable, cost-effective multidisciplinary approaches that incorporate high-quality geriatric and critical care capabilities, as well as reliable access to emergency medical and surgical services^{91,92}. Emergency and trauma providers accustomed to treating younger patients will need to make an important transition in both acute awareness and knowledge application regarding both general and specialty geriatric care including specifically targeted postgraduate, graduate, and medical education efforts.

CONCLUSION

Trauma in the elderly is responsible for a significant number of visits to EDs and will continue to increase. Knowledge of the physiologic changes associated with

aging, the impact of coexistent acute and chronic medical conditions, and an understanding of the unique patterns of injury in geriatric trauma patients is critical to maximizing outcome. Older patients tend to injure themselves most often after falls. Even falls from standing can result in significant fractures and traumatic injury. Geriatric trauma victims demand comprehensive assessment, aggressive management, a high index of suspicion for occult instability, and a low threshold for laboratory and radiographic investigation to assess injuries. Special injury severity scoring and pain assessment systems need to be developed to improve the care of the elderly involved in physical traumatic events.

While it is difficult to specifically identify one variable that will dramatically improve the care of the geriatric trauma patient, understanding how the different factors work together and creating prevention programs are essential⁹³. Trauma in the elderly should be addressed not just in the ED and hospital, but also from a public health perspective with emphasis on services and prevention. Research that addresses the different presentations, injury patterns, predictors of morbidity and mortality, and public health research on prevention will help further enlighten emergency physicians on how to best treat geriatric trauma patients to help them maintain high functional status. Much research remains to be done⁹⁴. Lastly, the leaders of sub-Saharan Africa and their health systems, in conjunction with the international community, must prepare to face the challenges associated with present the demographic trend.

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LOW BACK PAIN IN THE ELDERLY: BARRIERS TO COMMUNICATION AND VARIABILITY OF PAIN EXPERIENCE IN SELF-REPORT: A REVIEW

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Geriatric, LBP, Barriers, self-report, History taking, Assessment, Red flags

ABSTRACT

Background: Low back pain (LBP) especially if chronic is a common complaint among the geriatric population, which is sometimes considered trivial by caregivers and clinicians alike. The aetiology of LBP in the geriatric population is largely non-specific, multifocal and multifactorial with few diagnostic investigations available for thorough evaluation of sufferers. Therefore, a lot hinges on a patient's productive communication skill to obtain the relevant history and identify signs that can help the clinician to make an appropriate assessment, formulate an accurate diagnosis and institute appropriate therapeutic intervention(s).

Method: A review of literature was done with a focus on epidemiological trends, risk factors, aetiology, geriatric patients' perception about pain response, limitations to self-report and variability of pain assessment due to patient intrinsic and extrinsic factors.

Result: LBP has been identified as a disease in its own right. It ranks among the top 10 causes of DALY's (Disability-Adjusted Life Years) globally. 37% of LBP is work-related and this is estimated to cause 818,000 DALY's lost annually worldwide. More Pain management is an emerging field of specialization with few trained specialists. Geriatric patients with LBP as well as their health provider are faced with challenges that need to be surmounted to ensure optimal treatment, rehabilitation and return to function.

Conclusion: Physicians need patience with a creative communication style when assessing a geriatric patient presenting with LBP. There is also a need to assess therapeutic feedback to ensure optimal therapeutic intervention, prevent persistence of symptoms, disability and loss to follow-up care.

INTRODUCTION

Pain is an unpleasant sensory or emotional experience associated with actual or potential tissue damage or described in terms of such damage¹. Low back pain (LBP) can be described as pain anywhere between the costal margin above and the inferior gluteal folds below, with or without referral to the leg(s)^{2,3}.

Pain is known to be a disease component, however, chronic or recurrent pain has been regarded as a disease on its own⁴. Low back pain is the most common complaint among geriatric patients⁵ due to lumbar spine changes which are closely related to identifiable risk factors which often follow a chronic course⁶. Self-report of pain is the most reliable and accurate evidence of pain⁷ despite its subjectivity. Persons sixty-five years or older are referred to as the geriatric or elderly population⁸. However, the ageing process as well as co-morbidities may pose a personal barrier to effective communication of the patient's experience of pain.

Pain is a symptom of many disease conditions which can affect members of the population young or old, however, pain due to degenerative process is more likely in the elderly, hence, the frequency of this symptom in the elderly.

The frequency of this symptom in this population may be a contributing factor to the triviality with which sufferers, caregivers and clinician treat this complaint. Diverse risk factors found to be associated with LBP and barriers which pose challenges for effective communication of the pain experience are discussed in this review article.

Effective communication and appropriate feedback is essential for any meaningful transaction and health care is one such. Recounting and clerking the experience of pain both in the young and elderly population may be difficult sometimes especially in the geriatric population due to reasons discussed at a latter aspect of this article.

Epidemiological trends below show there is an increase in the geriatric population, hence an increase of geriatric patients with LBP. Pain is an emerging field with limited specialists to cater for the needs of the large patient load. Therefore, there is a need for every clinician to have basic skills in evaluating a patient with LBP and be prepared to identify the peculiarities of this population subset.

EPIDEMIOLOGY

There is an increase in the geriatric population from 13% in 2010 to more than 20% in 2030 at an increase

of 1.5 times the average rate in the United States⁸. There is also a consequent increase in the prevalence of LBP among the elderly, with a majority of patients residing in rural communities reflecting the close association with lifestyle^{2,9}.

The prevalence of pain is two-fold higher in geriatric patients when compared to younger populations as pain in children and younger adults are undertreated increasing the risk of transitioning to chronic pain in their old age^{10, 11}. The lifetime prevalence of non-specific LBP ranges between 60-70% in industrialized countries².

Among many symptoms of elderly patients presenting at a medical centre, pain is one of the most reported symptom⁵, which frequently runs a chronic course¹². LBP across culture appear to follow a similar trend and across countries it ranges from 1-58.1%, however, with substantial heterogeneous data².

Older persons are more vulnerable to persistent pain due to co-morbidities, nutritional problems and limited representation in drug efficacy study in this interest group, which may limit the range of treatment options^{13, 14, 15}, there is however, a 2-year recurrence rate of 60-80% in patients with LBP³ post-therapy. LBP ranks among the top 10 causes of DALY's (Disability-Adjusted Life Years) globally as 37% of LBP is work-related and this is estimated to cause 818,000 DALY's lost annually worldwide.

Despite the increasing patient pool, there is a relative lack of investigative clinical attention [2] [7] as well as trained specialist to effect standard practice for high yield therapeutic interventions¹⁶.

Risk Factors

Identifiable risk factors for LBP include ageing [6], occupational posture², bad posture⁶, sedentary lifestyle², obesity¹⁷, psychosocial factors (example include depression and low social support¹, chronic steroid use³, post radiation, post-stroke, tall height¹⁷, age⁶, trauma, vertebral column abnormalities⁶ like scoliosis, musculoskeletal diseases like fibromyalgia, joint or connective tissue diseases like Marfan Syndrome. Maladaptive beliefs^{3, 12} have also been identified.

Types of Low Back Pain

The types of LBP can be classified using duration of the condition or by nature of the aetiological factor.

I. Course

1. *Acute* : Course < 6 weeks

2. *Subacute*: Course 6 weeks to 12 weeks
3. *Chronic*: Course > 7 weeks to 3 months or > 3 months

II. Cause

1. *Functional*: Associated with physiological ageing process with no underlying pathology.
2. *Organic*: Associated with organic disorders especially in the spine. For example spinal stenosis and spondylolisthesis.

Tissues Involved

The tissue(s) involved in the causation of LBP include muscles, ligaments, tendons, connective tissue, joint capsule, cartilage, disc or nerve and may occur alone or in combination with others⁶. Pain can be triggered when these tissues are sprained, strained, pushed, compressed, abnormal tissue formation and direct or indirect tissue injury which leads to the activation of an inflammatory response and irritation of pain nerve fibers with the subsequent generation of action potential which is then conducted via the pain pathway⁶.

Pain Pathway

The lateral spinothalamic tract mediates pain and temperature sensation. Its receptors are free nerve (slow and fast conducting) endings (A-₁ and C). These free nerve fibers project to the spinal dorsal root ganglia (first order neurons) at all levels of the spinal cord and then enter the spinal cord through the dorsolateral tract of Lissauer to the dorsal horn (second order neurons). They then decussate in the spinal cord white matter forming a part of the ventral white commissure and thereafter ascending in the contralateral column to the VentroPosteroLateral (VPL) nucleus of the thalamus (third order neurons) from which they project through the posterior limb of the internal capsule to the somatosensory cortex of the cerebrum (Brodmann's area 3, 1 and 2)¹⁸.

Aetiology and Features

The definitive cause of low back pain is largely non-specific^{2, 17} with the interplay of multiple foci and aetiological factors¹⁹. There is need to exclude specific and emergency causes during assessment. LBP in geriatric patients may follow atypical presentation, course and outcomes as there may be multiple pathologies, diminishing physiological responses and presence of co-morbidities¹².

Mechanical strain is the most common cause of non-specific LBP in geriatric patients and 37% of LBP globally is work-related²⁰. Therefore, history of type of occupation and enquiry into the possible dynamics of occupational ergonomics will help the clinician to have

a high suspicion of mechanical strain as a cause of LBP if history is suggestive. There are many other causes of LBP, in which concise history taking and informed physical examination would guide the clinician on the possible differentials to consider while formulating his or her preliminary diagnosis. The table below categorizes and briefly describes some salient distinguishing features of some causes of LBP^{2, 3, 6, 21-23}

Barriers to Self-report: History Taking and Feedback Post-Therapy

Patience is needed in seeking appropriate clarification when obtaining history and feedback post-therapy from a geriatric patient with LBP and its relevant associations especially with function and activity⁶. The following factors have been identified as barriers to communication in the elderly with LBP:

1. *Patient's socio-demographics*: such as gender, age, culture, ethnic group, religion can influence a patient's expression of pain²⁴.
2. *Stoicism*: The endurance of pain without complaint making them more likely not to report pain and appropriate feedback after institution of therapeutic intervention¹²
3. *Societal misconceptions*: that LBP is a normal experience of ageing²⁵
4. *Comparing self to more ill person known to the patient*²⁵
5. *Psycho-social state such as mood*²⁵
6. *Fear of detection of undiagnosed medical condition and terminal illness*²⁵
7. *Fear of medical expenses*²⁵
8. *Fear of hospitalization or prolonged hospitalization*²⁵
9. *Fear of not being believed*²⁵
10. *Prioritization of symptoms and the type of stimuli*²⁶
11. *Fear of appearing to constitute a nuisance to caregivers and hospital staff*^{22, 26}
12. *Fear of Loss of autonomy to caregivers and health providers*²²
13. *Language barrier*: There is a terminology for pain in every language but the characterizations of pain is where the difficulty lies as not all descriptive words may be understood by the patient⁷ or have appropriate translation into native languages. Once the terminology of pain and relevant associations has been established, it should be clearly documented and all members of the managing team made aware²².
14. *Neurological impairments*:
 - A. Impairment in perception and sensation
 - B. Impairment in cognition
 - C. Impairment in communication

They all present a personal barrier to the assessment of pain in the geriatric patient^{12, 25, 27}. Where possible, it is preferable for the patient to communicate in the way he or she can best express himself or herself through non-verbal cues such as pictorial devices like pain maps or charts showing diagrams of the human body can be used by the patient to localize pain especially useful in patients with cognitive impairment²⁸.

More so, where possible and if necessary the patient should be encouraged to communicate in his or her native language, what they are experiencing, as self-report is the most reliable and accurate evidence pain⁷ especially when done verbally in cognitively-impaired patients²⁹ as studies have shown that older patients with communication challenges receive under-treatment of pain than others in similar age group and pathology³⁰.

Importance of a Sound History in Patient Evaluation

A good history will help the clinician to answer certain questions:

1. The type of low back pain: specificity, course, functional or organic
2. Identify risk factors
3. Single or multiple episode (s)
4. Possible underlying aetiology (s) and rule out emergency causes
5. Aggravating and relieving factors
6. Estimation of the localization and stage of disease based on symptoms and function
7. Presence and impact of disability
8. Understand the patient's perspective about his or her condition and inform the clinician on how to reach a therapeutic alliance with the patient.
9. What to look out for during examination, rule out red flags and direct the course of management.
10. Any previous or recent intervention?
11. Any underlying psycho-social pathology?
12. Prioritize investigations; which would be helpful in low resource settings and patients with financial constraints
13. Possible contra-indications to treatment
14. The need for rehabilitation
15. Which specialist (s) needs to be invited into patient management

Variability of Pain Experience

Geriatric patients have reduced sensitivity to pain due to a reduced density of unmyelinated nerves in the peripheral nervous system³¹ with accompanying slowing of nerve conduction along the pain pathway³² and a reduction of neurons and cells in the integration, interpretation and response feedback³³; this however,

Category	CAUSES	FEATURES
Non-specific LBP	Mechanical Strain	Commonest cause of LBP in geriatric patients [21] Pain worsened by change in posture and prolonged sitting or standing [21] Radiates to legs but usually not distal to the knee [21] Muscle spasm on palpation (pathological or physiological response to pathology [22] Slight spinal deformity, muscle weakness and commensurate age-related degenerative changes on neuro-imaging [6], No diagnostic tests [2,6]
LBP with radiculopathy or spinal stenosis	1. Spinal Stenosis a. Lumbar Spinal Stenosis	Non-specific leg symptoms worsened by prolonged standing, walking [3,6] neurogenic claudication [3,6] positive contralateral Straight Leg Raising(SLR) and Femoral nerve stretch testing [3] Less common than mechanical strain but risk increases with increasing age [22,23] and poor posture [6]
	2. Disc disease a. Lumbar disc herniation	Pain radiating down the posterior thigh into the leg aggravated by long walks or extended sitting Pain burning, electric shock-like, shooting or stabbing pain, paraesthesia, minor weakness positive crossed SLR > SLR test more predictive [3,22] Pain relieved in supine position with elevated legs and short walk [6] Abnormal gait often times [6]
	3. Cauda Equina Syndrome	New onset neurogenic bladder or bowel [3] saddle-like numbness, sciatica lower limb weakness. Surgical emergency [3,6]
	4. Fracture a. Compression b. Insufficiency Fracture (L3-5) c. Spinal Fracture	a. History of preceding trauma, chronic steroid use, strenuous lifting a. Percussion tenderness of the spinous process a. Preceding trauma may be absent b. non-specific LBP radiating to the limbs
	5. Spinal Malignancy (primary or secondary) a. Intraspinal intradural b. Intraspinal extradural c. Extrapinal d. Non-solid tumor E.g Multiple myeloma	Weakness, incontinence, positive babinski's sign Gait disorders from neurological deficits such as foot drag or slapping gait in affected feet with contralateral leg circumduction or steppage gait Constitutional symptoms: For example unexplained weight loss a. weakness before pain b. pain and weakness c. pain before weakness
	6. Spinal Infection e.g Disc Space Infection, Pott Disease	No position of discomfort Genitourinary instrumentation Fever
	7. Epidural abscess	Weakness, paresthesia, incontinence Symptoms and signs depends on location Percussion tenderness. Abscess do not destroy fibre tracts, instead displaces and spreads along axonal network
	8. Osteoporosis with a. Pseudo-arthritis b. Fracture	a. It can cause LBP due to non-traumatic osteoporotic spinal fracture heals over time with resolution of pain in 2-3 months, but if it persists, pseudo-arthritis should be suspected. This can be picked from a difference in vertebral height on standing and supine lateral spinal plain radiograph [6] b. Onset of pain is sudden and severe on lying from a sitting position or vice versa [6] Associated spinal deformities such as scoliosis and kyphosis [6]

	9. Sacroiliac disease	Positive Patrick test or FABER (Flexion, Abduction and internal rotation): eliciting pain at the contralateral side posteriorly around the sacroiliac joint is suggestive of a joint dysfunction
	10. Spondylolisthesis	LBP, spinal deformities and neurological leg symptoms [6]
Other causes of LBP	1. Seronegative spondylitis	For example Ankylosing spondylitis, reactive arthritis Pain persists for a longer duration
	2. Seropositive Arthritis	For example Rheumatoid Arthritis Pain persists for a longer duration
	3. Aortic Aneurysm [3]	Burning pain Abdominal bruit on auscultation Abnormal pulses, elderly
	4. Renal Infection	Dysuria, urgency, frequency Fever Renal angle tenderness
	5. Renal Calculi	Colicky pain radiating to the perineum [3]
	6. Inflammatory Radiculopathy [3,6,23]	Weakness on great toe extension (Sub-served Extensor hallucis longus) Asymmetrically decreased reflex Tapping the medial foot (tibialis posterior reflex) elicits pain It can be mono, poly or plexopathy Sensory loss in the lower limb in a lumbar radiculopathy (mono or polyradiculopathy), when present, can be mapped out using the corresponding dermatomal distribution.
	7. Endometriosis	Cyclical pain associated with dysuria, dysmenorrhea and dyschezia in a woman of reproductive age

does not cloud the intensity and quality of pain when they feel it^{26, 27}. Geriatric patients have been shown to have a greater level of underlying pathology when compared to younger populations²⁷.

There are downsides to the patient pain assessment as patients may sometimes tend to under-estimate or over-estimate (if they feel their experience will be considered trivial²⁵) the quality and intensity of their pain due to diverse factors earlier discussed, making pain thresholds or experience to differ between and within patients. The clinician has to find evidence of pain and take into consideration the aforementioned issues when evaluating such a patient to prevent complications of inappropriate treatment or sub-optimal treatment.

Pain assessment is important in the evaluation of a geriatric patient with LBP, however subjective it may seem. Many techniques are employed by health workers today and it is advised that it should be used regularly in the evaluation of patients with pain to ascertain treatment response and therapeutic efficacy of the chosen treatment method. A Self-report pain measurement scale can be used with special adaptation for patients with impairment(s) in sensory, motor, cognitive and communicative ability. Immediate feedback report is more reliable in patients with cognitive impairment than report of past pain experience²⁵.

Numeric Rating Scale (NRS): On a horizontal or vertical plane, with zero(0) at one end of the scale representing no pain and five(5), ten(10) or twenty(20) at the opposite end representing extreme pain. The

patient chooses any number along the scale that best describes the pain intensity²⁵.

Verbal descriptor scale (VDS): This involves the use of descriptive words such 'no pain', 'mild pain', 'moderate or intermediate pain', 'severe pain', 'extreme pain' and 'worst pain imaginable' showing a graded increase in intensity. This type is useful in educated patients. Pain thermometer is a variant of VDS, useful in patients with cognitive impairment²⁵.

Faces pain scales (FPS): uses pictures of faces that show varying level of painful distress. Useful in patients with limited education²⁵.

Other modes of assessment include the Visual analogue scale (VAS), McGill Pain questionnaire, pain interview, observational and surrogate pain report method²⁵.

Red Flags to Note

When a patient presents with LBP, the clinician needs to ascertain if the pathological basis would require an emergency intervention(s) or need special investigation(s). The following include some pathological basis in which the clinician would need more than routine test(s) for thorough evaluation.

1. **Metastasis:** When there is an underlying or previous osteophilic malignancy (example include carcinoma of the Prostate), insidious onset, not relieved at bedtime or lying supine³.
2. **Infection³:** from systemic and loco-regional sites. For example disseminated tuberculosis, chronic kidney and urinary tract infection and chronic

gynaecological infections. History of background immunosuppression, intravenous drug use with insidious onset.

3. *Vertebral Fracture*: Includes history of trauma, chronic steroid use, osteoporosis. In compression fracture, there may be no history of preceding traumatic event^{3, 6}.
4. *Acute Onset Cauda Equina Syndrome*: New onset neurogenic bladder, saddle-like numbness, sciatica or lower limb weakness may suggest acute onset cauda equina syndrome which is a surgical emergency^{3, 6}.

CONCLUSION

There is need for standard effective management of geriatric patients with LBP with facilitation of further researches that take into consideration this unique increasing population and ensures proper representation of this population in matters concerning their health. There is need for further training of pain specialists to increase availability of this much needed service. Patience and creative communication skills are important in the evaluation of a geriatric patient with LBP.

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AN EDUCATIONAL CASE-REPORT OF A PERSON WITH VASCULAR DEMENTIA AND COMPARISON WITH THE CHARACTERISTICS OF OTHER DEMENTIAS

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The dementias, Cognitive symptoms, Non-cognitive symptoms

ABSTRACT

The vascular dementias include a variety of severe cognitive disorders which are commonly the result of vascular risk factors, vascular disease, or both. The clinical spectrum is often varied, but may include changes in cognition, which are often severe. Additional fluctuation in emotions and personality are also commonly seen. This case presentation attempts to describe the clinical presentation of vascular dementia, in relation to other dementias. The paper concludes that detailed personal, medical and psychiatric history, as well as clinical and neuropsychological examinations may elucidate the cognitive and non-cognitive symptoms early in the course of vascular dementia and potentially differentiate vascular dementia from other types of dementias.

INTRODUCTION

The vascular dementias include a variety of severe cognitive disorders which are common, vascular dementias are the second commonest type of dementia in most clinical settings^[3]. The clinical spectrum is often varied. This variation may sometimes reflect the underlying predisposing pathology. In general, the clinical picture of vascular dementia may include deterioration in memory and not less than two other domains of cognition^[1]. The changes in cognition are often severe and affect the ability of the individual to function independently. Additional fluctuation in emotions and personality are commonly seen^[4].

The following case description is designed to help medical students, as well as doctors in their early years of training, appreciate the unique but variable clinical presentation of vascular dementia in relation to other dementias. The case described in the following section was managed at the Old Age Psychiatry Out-patient Unit of the University College Hospital Ibadan Nigeria.

CASE PRESENTATION

Mrs M.O, a 60 year old retired nurse was referred to the Old Age Psychiatry Out-patient Unit by the endocrinologists on account of difficulty with behaviours such as undue irritability, anger outburst and hostility. She was first seen 6 years earlier and managed for type 2 diabetes mellitus, hyperlipidaemia, and systemic hypertension using relevant medications as prescribed by the endocrinologist physicians. About 2 years before the referral, she had complaints of sudden onset

generalized slowness, occasional forgetfulness and unexplained weakness. The symptoms affected her ability to perform her usual chores like cooking and cleaning. In the year before her presentation to the outpatient unit, her forgetfulness was noticed to have become increasingly worse. She regularly forgot where she kept personal belongings such as her wallet and mobile phone. Repeatedly, she had to be reminded of the details of recent conversations. In addition, she was reported to have lost the ability to use money correctly over the period of her illness. As a result of this, she was stopped by her family members from shopping on her own. Eventually, she started having progressive difficulties with bathing and dressing which caused much distress to the family, especially her husband who was the principal caregiver.

Assessments

The mental state examination of Mrs. M.O at presentation to the unit revealed a middle aged woman with poor attention and concentration, poor registration and immediate recall with poor short and long term memory. Her blood pressure was 130/70mmHg. The only obvious neurological examination finding was abnormal ankle jerk reflex on the left side. The results of laboratory tests for fasting glucose, fasting lipids, thyroid function tests and other relevant investigations were also within normal limits. A selection of tests from the modified version of the Consortium to establish a registry for Alzheimer's disease (CERAD) neuropsychological battery was administered on Mrs. M.O. The local normative references for this battery

had been established for the Nigerian elderly ^[5]. The tests revealed impairment in multiple cognitive domains. Notably, she had a score of 16 out of a minimum of 22 expected for her level of education on the mini-mental state examination (MMSE). She was able to list 6 words out of 11, after a learning phase. Furthermore, she was able to name 5 animals out of a minimum of 7. A cranial Computerized Tomography (CT) Scan showed evidence of peri-ventricular intensities that were in keeping with white matter changes. Also recorded on the CT scan were multi-focal chronic infarcts and bilateral temporal lobe atrophy.

Clinical diagnosis and treatment

On account of the overall picture, a clinical assessment of vascular dementia was made according to criteria in the fourth revision of the diagnostic and statistical manual of mental disorders (DSM IV) ^[6]. This was based on the following characteristics: 1), the overall profile of deteriorating cognitive impairment leading to loss in functional ability such as being unable to perform household chores, shopping, bathing and dressing without assistance; 2), the presence of vascular risk factors including type 2 diabetes mellitus, hyperlipidaemia, and systemic hypertension, preceding the onset of cognitive impairment; and 3), the occurrence of multiple infarcts visualized on neuro-imaging examination.

She was placed on Tabs Risperidone 0.5mg nightly because of her behavioural symptoms. In addition she was encouraged to continue with her antihypertensives, oral hypoglycaemic agents and statins which are expected to provide ongoing control over the underlying vascular risks. She was planned for follow-up review after two weeks. However, she did not return to the clinic until after 2 months. On the return visit, the husband reported some improvements, evidenced by less hostility. She stopped coming to clinic after the second consultation.

DISCUSSION

Cognitive symptoms

The patient in this case report had cognitive impairments in three broad areas: memory, attention, and executive functions. Global cognitive impairment was psychometrically evident in her poor performance on the MMSE ^[5]. Specific impairment in memory was evident in her difficulties with remembering recent conversations, including the location of her personal belongings. Memory impairment was also evident in the problems she had with registration, recall, short and long term memory on the mental state examination. Psychometrically, specific problems with memory were

demonstrated by the poor performance in the word list learning test. In interpreting these changes in memory functions, it is often important to note that they may sometimes result from impairment in attention.

Impaired executive functioning may be responsible for her loss of the ability to use money correctly. This is also a reflection of impaired instrumental activities of daily living (ADL). In other perspectives, the ability to understand the correct value of money may be viewed in terms of an intact calculation ability, an aptitude that may require multiple areas of cognition such as language, memory, visuospatial abilities and executive functions ^[7]. Abnormality in executive functions was formally demonstrated by the poor performance in the Animal naming test. The patient in the report also had additional problems with dressing, a common problem of praxis that may also reflect impairment in self-care or basic ADL.

While most patients with vascular dementia may show variable or mild impairments in memory, these patients may exhibit more disturbances in attention and executive functions ^[8]. In contrast, impairment in memory functions may be a common and early presentation in Alzheimer's disease ^[9]. Some patients with frontotemporal dementia, especially the behavioural variant may also show impairment in attention and executive functions that may overlap with those of vascular dementia ^[10], while agnosia and severe visuo-constructional abnormalities may be more characteristic of Lewy body dementia ^[11].

Non-cognitive symptoms

The patient in the case report also had non-cognitive symptoms, which started with unexplained slowness and weakness, and later, irritability, anger outburst and hostility. These symptoms are referred to as the Behavioural and Psychological symptoms of dementia (BPSD). In terms of structure, the non-cognitive symptoms in the case reported may be viewed as the 'affective syndromes' of dementia ^[12]. They have also been categorised as 'mood' syndromes of dementia in other perspectives ^[13]. Yet, they have been referred to as 'depression syndromes' of dementia ^[14], or major depression ^[6] in other classifications. This symptom complex may be non-specific in terms of their diagnostic value in the dementias. However, as in the case report, they may be more commonly seen in the earlier or middle courses of vascular dementia ^[4]. Similarly, earlier presentations of 'affective syndromes' has been reported in Alzheimer's disease ^[15]. Perhaps, overlapping sub-cortical pathologies between, for example, depression and the sub-cortical dementias,

may explain the relatively high prevalence of the syndrome in conditions such as Parkinson's disease dementia and progressive supranuclear palsy ^[16]. In contrast to the mood symptoms, the 'behavioural' or 'psychotic' syndromes of hallucinations, delusions, euphoria and disinhibition^[12] may be more common in dementia with Lewy bodies and frontotemporal dementia. Visual hallucinations, in particular, may be common in dementia with Lewy bodies and Parkinson's disease dementia ^[16]. The psychotic and behavioural syndromes of dementia may also sign-post progression in the severity of many types of dementia, including Alzheimer's disease ^[17].

Underlying brain changes

Similar to the clinical presentation, the underlying brain changes that may be observed in vascular dementia may vary depending on the background aetiology. Vascular dementia may result from a single stroke with a strategically placed infarct. It may also take the form of multi-infarct dementia, or result from a progressive small blood vessel disease ^[18]. In many cases, it may occur following brain haemorrhages, or in combination with the neuro-pathology of Alzheimer's disease ^[19]. Despite this varied spectrum, most cases of vascular dementia may be characterised by increased number of infarcts on CT scan images of the brain structure ^[20]. Many lesions may become visible in the brain white matter on Magnetic resonance imaging (MRI) scans ^[20]. Irregular reduction in brain perfusion may become observable in many cases of vascular dementia when brain functions are investigated using the method of single photon emission tomography (SPECT) ^[21]. Similarly, evidence of irregular reduction in brain metabolism may be seen on Positron emission tomography (PET) images.

Pathologically, vascular dementia may be characterised by evidence of infarcts of various sizes, as well as severe cell losses in the hippocampus, a phenomenon often referred to as hippocampal sclerosis^[22]. These neuro-pathological changes in the brain of a person with vascular dementia may lead to interruptions in the neurochemical connections between different functionally meaningful parts of the brain. In addition, the vascular events may lead to changes in the pattern of circulation and permeation of oxygen and nutrients in several brain regions ^[19]. Neuro-pathological changes affecting the areas around the medial temporal lobe and hippocampus, for example, may result in the impairments of memory functions ^[23] as seen in the case presented. Similarly, the problems with praxis may result from neuro-pathological disruptions in several temporal and parietal connections ^[24]. Also, there were

problems with attention and executive functions in the case report. These changes may result from abnormal neuropathology affecting the frontal lobe or its connections with, for example, the thalamus ^[19]. Interruptions between the pre-frontal cortex, the limbic structures, and several sub-cortical regions may underpin the affective syndromes of depression and irritability ^[4] as demonstrated in the case in context.

Summary, lessons and conclusion

Vascular dementia encompasses several causes of severe vascular cognitive impairments. Detailed personal, medical and psychiatric history, as well as clinical and neuropsychological examinations may elucidate the cognitive and non-cognitive symptoms early in the course of the disease. Also, such clinical assessments may potentially differentiate vascular dementia from other types of dementias. Structural and functional neuro-imaging examinations may further enhance the reliability of the diagnosis of vascular dementia. These examinations may also help specify the type and location of the vascular pathology, thus differentiating the different causes of vascular cognitive impairments. The final diagnosis of dementia may be most reliably made by the neuro-pathological examination of the brain, typically after the death of the patient.

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THE PROBLEM OF DRUG UTILISATION AMONG THE ELDERLY

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ABSTRACT

As the population size and the population growth rate of elderly individuals increase worldwide, the proportion of elderly healthcare and drug product consumers also increase. The objective of this study was to review the use of drug among elderly persons in relation to polypharmacy, prescribing patterns, the occurrence of potentially inappropriate medications and the adverse effects on their health. Google Scholar and PubMed were the search engines used to search for articles relevant to the study. The following search terms were used: drugs and the aged, effects of polypharmacy, multiple medications, pharmacotherapy in the elderly, polypharmacy, prescription patterns, and potentially inappropriate medications. Most of the articles relevant to this review were obtained from the reference lists of authors and chapters of books. Irrational prescribing and polypharmacy remain prevalent among elderly patients.

INTRODUCTION

The elderly are individuals over the age of 65 and who have variable functional impairments. ^[1]The elderly account for a significant proportion of the population in many countries of the world^[2-4]. Over 60% of the elderly live in developing countries^[2-4]. It is a global phenomenon that the population growth rate of older persons is faster than those of persons in other age groups^[2,5]. Also, the number of older persons living in high-income countries is greater than the number living in the low and middle income countries^[2], albeit, the population growth rate of older persons in high-income countries is declining, while those of the low and middle-income countries are quite accelerated^[2]. In addition, the number of people aged 80 and above^[2], the “old-elderly”^[6], is growing even faster than the number of older persons overall^[2]. A significant observation made between 2010 and 2015, was that women outlived men by an average of 4.5 years^[2,5], and there is a progressive decrease in the sex ratio with advancing age^[2]. These statistics indicate continued growth in the population of elderly healthcare consumers^[6], majority of whom are females^[2,5,6].

A drug is a chemical substance of known structure, other than a nutrient or an essential dietary ingredient which when administered to a living organism produces a biological effect^[7]. Drugs may be obtained naturally, from plants or animals, or artificially, from synthetic chemicals or products of genetic engineering^[7].

Medicines are chemical preparations administered with the intention of producing a known therapeutic effect^[7]. Polypharmacy refers to the use of multiple medications, typically five or more^[8]. It is presently also being used to describe the use of inappropriate medications, or more medications than is clinically indicated^[9-11]. Consequences of polypharmacy include adverse drug reactions, drug-drug interactions, non-adherence, increased risk of cognitive impairment, impaired balance and falls, increased risk of morbidity, hospitalization, and mortality^[8,11].

This review describes the functional decline in elderly patients in relation to drug utilization, the problem of potentially inappropriate medications from poor prescription patterns and adverse drug reactions. A combination of the following search terms was used: drugs and the aged, effects of polypharmacy, multiple medications, pharmacotherapy in the elderly, polypharmacy, prescription patterns, and potentially inappropriate medications. In addition, a manual search of the reference lists from identified articles, book chapters, and recent reviews was done to identify articles that explained the following topics: physiological decline in geriatrics, pharmacotherapy, and adverse drug reactions (ADRs).

FUNCTIONAL DECLINE IN THE ELDERLY

Ageing is a progressive functional decline, or gradual deterioration of physiological function with time,

including a decrease in fecundity^[12,13] as the various phases of life are attained. It describes the intrinsic, inevitable and irreversible age-related process of loss of viability, increasing vulnerability, and the progressive likelihood to die, once the reproductive phase of life is over^[13-18]. With advancing age, usually after the fourth decade of life, progressive functional decline in organs such as the kidneys and the liver, and organ systems lead to changes in the way medications are handled and expressed^[19-21].

The rapidity of this decline varies with organ systems, as with individuals. The decline is attrition in normal function, a normal phenomenon, which does not include changes associated with pathological processes^[22,23]. However, ageing can be accelerated by a superimposed pathology^[21]. The rate of ageing in the fifth decade of life is the same as in the eighth; the difference is the cumulative decline in physiology over time^[21,22].

Disturbances of oesophageal motility, expressed as decrease in peristaltic response, delay in transit time, and decreased relaxation of the lower oesophageal sphincter after deglutition are some of the changes that occur in the gastrointestinal system as individuals advance in age^[22,23]. The incidence of atrophic gastritis of the types A and B is also higher among the elderly. Both types present with achlorhydria, deficient secretion of intrinsic factor and deficient pepsinogen production^[22]. Type A atrophic gastritis also present with hypergastrinemia^[22]. Decrease in the volume of the liver is observed as a progressive alteration in hepatic drug metabolism, arising from a decline in the amount and distribution of smooth endoplasmic reticulum^[22]. There is also a reduction in first pass metabolism^[11]. The incidence of cholelithiasis and higher risk from the complications of gallstones, is associated with ageing^[22]. There is a decrease in intestinal motility from hypotonia^[22] and a reduction in active transport^[11], resulting in a longer transit time, increased storage capacity and greater dehydration of stool that predispose to impairment in the breakdown of food matter and absorption as well as chronic constipation^[21-23]. Diverticulosis and fecal incontinence are also higher among elderly persons.

The cardiac output decreases linearly at the rate of 1% annually in healthy subjects after the third decade^[22,23]. The senescent cardiac muscles show decreased inotropic response to catecholamines and cardiac glycosides^[21,24]. There is also increasing diastolic and systolic myocardial stiffness^[25], with stiffened arteries, especially of the larger vessels, that result in an increased afterload^[26]. The accumulation

of amyloid deposits in the myocardium, ventricles and vessels may cause congestive heart failure and conductive disturbances in the electrical activity of the heart^[27]. Blood pressure also increase progressively^[28] from the first decade of life; arterial wall thickens due to hyperplasia of the intima, collagenization of the media and accumulation of calcium and phosphate among elastic fibres^[22,23]. Atherosclerosis and the risk of myocardial infarction thus increase with advancing age^[21-23].

Although the total lung capacity remains constant, a linear decrease in vital capacity occur because the residual volume increase as the lung ages^[21,22]. Similarly, the alveolar oxygen tension remains constant, however, the progressive decrease in arterial oxygen pressure causes an increase in the alveolar-arterial oxygen difference^[29] and ventilation-perfusion mismatch^[21,29,30] that is worsened by the reduced elastic recoil of the lungs^[30]. The maximum voluntary respiratory effort, forced expiratory volume in one second and the peak expiratory flow rate also reduce by about 20-30%^[22] after the seventh decade. The general depression in the immune system, especially those of the respiratory system predispose to respiratory tract infections^[21-23]. Other factors that exacerbate depressed immunity include poor oral hygiene, decrease in saliva flow rate, difficulty swallowing and a higher risk of colonization by gram negative bacilli^[22].

The volume and the size of the kidneys, that is the total number of glomeruli, would have reduced by about 30% between the third and the ninth decades^[31,32]. There is also a corresponding decline in the creatinine clearance^[21,22] due to a reduction in muscle cell mass^[21] that parallels the decrease in the glomerular filtration rate (GFR), however, the serum creatinine concentration does not change much^[21,33]. Tubular functions such as maximal glucose absorption^[22], concentrating and diluting ability of the kidneys deteriorates and predispose to hyponatremia and dehydration^[22].

Impaired glucose metabolism, as a consequence of progressive decrease in the number and function of β -cells of the pancreas occur. The average 2-hour postprandial glucose level increases by 1mg/dL annually^[21], because peripheral insulin resistance is progressively worsened by the relative reduction in insulin receptors on adipocytes. The increase in adiposity^[23] occur largely from hypertrophy of fat cells and the relative reduction in the lean body mass as the muscles atrophy^[21-23].

The combination of impaired renal function (decreasing maximal glucose reabsorption) and impaired glucose

metabolism predisposes to a vicious cycle of hyperglycaemia, a consequential osmotic diuresis, dehydration and further hyperglycaemia, that may spiral down to Hyperosmolar Hyperglycaemic State (HHS) especially in diabetic (Type 2) elderly persons. Impaired homeostatic mechanisms can cause profound effects, for instance, orthostatic hypotension, especially with anti-hypertensives^[21]. The compensatory mechanisms may become ineffective, and manifest as impaired reflex tachycardia, impaired regulation of temperature or electrolyte imbalance^[11].

Osteoporosis is usually initiated in the fourth decade; a cumulative 30-50% loss of bone mass is observed by the ninth decade^[22]. This decline is more profound in postmenopausal women^[21]. The muscle mass reduces at the rate of 1% annually beginning in the middle age^[34]. Degenerative changes in the joints are not excluded^[22,35].

Other changes in organ systems include the integumentary system- the epidermis atrophy, re-epithelization takes twice longer, the dermal collagen stiffens and elastin becomes more cross-linked, causing an overall decrease in the elasticity and tone of the skin^[23,36]. Ageing affects all systems of the body and the physiological processes in these systems.

THE PHARMACOKINETICS AND PHARMACODYNAMICS OF DRUG UTILIZATION AMONG ELDERLY PERSONS

Pharmacokinetics describes how the body processes a specific drug after its administration^[6,19,21]. The pharmacokinetic description of a drug is based on specific parameters such as age, sex, weight, body mass index, hepatic function and renal function^[4].

Limited pharmacokinetic data are available for the elderly, many assumptions are made^[6,11,20] about the drugs that may be implicated when side effects occur. A study which examined the randomized control trials of four commonly used medications found that the proportion of older patients (greater than 65 years of age) enrolled was significantly lower than the proportion of the average population and out of 155 trials, only three dealt exclusively with the elderly^[20].

Certain pharmacokinetic changes have been related to absorption^[19,21], for example, the decrease in active transport^[21] have been found to cause a decrease in the bioavailability of some drugs; whereas a reduction in the first pass metabolism, arising from a smaller liver mass with a reduction in blood flow, have been observed to cause an increase in the bioavailability of other drugs^[11].

Increased body fat prolongs the half-life of fat soluble drugs like amitriptyline and diazepam, while a decrease in body water increases the serum concentration of certain other drugs like digoxin, ethanol, levodopa, and morphine^[11,19,21].

The progressive reduction in hepatic volume and blood flow^[37], or the presence of an hepatic disease altogether^[21], cause a reduction in oxidative metabolism through cytochrome P450 (CYP450) enzyme system and lead to higher steady state concentrations of drugs like alprazolam, diazepam^[21], metoprolol, phenytoin and theophylline^[11,21,37].

The excretion of drugs is affected by a reduction in the cardiac output, due to senility or a failing heart, with a resultant reduction in the perfusion of the liver and the kidneys. These may cause a decrease in the elimination of high extraction ratio drugs^[11,19,21] such as imipramine, lignocaine^[21], morphine, and propranolol^[11].

Impaired renal function reduces the excretion of many drugs, and metabolites that are eliminated or deactivated by the kidneys^[21], for example, aminoglycosides, cephalosporins, digoxin, diuretics, gabapentine, lisinopril, meperidine, metformin, morphine, penicillin, ramipril, sotalol and tetracycline^[11,21,22], thus prolonging the half-lives of these drugs^[21,22].

Pharmacodynamic changes, involving the mechanisms of action as well as the physiologic and biochemical effects of drugs on the body, and associated with ageing include increased sensitivity to cardiovascular medications, anticoagulants, opioid analgesics, antipsychotics, and benzodiazepines^[19,21]. Altered concentrations of neurotransmitters and receptors as well as altered receptor binding properties or responsiveness are thought to contribute to pharmacodynamic changes that cause exaggerated drug effects^[11,21].

Functional reserves of many organs and tissues generally decline with age, sparing no system in the body especially, the cardiovascular, musculoskeletal and central nervous systems, and predispose to exaggerated drug effects^[11].

PRESCRIPTION PATTERNS AMONG ELDERLY PATIENTS

There is a high level of irrational pattern of prescription and inappropriate prescription of drugs among elderly persons for various reasons^[6,8-11,19-21]. In a study to determine the prescribing pattern and the prevalence

of potentially-inappropriate-medications (PIMs) among elderly outpatients visiting a Nigerian tertiary hospital^[38], the observation made was that, of 1000 prescriptions and a total of 3979 prescribed medications, analgesics, vitamins/mineral, cardiovascular drugs, psychotherapeutic drugs, diuretics and antibiotics made up 75.6%, 73.1%, 50.4%, 32.6%, 31.6% and 28.6% respectively. Of these 1000 prescriptions, 45.6% had one or more potentially inappropriate medications from Beers' list^[38]. Out of the potentially-inappropriate prescriptions, 73.5% had a single drug on Beers' list, 24.6% had two different medicines of concern (methyldopa and nifedipine)^[38] and 1.9% had 3-4 medicines from Beers' list occurring concurrently^[38]. This study is compared with another study in the same country (Nigeria)^[4] and a similar study done in India^[39] in Table 1.

In order to prevent the prescription of potentially-inappropriate-medications or reduce the unwanted outcomes of poor prescription patterns, it is important to determine which medications are still providing benefit. This is a very important step in the pharmacotherapy workup^[40], however, it can be more challenging than identifying potentially-inappropriate-medications (PIMs).

POLYPHARMACY AMONG THE ELDERLY

Polypharmacy is a growing problem, both in scope and impact^[6,11], and research has shown a strong correlation between polypharmacy and negative clinical consequence^[9]. Polypharmacy is derived from the Greek words "poly", which means more than one, and "pharmakon", which means "pharmacy"^[41]. Polypharmacy refers to the use of multiple medications, typically five or more^[8], or the use of more medications than are medically necessary^[9-11].

Polypharmacy may arise from: a prescription cascade, that is, the sequential treatment of side effects of medications^[11] as described in Table 2, prescription for multiple morbidities affecting elderly patients^[6,21], errors in medication administration^[6], no indication for drug utilization, and/ or unnecessary therapeutic duplications. It is a common observation in elderly persons in ambulatory care, hospitals and nursing homes^[9].

Strategies can be developed to redress issues arising from polypharmacy. This may entail the identification of potentially inappropriate medications by using recognized screening tools such as the Beers' criteria^[42,43], the Screening Tool of Older Persons' Potentially Inappropriate Prescriptions (STOPP) criteria and Screening Tools to Alert Doctors to Right

Treatment (START) criteria^[44]. The Beers' criteria was published in 1991 by the late Dr. Mark Beers, and it is a consensus list describing medications considered to be inappropriate for long-term care facility residents, for example, nursing homes^[42,43]. It has been updated five times^[42,43]. The STOPP and the START criteria are guiding principles describing the potential errors of prescribing commission and omission respectively^[44]. They were both developed in 2003 and validated in 2006 using the Delphi Consensus Methodology^[44].

Utilizing standard screening tools with good clinical judgment, as well as putting the patient's need into consideration will aid the identification of the drugs of benefit to the patient.^[11] Prioritization of drugs to be tapered or stopped through the development of a coordinated plan that is well communicated to the patient or their prescriber^[38]; and finally, simplifying medications by assessing the regimen and timing with necessary adjustment where suitable, will also help to curtail inappropriate and unnecessary drug use.

ADVERSE DRUG REACTIONS (ADRs) AND ADVERSE DRUG WITHDRAWAL EVENTS (ADWEs)

The elderly are under-represented in drug trials, yet they are the greatest consumers of medications^[6,11,20]. The problem of polypharmacy^[6,8-11] and undesirable drug-drug interactions^[19,21] are the bane for adverse drug reactions.

Although, there have been arguments and uncertainty about the relationship between potentially-inappropriate-medications (PIMs) and the occurrence of adverse drug reactions (ADRs)^[38,44], a recent study of 715 consecutively admitted older persons with acute, unselected illness to Cork University Hospital has provided some insight^[45]. The study showed that the potentially-inappropriate-medications (PIMs) listed in STOPP criteria were causal or contributory to acute admission in 11.5% of cases compared to 6% of cases using the Beers' criteria^[45].

Earlier studies have used Beers' criteria for determining potentially-inappropriate-medications (PIMs), although, its sensitivity seem lower, nonetheless, Beers' criteria is able to detect to an extent a relationship between the use of potentially-inappropriate-medications (PIMs) and adverse drug reactions (ADRs). In the study in the aforementioned Nigerian tertiary hospital^[38], Beers' criteria and the WHO indicators were used to determine the prescription patterns and the occurrence of inappropriate use of medications^[38], the data analysis

Table 1: A comparison of three (3) similar studies in two (2) developing countries- describing prescription patterns and the prevalence of potentially-inappropriate-medications among elderly patients in the Outpatient Department of the tertiary

Study	Nigeria ^[4]	Nigeria ^[38]	India ^[39]
I. STUDY DESIGN			
Place of study Setting	Ido-Ekiti General Outpatient Department of a rural tertiary hospital	Sagamu Outpatient Department, OOUTH	Jaipur Medicine Outpatient Department of NIMS Medical College and Hospital
Aim(s) and objective	To assess prescribing patterns for geriatric patients To estimate prevalence of PIMs in the same cohort	To determine prescription pattern and occurrence of PIMs	To assess the pattern of prescriptions and the cost analysis among geriatric patients
Type of study/ Period of study	Prospective cross-sectional/3 months (April - June 2011)	Retrospective	Prospective cross-sectional/ 6 months (June - December 2013)
II. METHODOLOGY			
Drug use indicators	WHO guidelines	WHO core indicators	WHO core indicators
PIM screening criteria	Beers' criteria	Updated Beers' criteria	ATC, WHO EML, NLEM 2011
III. SAMPLE NATURE			
Sample size	220	1000	235
Age group (years)	≥65	>60	≥65
Mean age (age)	72.8 ± 7.2	68.8 ± 7.3	81-85 (M); 65-70 (F)
Male: Female	1.39 : 1, M>F	0.83 : 1, M<F	1.23 : 1, M>F
Comorbidities (%) and/or frequency in the number of comorbidities (%)	i) Systemic hypertension (54.50) (Hypertension only- 59.20; Hypertension + others- 22.50; and Hypertension+ Diabetes- 18.30) ii) Diabetes mellitus only (6.40) iii) Malaria (6.40) iv) Osteoarthritis (5.50)		i) Cardiovascular (83.4) ii) Respiratory (73.19) iii) Musculoskeletal (65.11) >3 comorbidities (6) 3 comorbidities (38) 2 comorbidities (37)
IV. RESULT ANALYSIS			
Number of drugs	837	3979	1296
Average number of drugs per patient	3.8 ± 1.3	3.9	5.51
Fixed-dose combination(%)	25	-	-
Injectables (%)	14.96	0.8	-
Prescription by generic names (%)	43.2	48.9	31.94
Total PIM (%)	0.078	-	-
Frequency of PIM using a specified criteria (%)	≥1 PIM, Beers' criteria (25.5)	≥1 PIM, Beers' criteria (45.6) NLEM (95.4)	WHO EML (42.12) NLEM 2011 (60.10)
Common drugs by percentage (%), according to therapeutic group	i) Antihypertensives (30.6) ii) Multivitamins/food supplements (11.5) iii) Analgesics (10.8) iv) Antibiotics (7.8) v) Oral hypoglycemic (7.5) vi) Sedative (2.6)	i) Analgesics (75.6) ii) Vitamins and minerals (73.1) iii) Cardiovascular drugs (50.4) iv) Psychotherapeutics (32.6) v) Diuretics (31.6) vi) Antibiotics (28.6)	i) Cardiovascular (27.46) ii) Antibiotics (9.79) iii) Bronchodilators (9.72) iv) Antacid (8.71) v) Analgesic (8.41)
Common PIM encountered	i) NSAIDs (30.3) ii) Antihistamines (28.8) iii) Amitriptyline (15.2) iv) α-methyldopa (9.1) v) Diazepam (4.5)	i) Nifedipine (23.79) ii) Amitriptyline (16.81) iii) Methyldopa (15.97) iv) Chlophibiramine (10.65) v) Diazepam (6.16)	
V. OTHER INFORMATION			
Main cause of mortality	Cardiovascular conditions		

ATC; Anatomical therapeutic chemical classification;
PIM; Potentially inappropriate medications;

OOUTH; Olabisi Onabanjo University Teaching Hospital;
WHO; World Health Organisation;

showed that 45.6% of the 1000 (i.e. 456) prescriptions were on Beers' list, and high severity for potentially adverse effects were 82.7% while those of low adverse consequence occurred in 17.3% of cases^[38].

In a more rigorous prospective study of 600 consecutive older persons at the Cork University Hospital^[46], comparing the relationship between adverse drug reactions (ADRs) causal to acute hospitalization and potentially-inappropriate-medications (PIMs) as defined

among drug-drug interactions. This problem has led to a dearth in the number of studies or randomised controlled trials that has been done to establish the variable relationship of drug utilization among elderly persons.

The disturbances of oesophageal motility and delay in transit time would cause a longer contact time between the chemical ingredients of a drug (or drugs), and the epithelium of the gastrointestinal system. The studies

Table 2: Common presentations in geriatrics that can be caused by drugs

Clinical presentation	Drug-related causes
Falls	Sedatives (e.g benzodiazepine) ^[44] , hypnotics, anticholinergics, antihistamines (first generation) ^{a[44]} , antihypertensives, antidepressants, antidiabetics ^[11] , long term opiates, vasodilators ^{b[44]}
Cognitive impairment	Anticholinergics, benzodiazepines, antihistamines, tricyclic antidepressants ^[11,21,44]
Constipation	Anticholinergics ^[44] , opioids, tricyclic antidepressants, calcium channel blockers ^[44] , calcium supplements ^[11]
Incontinence	Alpha-blockers, antidepressants, sedatives (e.g. benzodiazepines), Diuretics ^[11]
Delirium	Antidepressants, antipsychotics, antiepileptics ^[11]
Diarrhoea	Antibiotics, proton pump inhibitors, allopurinol, selective serotonin reuptake inhibitors, angiotensin II receptor blockers, psycholeptics (anxiolytics, antipsychotics) ^[11]
Gastrointestinal bleeding	Nonsteroidal anti-inflammatory drugs, oral anticoagulants ^[11]

^a As a result of altered sensorium

^b Causes postural hypotension

by STOPP and Beers' criteria, the data showed that STOPP criteria are more relevant than Beers' criteria, in defining potentially-inappropriate-medications(PIMs) in older persons presenting to the hospital with acute illness^[46].The previous study^[45] also suggests that potentially-inappropriate-medications (PIMs) as defined by the STOPP criteria are significantly associated with serious adverse drug reactions (ADRs)^[44], that is, have increased sensitivity compared to the Beers' criteria. The study further used the Hallas criteria^[47] to evaluate the definite or possible prevention of adverse drug reactions in older persons. The result obtained was that STOPP criteria detected definite or possible prevention of adverse drug reactions (ADRs) 2.8 times more frequently than Beers' criteria^[44].

DISCUSSION

The overall changes in the physiological mechanisms of older persons predispose to variable responses to drugs among them. The variable degree of functional decline with the different comorbid conditions among them also posed difficulty in establishing standardized universal tools that would aid the assessment of drug utilization and the consequential effects of each drug

compared in Table 1 showed that analgesics rank among the first five most commonly used drug among the sample populations^[4,38,39].Also, non-steroidal anti-inflammatory drugs(NSAIDs) were found to rank first (30.3%) among the PIMs used among the 220 elderly persons assessed in Ido-Ekiti, Nigeria^[4]. The irrational use of NSAIDs, although for pain relief, is a known risk factor for the development of gastritis and peptic ulcers which may result in gastrointestinal bleeds. These risks together with atrophied gastritis is another risk for the prescription of another PIM, likely an antacid. Antacid, for instance, accounted for 8.71% of PIMs for the study in India^[39].

Aside the emergent gastrointestinal symptoms, the use of Celecoxib in an elderly person with co-morbid heart failure may cause oedema, worsening the heart failure. This may lead to the prescription of anti-failure regimen and their emergent adverse effects.

Identifying the severity of the pain and its origin, whether neuropathic or musculoskeletal, considering the adverse effects of the analgesic to be utilized as well as the comorbidity in the individual elderly patient are

thus key components in controlling the pain of the patient optimally. Essentially, the need for another drug – likely a PIM would be avoided.

It was not surprising that cardiovascular drugs were among the first three drugs in the studies compared^[4,38,39] and comprise about 30-50% of PIMs. The normal attrition in the cardiovascular system and its function at the rate of 1% annually without any comorbid condition, subjects the heart to about 65% of its function after the third decade (by 65 years). The imminent thickening of the vessels, the increasing blood pressures, stiffened myocardium among other changes are some of the reasons why elderly patients may require higher doses of cardiac glycosides and catecholamines. Cardiac output that is reducing over time also encourage stasis of blood in the cardiac chambers, hence, the need for low dose aspirin or other antiplatelet depending on the degree of severity of any associated comorbid condition. The benefits of the need for antiplatelets must be carefully ascertained because of the risk of bleeding, especially in elderly person with creatinine clearance rate of less than 30ml/minute.

Antibiotics were also among the frequently used PIMs among the study populations considered which may be due to the comparative reduction in the function and activities of the immune system predisposing to infections, especially respiratory tract infections. Infections of gastrointestinal focus may arise because of the relatively reduced motility rate, allowing microbes to proliferate until a negative balance is established.

Most elderly person also suffer a decline in cognition while others tilt into delirium at variable stages depending on the interplay of the variable risk factors. This decline alongside the presumption that almost all elderly persons require some form of psychotherapeutic treatment may predispose to constipation - a common adverse effect for a number of psychotherapeutic drugs, also aiding microbial proliferation. Others, such as paroxetine, are known to predispose to urinary retention. Chronic retention is a risk factor for urinary tract infections and hence, the need for antibiotics.

The use of diuretics are also prevalent among elderly persons. The decline in kidney function, arising from normal attrition due to age, or associated with cardiac failure, or imbalance in metabolism and fluid homeostasis may cause the need for this therapeutic group of drugs.

However, some elderly persons are known to suffer some form of malignancy or the other that would require chemotherapy. Chemotherapeutic agents like vincristine and cisplatin may cause Syndrome of Inappropriate

Antidiuretic Hormone secretion (SIADH), that may be mistaken for fluid retention from heart failure or kidney dysfunction. Hence, the prescription and utilization of another PIM.

The psychotherapeutic drugs are also quite prevalent among the listed PIMs^[38]. Analgesics, such as meperidine, pentazocine, and tramadol, and antidepressants are known to worsen cognition or delirium, cause confusion, hallucinations or lower seizure threshold. These adverse effects may be misinterpreted as new complaints, hence the need to prescribe these pharmacotherapeutic drugs.

Understanding the various multi-level interplay of drugs and their metabolism with the physiological changes as well as the role of any pathological component, in the body systems of the elderly person would be an invaluable tool in giving the best care possible, reducing the prevalence of polypharmacy and the prescription of PIMs.

CONCLUSION

The elderly constitute a population at risk of inappropriate drug use. Practical reduction of polypharmacy from the point of drug production to drug consumption must be undertaken. All the levels of prevention should be explored to contain and control the effects of polypharmacy. This may be achieved by providing health education for medical practitioners, especially specialties other than geriatrics.

Adherence will be promoted by eliminating unnecessary prescriptions and the employment of patient-centred treatment strategy. A planned periodic review of the health status (physical, emotional and psychosocial components) of the patient and the medications taken should be encouraged among medical practitioners to identify and deal with prescription cascades.

Thorough history taking and physical examination of the patient at every visit will help to determine the exact timing or near-timing of the onset of the symptoms in relation to changed medications. Otherwise, elderly persons will continue to be at risk of adverse consequences of drug use.

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PRESBYCUSIS: A CAUSE OF HEARING LOSS IN THE ELDERLY

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ABSTRACT

Hearing is a vital sense in the elderly which can serve as their windows to the world especially when faced with disabling multisensory loss that often inevitably accompanies their ageing. In old age, emphasis is placed on improving quality of life as nothing significant could be done to ameliorate degenerative changes that occur with ageing. Presbycusis being a cause of hearing loss purely due to changes of ageing is very prevalent in the elderly population and significantly affects their quality of life. There is a key place for the clinician in understanding a likely pathology a patient may have and the specific hearing difficulties the patient has in guiding appropriate treatment. Presbycusis is a disease which although is disabling to the patient can be successfully managed by the Otologist with laudable outcome.

INTRODUCTION

Hearing is one of the most important senses to the elderly. It enables them to stay alert, catch alarming sounds, listen in the dark and communicate efficiently with other family members. Good hearing is very vital for the elderly to cope with the disabling challenges of old age. Loss of this sense reduces their quality of life and presbycusis is a highly prevalent cause[1].

Presbycusis (from Greek presbys “elder + akousis “hearing”) is also known as ageing related hearing loss and can be defined as an apparently idiopathic, progressive, bilateral and symmetrical sensori-neural hearing impairment resulting from the degenerative changes of ageing. It is a complex and multifactorial disorder but occurs mainly as a result of ageing in the cochlea and central auditory system. It is likely the product of a lifetime of insults to the auditory system[2]. In 1974 Schuknecht a pioneer otologist described four types of human presbycusis:

- (1) **Sensory**, mainly affecting the cochlear hair cells and supporting cells
- (2) **Neural**, typified by the loss of afferent neurons in the cochlea
- (3) **Metabolic**, where the lateral wall and stria vascularis of the cochlea atrophy; and
- (4) **Mechanical**, where there seems to be a so-called “stiffening” of the basilar membrane and organ of Corti. These four areas have been shown to be implicated in the pathogenesis of presbycusis and a good understanding of it can guide the clinician in effective management.

EPIDEMIOLOGY

The prevalence of presbycusis can be 25% in those between 70 - 74 years, 50% by age 85, and >80% at 85 years old and above[1,3]. The incidence and patterns of presbycusis varies widely between westernized countries and primitive civilizations. For example a 1962 study by Rosen and colleagues of a remote tribe of the Sudan called the Mabaans revealed significantly less hearing loss in the elderly population than in similarly aged people of urban societies[4]. Whether this is because of the lack of chronic noise exposure or the paucity of other systemic ailments that are common in industrialized societies (e.g., atherosclerosis, diabetes, reactive airway disease) is not known. In general, most of the world's population experiences some degree of decline in hearing with advancing age[4]. Additionally, there is no difference in the prevalence of presbycusis between sexes[3] but after the age of 60 years, hearing is said to decline by about 1 dB per year and this was said to be worse in males than females[5]. Men are also affected more at higher frequencies.

Commonly associated risk factors include arterial hypertension, noise exposure, smoking and diabetes mellitus[6].

NORMAL AUDITORY PHYSIOLOGY

Understanding the normal auditory process is key to knowing how presbycusis results. The discussion here is brief, it focuses on the cochlea and relates mainly to the ideas important for understanding the pathologies relating to presbycusis.

The external ear comprises the pinna and external auditory canal, which acts as a resonator and enhances sound transmission. The middle ear transforms air vibrations into the fluid-filled inner ear (cochlea). The frequency range of human hearing ranges from 20 Hz to 20 kHz[7,8]. The cochlea is a coiled bony tube about 35 mm in length with three compartments: scala tympani, scala vestibuli, and scala media (figure 1)[9]. Scalae tympani and vestibuli contain perilymph, which has a high sodium concentration. Scala media contains endolymph with a high concentration of potassium. An endolymphatic potential (EP) of 80–90 mV is measurable in scala media[7,8]. This large direct current resting potential arises from $\text{Na}^+ \text{K}^+$ ATPase pumps in the stria vascularis located on the lateral wall of the cochlea. The lateral wall (stria vascularis and spiral ligament) and the direct current resting potential are seriously affected by the ageing process and will be discussed

A concise way of understanding normal cochlear physiology and how it breaks down with age is to segregate its functional aspects into three interlocking

systems: the cochlear amplifier, its power supply, and the transduction mechanism[7-10].

The cochlear amplifier starts with the outer hair cells (OHCs) which amplify waves produced by the movement of the stapes, these wave vibrations travel from the oval window along the basilar membrane stimulating the OHCs[7,8]. The amount of amplification is highly dependent on the potential (voltage) between the scala media and scala tympani, thereby present across the OHCs. This voltage is the Endolymphatic Potential (EP), which is ~90 mV within the scala media[7-10]. The amplification dependency has a direct relationship such that about a 1-dB decrease in amplification results from a 1-mV decrease in EP. The basilar membrane amplification from the active OHCs also shows a strongly compressive nonlinearity: vibrations from low-level sounds are amplified most, whereas those from intense sounds are amplified least. This compression of dynamic range at the level of the basilar membrane results in a relatively constant vibratory stimulus exciting the inner hair cells (IHCs)

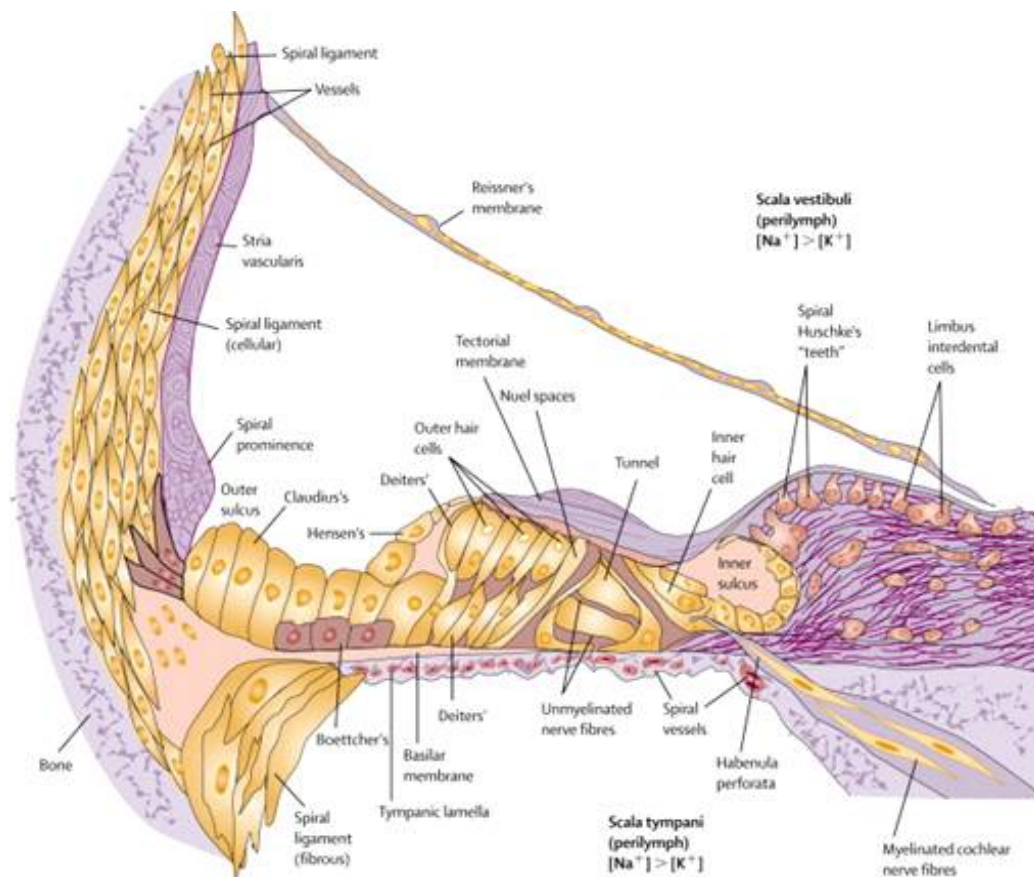


Figure 1: Cross section of the cochlea
Adapted from Lippincott Williams and Wilkins

over a wide range of acoustic intensities. Many forms of hearing loss involve the cochlear amplifier[7-10].

The second system is the cochlear power supply comprising the lateral wall tissues, including those of the stria vascularis where the EP is generated. This power supply is intimately related to the K⁺-recycling pathway, which actively pulls K⁺ back into the endolymph as it is effluxed from the hair cells into the perilymph. [10] The EP serves as the cochlear battery. Strial and lateral wall pathologies can both result in a lowered EP [10].

The third system in the transduction of cochlear vibration to neural impulses comprises the Inner hair cells (IHCs) and the afferent fibres of the auditory nerve[10]. The IHCs function as passive detectors of basilar membrane vibration and excite afferent fibres around the base of the cell. IHCs are more resistant to noise and chemical trauma than the OHCs and tend to survive with comparatively less pathology in aged ears. Even so, in animals raised their entire lives in quiet (quiet-aged ears), there is a significant loss and shrinkage of the afferent nerve fibres and their cell bodies; the spiral ganglion cells (SGCs) in Rosenthal's canal[10]. The loss and shrinkage with age occur even with the IHCs present and seemingly normal both in animal models and in humans[10].

PATHOGENESIS

This would be addressed according to the sites of the cochlea as highlighted earlier

- *Sensory presbycusis*: This refers to epithelial atrophy with loss of sensory hair cells and supporting cells in the organ of Corti. These changes correlate with a precipitous drop in the high-frequency thresholds, which begins after middle age. When human audiograms were matched to temporal bone pathologies, it seemed clear that the high-frequency loss so often seen in presbycusis matched the OHC loss in the basal coil of the cochlea. Speech discrimination is often preserved in this type of prebycusis [11-13].
- *Neural presbycusis*: It refers to atrophy of nerve cells in the cochlea and central neural pathways. Schuknecht estimated that 2100 neurons are lost every decade (of 35,000 in all). This loss begins early in life and may be genetically predetermined, another universally noticeable pathological change in aged temporal bones is the shrinkage and loss of Spiral Ganglion cells in Rosenthal's canal. [10] Effects are not noticeable until old age because pure-tone average is not affected until 90% of neurons are gone. Atrophy occurs throughout the

cochlea, with the basilar region only slightly more predisposed than the remainder of the cochlea[10]. Therefore, no precipitous drop in the high-frequency thresholds on audio is observed. A disproportionately severe decrease in speech discrimination is a clinical correlate of neural presbycusis and may be observed before hearing loss is noted because fewer neurons are required to maintain speech thresholds than speech discrimination[10]

- *Metabolic presbycusis*: This condition result from atrophy of the stria vascularis. Studies show that the degeneration of the stria vascularis is the most prominent element in presbycusis[14]. In addition, there is loss of Na⁺K⁺ATPase. Also the stria vascularis is heavily vascularised and has an extremely high metabolic rate, studies have provided strong evidence for vascular involvement in age-related hearing loss thus diseases such as diabetes and hypertension are significant here. The stria vascularis normally maintains the chemical and bioelectric balance and metabolic health of the cochlea. Atrophy of the stria vascularis results in hearing loss represented by a flat hearing curve because the entire cochlea is affected due to decreased EP. Speech discrimination is preserved[10,14].
- *Mechanical (i.e., cochlear conductive) presbycusis*: This condition results from thickening and secondary stiffening of the basilar membrane of the cochlea. This correlates with a gradually sloping high-frequency sensorineural hearing loss that is slowly progressive. Speech discrimination is average for the given pure-tone average[10].

AETIOLOGY/RISK FACTORS

The most significant are the ageing processes at the cellular level (hair cells and neurons) and organ level (basilar membrane, organ of Corti, stria vascularis) Genetic predisposition is also a factor in many patients[14,15]. A cumulative exposure to exogenous factors that can damage hearing also has causal significance with ageing. These factors include:

Exposure to loud noise/music on a continuing basis stresses cochlea, hastening presbycusis[15]. Ototoxicdrugs: Ingestion of ototoxic drugs e.g. aminoglycosides, aspirin may hasten the process of presbycusis[14].

Atherosclerosis which diminishes vascularity of the cochlea reducing its oxygen supply[16].

Diet containing a lot of saturated fat would accelerate atherosclerotic changes in old age[16].

Diabetes would cause vasculitis and endothelial proliferation in the blood vessels of the cochlea, thereby reducing its blood supply[16].

Smoking is postulated to accentuate atherosclerotic changes in blood vessels aggravating presbycusis[16]. Hypertension causes potent vascular changes, like reduction in blood supply to the cochlea, thereby aggravating presbycusis[16].

CLINICAL FEATURES

The main symptoms experienced by patients include hearing loss and tinnitus. Each of these symptoms could make sufferers experience not only physical discomfort but could also affect them emotionally thus making life miserable [14]. More distressing are the communication problems experienced by the patients. Elderly patients often have difficulties in hearing the high frequency sounds which may not be noticeable by people around until they have difficulty in communication which is a sequel of affectation of the speech frequencies. Although presbycusis affects the high frequency sounds at the outset, the hearing loss extends to the lower frequencies with time resulting in poor speech detection as well as poor speech understanding[14]. Hearing deficits are exacerbated in the presence of competing background noise. The missing high frequencies are essential to allow the inner ear to focus on sounds of particular interest and pick those sounds out from competing ambient noise. Patients with presbycusis will often perform quite well in one-on-one communication in a quiet room, but the ability to hear will decline when there is even a small amount of competing noise[14]. This experience is often referred to as the “**cocktail party effect**,” which emphasizes the difficulty that patients experience with communication in social settings. Patients also will often complain that they have more difficulty hearing women than men, which is the result of the inherently higher pitch of women’s voices.

Paradoxical hypersensitivity to loud sounds is also a common finding. Patients will often complain that sounds become too loud at levels that would easily be tolerated by persons with normal hearing. This is the result of “**recruitment**,” a disordered processing of sound in the inner ear. The simultaneous elevation of the threshold needed to hear quiet sounds, and the reduction of tolerable loud sounds. Recruitment explains why shouting at patients with presbycusis is often counterproductive, since it is primarily the low vowel frequencies that are amplified by shouting, which carry little of the missing speech information and can be quite uncomfortable to the listener[14].

EVALUATION

Good history is invaluable to guide diagnosis and suitable treatment. While taking history helps to ascertain what sounds the patient cannot hear clearly and sounds they cannot understand. It is also important to look out for concurrent problems such as cognitive disorders and depression. Also rule out risk factors such as smoking, diabetes and hypertension. Previous history of constant exposure to noises like that of a gunshot may result in presbycusis in the entire frequency range. It is important to check if there are any otologic symptoms such as tinnitus and dizziness in order to ensure that hearing loss is not caused by other illnesses such as tumors around the auditory nerve[14, 17].

Otoscopy should be done during examination of the patient although in clear-cut presbycusis findings would be normal, doing it is important to rule out other causes. E.g. cerumen impaction(which is more prevalent in the elderly)[14,17,18], infection, tympanic membrane perforation, or tumours. Presbycusis is a sensorineural hearing loss so Rinne’s test though diminished would still be positive (that is air conduction will be greater than bone conduction). Weber’s test would be central if both ears are equally affected or it would be lateralised to the better ear (that is the sound is quieter in the affected ear in Weber’s test). In Rinne’s test, both air and bone conduction are diminished. Whispered voice test is a simple clinical test that can be done to estimate the degree of hearing loss in decibels; it is done by standing at arm’s length behind the patient (to prevent lip reading) and mask hearing in one ear by occluding the ear canal and rubbing the tragus in a circular motion then whisper a short sequence of letters and numbers and ask the patient to repeat them and test the other ear in a similar manner[19]. The Hearing in Noise Test (HINT) can be done to measure the patient’s ability to hear speech in quiet and in noise; as noted earlier, presbycusis patients find it difficult to discriminate and understand conversations in noisy environments.

Audiometry should also be done. In presbycusis, an audiogram will show downward-sloping pure tone thresholds with relative preservation of word recognition scores. Vowels tend to be lower and louder, while the consonants, which carry the majority of meaning of words, fall in the higher and softer range. Audiometry also helps guide treatment as a word recognition score can be produced from it. Good word recognition in a presbycusis patient tells the clinician that amplification of sounds would likely produce a favourable response[14, 17, 19].

Diagnostic imaging should be considered to rule out central neural pathology. This should be suspected especially if there is tinnitus, unilateral cranial nerve deficit, vertigo.

MANAGEMENT

Although presbycusis has a high prevalence, the hearing loss can often only be compensated so daily function and well-being can improve. Simple diagnosis is a major positive step, as hearing loss in older adults can be mistaken for cognitive impairment. The identification of hearing loss can be reassuring for a patient.

Hearing aids work by amplifying sounds and can improve hearing function for most cases of presbycusis. It can lead to improvement in quality of life as it reduces the withdrawal, depression, and emotional impact that are commonly associated with presbycusis[20].

In severe cases where hearing aids do not work, cochlea implants may restore hearing. Cochlea implantation involves the placement of an electrode array within the inner ear to bypass the damaged cochlea, and stimulate the remaining cochlear neurons directly with electrical stimulation. Cochlea implant outcomes in presbycusis patients may be limited by the age-related reduction in ability to process sound information, as well as age-related cognitive deficits. Hearing impairment can also result from a loss of cochlear nerve fibers that the implant stimulates. Despite these considerations, the great majority of patients undergoing cochlea implantation for presbycusis can be expected to achieve significant functional improvement, similar to that seen in younger patients. Auditory rehabilitation is defined as sensory management, instruction, perceptual training, and counselling for hearing impairment. Auditory rehabilitation includes interventions such as active listening training, speech reading, and communication enhancement. Specific examples include education on reading facial expressions or lip contours of speakers. These treatments are usually administered through one-on-one training, as well as in the group setting. Auditory rehabilitation, when available, is usually practiced in combination with hearing devices[21].

FUTURE DIRECTIONS

Regeneration of Hair Cells

There is now a huge literature on hair cell regeneration. Certainly, it would be of great advantage to regrow hair cells in ears deafened by noise or ototoxic drugs; however, with regard to pure aging, it is the EP that must be regenerated before replacing lost hair cells. Two ways to re-establish the EP come to mind: using

external currents to aid the cochlear battery or regenerating the cells along the lateral wall that are responsible for generation of the EP[7,21].

Injection for Metabolic Presbycusis

Glass pipettes filled with a K^+ solution has been inserted into the scala media of quiet-aged and furosemide-treated gerbils with the purpose of passing a positive current to boost the EP [10]. When this is done, the EP does increase but unfortunately, the disadvantage to current injection in this manner is that the K^+ -recycling pathways function poorly in aged animals (which is why the EP is reduced). Passing a large K^+ current through the electrode into the scala media gradually overwhelms the recycling pathways and after some period of time, the K^+ overwhelms the homeostatic mechanisms in the cochlea, whereupon the system dies. Thus, although promising at first, the K^+ build up in the scala media is problematic.

Cell Regeneration

Another way to approach the problem of increasing the EP in metabolic presbycusis lies in maintaining and regenerating the cells responsible for its production. Studies from several laboratories have shown that the lateral wall cells, including the intermediate cells in the stria vascularis have a normal cycle of cell renewal[7]. Thus perhaps the most promising way to approach the amelioration of metabolic presbycusis is by understanding lateral wall cell turnover and why it decreases with age. Most of the lateral wall cells are fibrocytes, so maintaining and regenerating these cells should be easier than finding ways to regenerate terminally differentiated cells like hair cells.

CONCLUSION

Presbycusis is a highly prevalent cause of hearing loss among the elderly. It is a sensori-neural disease. Metabolic presbycusis is the mainstay of presbycusis types. The etiology includes degenerative changes in the inner ear and several factors including hereditary, environmental, systemic disease which worsen the progression of the disease. Although prevention of presbycusis is difficult and treatment is challenging, patients in the hands of good clinicians would have an improvement of symptoms and quality of life. The clinician should also have a high index of suspicion and look out for other causes and co-morbidities. Presbycusis is unlikely to be the only problem an elderly patient would have.

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ISOLATED SYSTOLIC HYPERTENSION IN THE ELDERLY: SHOULD WE MIND THE GAP?

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ABSTRACT

Isolated systolic hypertension (ISH) is the most common form of hypertension in the elderly and generally it is expected that 66% of population above 60 years would have hypertension. Age related vessel changes and declining renal function are the most important pathophysiological factors. Until very recently there was no clear consensus on whether to treat isolated systolic hypertension in elderly. This article is a brief overview of isolated systolic hypertension in elderly and the current guidelines treatment recommendations regarding this prevalent variant of hypertension in this population.

INTRODUCTION

Hypertension is assuming a global epidemic dimension with majority occurring in low income and middle income countries(1). It is the commonest cardiovascular disease in Africans and there is a significant likelihood of old people developing hypertension as blood pressure rises with age(2). High blood pressure is therefore a serious threat to survival and well-being of this population and the burden is expected to rise as the life expectancy of the general population improve in addition to the associated complications such as stroke, heart failure, coronary heart disease, renal failure, Left ventricular hypertrophy (LVH), dementia, aortic dissection and retinal vasculopathy(1).

ISOLATED SYSTOLIC HYPERTENSION IN ELDERLY

Isolated systolic hypertension in elderly (ISHE) is systolic blood pressure of >160 mm Hg and a diastolic blood pressure of <90 mm Hg in people aged 60 years and above(3). It must be noted there is no universal definition of elderly with lower limit varying with study protocols, national policies and other settings. The age cut-off, however, varies between 55 and 65 years.

ISHE is the commonest form of hypertension among this age group(4). Generally it is expected that 55% of adult population would be hypertensive by age of 60 years and 65% by age of 70 years(5). Another report suggests that about 66% of population above 60-years have hypertension(6).

The prevalence of ISHE tends to be generally higher in blacks and women than whites and men(7). The

tendency of elderly to develop systolic hypertension usually around 50- 60 years and above is also associated with elevated pulse pressure, in addition to increased total peripheral resistance(8). They also have increased arterial wall thickness, increased left ventricular mass and left ventricular wall thickness while in the reverse they have decreased cardiac output, heart rate and diastolic blood pressure.

Data on ISHE in developed countries is well documented and it constitutes a significant proportion of such population. National data on such are lacking in many low and middle income countries (LMIC)(1,9). A Portuguese national study reported a prevalence of 20.3% from primary care setting and 35% from the community and also confirmed higher prevalence in elderly women(10).

Until recently, there was no clear consensus on whether to treat or not to treat ISHE. It was seen as a benign accompaniment of aging(11).

AETIOPATHOGENESIS AND PATHOPHYSIOLOGY

Aging related vessel changes is the most important aetiological factor of ISHE while Paget's disease of the bone, anaemia, thyrotoxicosis and aortic regurgitation play lesser role(5).

Increasing age is associated with structural changes in vessel wall, which include increase in collagen to elastin ratio and functional changes with decrease in arterial wall compliance and central arterial stiffness(11-

13). These lead to increase in large vessel rigidity, decrease in elasticity of large capacitance vessels, decrease in lumen-to wall ratio and overall cross-sectional area and decrease in arterial compliance ("windkessel function" of the large arteries)(5),(14). This appears to be the major mechanism of development of ISHE.

The development of ISHE that comes with stiffening of the large vessel especially the aorta leads to isolated and high systolic blood pressure but normal or lower diastolic pressure(8). There is also lipid and calcium accumulation in the vessel wall(12,14).

Pulse Pressure (PP) and pulse wave velocity (PWV) (an independent risk factor for cardiovascular events) are also increased(13). The elevated blood pressure can further impair endothelium-dependent vasodilation thereby further worsening the blood pressure(6).

The aging related declines in kidney function also play a role in the development of the hypertension. Other factors that have been identified in the pathophysiological process include obesity, decreased physical activity, anaemia and decreased baroreceptor function(5),(6).

The end result is increased risk of cardiovascular events since systolic blood pressure and associated wide pulse pressure is a significant predictor of cardiovascular events. (4, 15).

Pulse pressure increase in elderly aside from the structural changes in vessels is also due to the endothelial dysfunction which is associated with increase in the production of vasoconstrictors such as angiotensin II, endothelin and thromboxane while there is decreased release of vasodilators such as NO and bradykinin(13). In terms of gender differences, elderly hypertensive women usually have stiffer large arteries, greater central wave reflection, and higher pulse pressure (both carotid and brachial) than elderly men(16).

IMPLICATIONS

The Rotterdam elderly study examined the relationship between isolated systolic hypertension and carotid intima media thickness and found that carotid end-diastolic mean lumen diameter was significantly larger in this group of patients(3). Furthermore atherosclerotic plaques were more frequently seen among those with ISH compared to the control participants. These findings have significant implication on the risk of ischaemic stroke.

A meta-analysis involving 15, 693 elderly persons with ISH shows that antihypertensive therapy prevents cardiovascular events especially for those aged 70 years and above(17).

In a follow up study of renal function in treated and untreated older patients with isolated systolic hypertension calcium channel blocker use was associated with reduction of overt proteinuria(18). Findings from the hypertension in the very elderly trial cognitive function assessment (HYVET-COG) study suggests that blood pressure treatment did not reduce the incidence of dementia(19).

GUIDELINES/RECOMMENDATIONS ON TREATMENT OF ISHE

Guidelines are available to guide physicians in managing of hypertension including ISHE and these include the hypertension guidelines of the National Institute for Health and Clinical Excellence(NICE), Eighth Joint National Committee (JNC 8), European Society of Hypertension/European Society of Cardiology (ESH-ESC), Canadian Hypertension Education Program (CHEP) and American Society of Hypertension/International Society of Hypertension(ASH/ISH), International Society for the study of hypertension in Blacks (ISHIB), the African guideline, Nigerian Hypertension Society guideline and the South African guideline(20).

The guidelines highlighted the importance of SBP as an important cardiovascular risk factor compared to diastolic blood pressure. All the guidelines suggest that the treatment of ISHE prevents cardiovascular events(21). JNC 8 published in 2014 recommends the initiation of drug therapy in order to lower a systolic BP (SBP) of ≥ 150 mmHg for those aged 60 years or older(22). (See Table 1)

In a minority view on JNC-8 objected to increasing the target SBP from 140 to 150 mm Hg in persons aged 60 years or older without diabetes mellitus (DM) or chronic kidney disease (CKD) as in the previous guideline(23). (See Table 1)

There is a unanimous agreement to treat to a target of systolic blood pressure (SBP) of 140mmHg. It is also necessary to consider and address co-morbidities such as diabetes mellitus, lipid abnormalities, obesity and other lifestyle issues such as smoking that commonly or can occur in hypertension including ISH patients. The general knowledge of hypertension in blacks such as the requirement of more than one antihypertensive drugs to control blood pressure, variable response to

such drugs and poor response to angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, and beta-blockers should be acknowledged and applied(8). However, there is need for more studies of therapy among African black ISH elderly.

In individuals aged ≥ 80 years, American Society of Hypertension and the International Society of Hypertension (2014) recommends starting treatment at BP levels $\geq 150/90$ mmHg and treatment target should be $<140/90$ mmHg except those with chronic kidney disease or diabetes(8).

European Society of Hypertension/European Society of Cardiology (ESH/ESC) recommends that the physically and mentally fit over 80 year or very elderly with initial SBP of ≥ 160 mmHg to have target SBP reduction of 140-150 mmHg. The systolic blood pressure of 140 mmHg for the physically and mentally fit elderly(24). The decision for the frail ones are left to the managing physician. Elderly hypertensive (less than 80 years) with SBP of ≥ 160 mmHg are strongly recommended to be reduced to 140-150 mmHg while the mentally and physically fit may be considered reduced to less than 140 mmHg if they tolerate.

National Institute for Health and Clinical Excellence (NICE) recommends target of less than 150/90 mmHg

in above 80-years(25). In addition, Calcium channel blockers are preferred first drugs for patients over 55 years and those of Afro-Caribbean origin although angiotensin converting enzyme inhibitors (ACEIs) may be offered and if not tolerated angiotensin II receptor blockers (ARB).

All the guidelines generally recommended treating ISHE (See Table 1). The target SBP, however, should be attained slowly. Lifestyle modification is also necessary and choice of medication depends on co-morbidities and overall cardiovascular risk(5). The addition of anti-lipid agents such as statins is beneficial(26).

The downside is the difficulty in controlling of ISHE particularly due to persistent focus on the DBP as a carryover from era when DBP is considered worse than SBP as a cardiovascular risk(27). Such treatments are not free from adverse effects which may include dizziness, headache, rash, renal dysfunction and arrhythmias that can arise from antihypertensive therapy.(28)

The grey area

There is possibility of increased mortality with excessive lowering of diastolic pressure which comes with attempt to control ISH. Therefore, there is need to tow line of caution and ensure a balance in the lowering of systolic and diastolic blood pressure(4),(6). This adverse

Table 1: Summary of major guidelines on ISHE

Guidelines	Year of Publication	General recommendation on ISHE	Treatment Threshold	Goal of treatment	Recommended Drugs	Comments
Eighth Joint National Committee (JNC 8)	2014	Treat	≥ 150 mmHg (≥ 60 years)	<150 mmHg	Calcium Channel Blockers, Diuretics or both	Extensively addressed ISHE
European Society of Hypertension-European Society of Cardiology (ESH-ESC)	2013	Treat	≥ 160 mmHg (≥ 80 years)	140-150 mmHg, less than 140 mmHg (Fit)	Calcium Channel Blockers, Diuretics	Less extensive on ISHE
National Institute for Health and Clinical Excellence (NICE) on hypertension	2011	Treat			Calcium Channel Blockers	Cut off age of elderly is 55 years

outcome has to do with decrease myocardial perfusion especially in those with coronary artery disease leading to myocardial infarction and death especially when the DBP is lowered to less than 70mmHg(11). Therefore, lowering DBP to less than 70mmHg is discouraged.

CONCLUSION

ISHE is a common clinical problem in this age group. Practice guidelines generally recommend treatment with antihypertensive depending on co-morbidities and overall cardiovascular risk. Lifestyle modification is necessary too in the management plan.

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ABSTRACT

The population of the elderly is reported to be increasing. A 2015 survey showed a 48% increase in the population of the elderly globally and these figures have kept increasing in the last five years. Two third of this population was found to live in developing countries, with an increasing number requiring medical care. Of note is the difference between chronological and physiological age. The elderly patients are a highly diverse group, often frail, with multiple comorbidities. This is due to aging related changes in them (elderly). These morbidities make them at a higher risk for adverse outcomes perioperatively. The foregoing presupposes that they require specialist tailored care by the physician, who must be aware of these changes and how to tackle them, in order to deliver adequate management. This review seeks to highlight the salient points in challenges and management of the elderly surgical patient perioperatively.

INTRODUCTION

The elderly population is a fast growing age group. Global trends indicate that their number is increasing in different parts of the world. The 2015 world population ageing report¹, states that there was a 48% increase in the number of people aged 60 and over between 2000 and 2015, by 2030 the figures are expected to grow by 56%, and at current growth rates, the elderly population is expected to be more than double its size in 2015 by 2050. Of this population, the number of people aged 80 and above is growing faster than the number of the older people overall¹.

Two thirds of the world's older persons live in developing countries and their number is growing faster there than in developed regions. In Nigeria according to the 2006 census, 4.3% of the about 140,431,790 million people are aged 65 years and above².

The above statistics underscore the importance of more efforts directed towards the care of this set of the populace. One study reported that there is an increasing population of surgical patients aged 65 years or older, and the fastest growing age groups among them are individuals aged 85 years and older³, this is not surprising, given the overall population demographics.

There is an age-related decline in physiological reserve (that is the capacity left in an organ to carry out its physiological function especially in the context of a disease or in ageing), which may be compounded by

illness, cognitive decline, frailty and polypharmacy. They are at a higher risk of perioperative adverse outcomes than their younger counterparts, even from relatively minor stresses and the elderly patient with comorbidity is even at a greater risk.

Perioperative refers to care received before, during and after surgery. Each of these stages in the care of these patients is very critical, especially in ensuring good outcome. An increasing number of surgical patients present with ageing related conditions e.g. from cardiac or pulmonary disease which may result in a poor prognosis if not properly managed⁴. It will therefore be timely to review the perioperative management of this age group, doing this will help increase the knowledge base of managing this dynamic, fast growing set of patients and thus ensure better outcomes for them.

PHYSIOLOGICAL CHANGES IN THE ELDERLY AND THEIR CLINICAL SIGNIFICANCE

Physiological decline is a feature of ageing and takes place in all organ systems at a rate of H¹1% function per year after 40 years of age. These changes occur across all organ systems, are normal and should be differentiated from pathological changes as a result of diseases which also have an increased prevalence in the older age group⁵. These changes, whether physiological or pathological have implications for clinical outcomes.

It is imperative to highlight some key changes in the functioning of various organ systems that occur with ageing. Emphasis is laid particularly on the changes of clinical importance in day-to-day management of patients.

Cardiovascular System

According to Brandfonbrener et al, cardiac output decreases with age at a rate of about 1% in normal subjects who have no cardiac disease⁶. This decline in cardiac output has been attributed to several factors: the decreased response of senescent muscle to inotropic stimulation and importantly of clinical significance cardiac glycosides⁷, an increased diastolic and systolic myocardial stiffness due to interstitial fibrosis⁸, and thickening of the walls of arteries causing an increased afterload⁹.

A progressive age-associated increase in systolic arterial pressure has also been noted, this has been partly attributed to the radius of the vessels and the increased thickness of vessel walls¹⁰, increased plasma norepinephrine concentrations¹¹, attenuation of baroreceptor reflex due to decreased sensitivity of the arterial wall to stretch^{10,12}.

In addition, the ability to accommodate increased venous return is reduced in the elderly due to reduced vascular and myocardial compliance¹³. This is an important consideration in these patients as a little fluid overload which may have been otherwise tolerated in younger patients may have far reaching consequences in them. Compensatory cardiovascular mechanisms are diminished such that syncope results from postural changes, consumption of a meal, urination; stimuli that do not cause a similar response in younger patients¹³.

Respiratory System

Vital capacity has been found to decrease with age in a linear relationship¹⁴, the total lung capacity however still remains the same and the residual volume therefore increases with age. Arterial oxygen concentration drops with age, increasing the alveolar-arterial oxygen difference¹⁴, this has been attributed from increasing mismatch in ventilation/perfusion.

Elastic recoil of the lungs decreases with age and the likelihood of airway collapse is more in the elderly, more so after a surgery. There is also an approximate 20%-30% decrease in flow rates like forced expiratory volume in one second, maximal expiratory flow rate, maximum voluntary ventilation¹⁴. This is believed to also be related to the reduced elastic recoil in the lungs.

There is also an increased incidence of respiratory infections in the elderly; while this may be partly due to the relative immunosuppression, some other factors related to the respiratory system may also play a role. These include aspiration of oropharyngeal secretions noted to be more common in the elderly, to be noted also is the fact that the usual clearing of the respiratory tract by the mucociliary apparatus is less effective in the elderly⁵.

Gastro-intestinal System

The motility function of the esophagus reduces as age increases, a phenomenon known as presbyoesophagus. There may be a decreased peristaltic response, delayed transit time and may cause the elderly patient to restrict intake. The lower esophageal sphincter does not readily relax as easily as in younger patients and there is also an increase of degenerative changes in the epithelia of the stomach (atrophic gastritis)¹⁵. Decreased intestinal motility, leads to longer transit time and greater stool dehydration, these contribute to the recalcitrant constipation that commonly affects the elderly. Diverticula become a challenge as age increases, other challenges include loss of sphincter control in the presence of normal cognition, identified in one study to be due to a loss of tone of the external rectal sphincter⁵. The metabolism of certain drugs by the liver is known to decrease with age, and attention must be paid in administration of such drugs⁵.

Genitourinary System

There is a gradual decrease in the volume and weight of the kidneys with aging, such that at the ninth decade, renal size is only about 70% of its size during the third decade. The total number of glomeruli per kidney reduces from about one million below the age of 40 to about 700,000 by age 65^{16,17}. As a result creatinine clearance usually decreases but there is also a concomitant drop in the amount of creatinine produced as a result of reduction in muscle cell mass, so serum creatinine levels do not change much¹⁸.

The above highlighted features have implications in clinical management. Drugs like aminoglycosides, digoxin, penicillin and tetracycline which depend mainly on the glomerular filtration for clearance will have a prolonged half-life, even when dosage is modified through the standard use of serum creatinine concentration. Tubular function declines also with age, the threshold for glucose reabsorption ranges from 130-310mg/dl in the elderly and so in management of diabetes mellitus, glycosuria may be misleading in diagnosis.

Urinary incontinence begins to pose a challenge as age increases, more than 90% of men aged 80 years and above have symptomatic prostatic enlargement.⁵

Endocrine system

The capacity of the beta pancreatic cells to recognize and respond to elevated blood glucose levels is impaired with aging¹⁹. There is equally an increased tendency to development of peripheral insulin resistance with age due to a relative increase in adiposity in the elderly, associated with down-regulation of insulin receptors²⁰. Osteoporosis is quite common in elderly, more in women, due to an age related decline in bone mass. Beginning in the fourth decade, there is a linear decline in bone mass at a rate of about 10% per decade for women and 5% per decade for men and so by the eighth and ninth decades 30-50% of skeletal mass may be lost^{21,22}.

Skin

The skin in many pathologic conditions gives a clue as to what the underlying problem may be, ageing is not left out. The epidermis begins to atrophy with age and is particularly apparent over exposed areas: the face, neck, upper part of the chest. Dermal collagen fibres become stiffer and less pliable with age, this causes a loss of skin tone and elasticity causing the sagging and wrinkling commonly seen in them²³. There is also a relative ischemia of the skin, due to reduction in the number of dermal blood vessels. This may contribute to the development of decubitus ulcers.

Musculoskeletal system

There is an age-dependent decline in lean body mass which occurs due to loss and atrophy of muscle cells, affecting some muscles, for example the Soleus very much and others, for example, the diaphragm only minimally²⁴. Degenerative joint disease occurs in 85% of persons older than 70 years of age and is a major cause of disability and pain in this group⁵.

Nervous System

The age related changes occurring in the nervous system affect both central functions and the peripheral nervous system. Changes in mentation include difficulty in learning and forgetfulness though of minor details and should be differentiated from dementia in which loss of memory involves important information and affects functioning. Intellectual performance, though noticed to be maintained till about age 80 in those without neurological disease, has been found to slow down as age increases: elderly individuals spend longer time on tasks. The number of nerve cells in the brain reduces with age; this reduction affects different parts of the brain to varying degrees. Brain weight has been noted

decreases by about 10% from age 20-90. Histologic changes seen in pathologic states are also seen in normal aging brains, though of course to far less degrees. These include deposition of pigment lipofuscin, amyloid in blood vessels, senile plaques and neurofibrillary tangles.

Changes occur in neurotransmitter systems; important is the increase in monoamine oxidase which contributes to the development of Parkinson's disease. When this is slowed by administration of monoamine oxidase inhibitors, onset of Parkinson's is delayed. Cerebral blood flow decreases by about 20% on the average and is worse in persons with small vessel cerebrovascular disease due to diabetes or hypertension.

The effects of aging on the spinal cord are indirect mainly occurring as a result of a degenerative disease of the spine and intervertebral disc, compressing the spinal cord, entrapment of nerve root, etc.

That said, it is important to note that compensatory mechanisms exist which tend to reduce these effects. These include redundancy (a phenomenon in which more nerve cells exist than are actually needed), plasticity of nerve cells (compensatory lengthening and production of dendrites etc. These may serve to cushion the overall effects of the changes to some extent.

PERIOPERATIVE MANAGEMENT OF THE ELDERLY

It is obvious from the discussion above that the elderly are a unique group, requiring specialized care. Surgery constitutes stress on the patient, which if not well tolerated by the patient may result in further morbidity. Increasing numbers of patients are presenting with aging-related pre-existing conditions that place them at a higher risk for adverse outcomes²⁵ and mortality has been noted to be generally higher in the elderly²⁶. Adequate preoperative assessment of patients therefore becomes invaluable in achieving favorable outcomes. Adequate care in the intra-operative and post-operative periods is equally as important. At each stage in management, problems as well as potential problems must be identified and addressed.

Preoperative Management

In the preoperative period, the healthcare team is expected to build a good rapport with the patient, especially ascertaining patient treatment goals and preferences²⁷. A proper history is essential to identify what the complaints are as well as other issues in management. Segments of the history where a patient

may not be able to give proper information, the caregiver may assist. Significant medical history and co-morbidities must be ascertained and documented, as well as mental status, social habits and drug history as these have implications in management of the patients. One study showed that 59% of 178 chronically ill patients made errors reporting their drug use in the history. 26% were potentially serious²⁸, and so drug use must be clearly ascertained. Patients should bring their prescriptions to the hospital and explain how those drugs are used, the surgeon may also confirm with the caregivers. Again, ascertaining the mental status preoperatively will be important in assessing a patient for post-operative delirium. The following check list may be used in the preoperative period:

- Confirm and document patient goals and treatment preferences, including advance directives.
 - Confirm and document patient's health care proxy or surrogate decision-maker.
 - In patients with existing advance directives, discuss new risks associated with the surgical procedure and an approach for potentially life-threatening problems consistent with the patient's values and preferences ("required reconsideration").
 - Consider shortened fluid fast (clear liquids up to two hours before anesthesia).
 - Adhere to existing best practices regarding antibiotic and venous thromboembolism prophylaxis.
 - Ensure non-essential medications have been stopped and essential medications have been taken.
- Adapted from 2015 ACS, NSQIP/AGS Best Practices Guidelines*²⁷.

Patient should be encouraged to designate a healthcare proxy and this should be documented. This is because in many cases the elderly are required to take decisions concerning their health, even though they may not have the capacity, most likely resulting from one comorbidity or the other. A health care proxy or an advance directive would help out in such circumstances. One study indicated that 70% of patients over 60 years requiring decisions about their health lacked the decision making capacity. About 68% of them had advance directives which guided the choice of treatment for them and hence they were treated according to their wish²⁹. Thus, it is important to properly document patient preferences in dealing with the elderly. Unfortunately, this is not common practice. According to literature, only few patients undergoing surgical procedures have advance directives in place and not many surgeons discuss these issues routinely^{30,31}.

An advance directive is a document in which a person states his will on various issues concerning their

healthcare, such that they can be implemented in the event that the person becomes unable to make those decisions in the future. It consists of the living will, the durable power of attorney, the "do not resuscitate" and "do not intubate orders". The details of these however are beyond the scope of our discussion in this article. After history taking is sorted out, the patient is examined. Evidence suggestive of the current illness is sought, while also looking for occult co-morbidities (especially in the pulmonary and cardiovascular systems) that may affect post-operative outcomes. The surgeon should explain to the patient the procedure about to be undertaken and obtain an informed consent from the patient.

Routine preoperative blood tests: electrolytes, urea and creatinine, albumin, glucose and a full blood count are done, the value of these are however controversial³². ECG is recommended for patients over 55 years. A pre-operative chest radiograph may be taken in patients with cardiovascular or pulmonary signs and in those scheduled for thoracic/upper abdominal procedures.³² Preoperative functional assessment is important, as it might influence the decision on whether to go ahead with the procedure or not, for example in a case where the surgery might cure disease but leave the patient with a diminished quality of life or functional status³².

Risk Stratification

A very important aspect of the preoperative assessment of the surgical patient is risk stratification. Surgical risk can be assessed using the physical status scale devised by the American Society of Anesthesiologist, ASA³³.

Table 1: ASA physical status classification system (2014). *Adapted from* www.asahq.org³⁵

ASA Classification	Definition
ASA I	A normal healthy patient
ASA II	A patient with mild systemic disease
ASA III	A patient with severe systemic disease
ASA IV	A patient with severe systemic disease that is a constant threat to life
ASA V	A moribund patient who is not expected to survive without the operation
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes.

The addition of an 'E' indicates emergency

It has been shown to correlate well with surgical fatality³⁴.

We now consider assessment of certain key organ systems: the cardiovascular and pulmonary systems in some detail.

Assessment of the Cardiovascular System

Cardiac output is increased, increasing myocardial oxygen demand, anaesthetic agents can depress myocardial function, increasing irritability of the myocardium and cause vasodilatation. Intraoperative hypo/hypertension may occur especially in the

Table 2: Goldman multifactorial cardiac risk index.
Adapted from www.clevelandclinicmeded.com⁴⁶

Risk Factor	Points
Preoperative third heart sound or jugular venous distention indicating the active heart failure.	11
Myocardial infarction in the past 6 months	10
≥ 5 premature ventricular complexes/min before surgery	7
Rhythm other than sinus	7
Age ≥ 70 years	5
Emergency surgery	4
Significant aortic stenosis	3
Intraperitoneal, intrathoracic, or aortic surgery	3
Markers of poor general medical condition (eg renal dysfunction, liver disease, lung disease, electrolyte imbalance)	3

previously hypertensive. Some of the risks extend beyond the period of surgery, for example the risk of myocardial infarction has been shown to be present for at least 4 days post-operatively³⁶.

The above shows the importance of a thorough evaluation of cardiovascular system. One of the most commonly used methods for assessing cardiac risk pre-operatively is the Goldman cardiac risk index. The risk index assigns to patients points for various risk factors. The total number of points is then used to calculate cardiac morbidity and fatality.

The kind of surgery also predicts the risk. The ACC/AHA jointly classified surgeries into various categories of risk, summarized below. High risk procedures have an adverse cardiac event of higher than 5%, intermediate risk, between 1% and 5% while low risk is less than 1%.

Pulmonary Assessment

Preoperative pulmonary assessment includes pulmonary function tests, especially in those undergoing lung resection/upper abdominal procedures. In patients requiring pulmonary function tests, the maximal ventilatory volume and arterial blood gases, constitute a reasonable assessment. FEV₁ of <1 litre (2L in those undergoing lung resection), a maximum ventilatory volume < 60% of predicted or PCO₂> 45mmhg indicate significant risk. Cessation of smoking at least 2 months prior to surgery, improved lung functions in those at risk in one study³⁷.

Table 3: Cardiac Risk stratification for non-cardiac surgical procedures.

Adapted from www.clevelandclinicmeded.com⁴⁶

Cardiac Risk for Non-cardiac Surgical procedures

High Risk (reported cardiac risk > 5%)

Emergent major operations especially in older patients

Aortic and other major vascular surgeries

Peripheral vascular surgeries

Anticipated prolonged surgical procedures associated with large fluid shifts, blood loss or both.

Intermediate Risk (reported cardiac risk >1% but <5%)

Carotid endarterectomy

Head and neck surgery

Intraperitoneal and intrathoracic surgery

Orthopaedic surgery

Prostate surgery

Low-Risk (reported cardiac risk generally < 1%)

Endoscopic procedures

Superficial procedure

Cataract surgery

Breast Surgery

INTRA-OPERATIVE MANAGEMENT

The elderly surgical patient is mainly under anaesthesia during the intra-operative time, hence the principles of anaesthetic techniques in this particular group of surgical patients are hereby discussed, bearing in mind the decreased ability of the elderly to compensate for physiologic stress. The following intraoperative management checklist is recommended:

- Anesthetic approach.
Consideration of regional techniques over general anaesthesia, to avoid postoperative complications and improve pain control.
- Perioperative analgesic plan
Directed pain history
Multi-modal or opioid-sparing techniques
Consideration of regional techniques
- Postoperative nausea risk stratification and prevention strategies
- Patient safety
Strategies employed to prevent pressure ulcers and avoid nerve damage
- Prevention of postoperative pulmonary complications and hypothermia
- Fluid management and physiologic management
Appropriate use of intravenous fluids
Appropriate hemodynamic management
Continuation of indicated cardiac medications
*Adapted from 2015 ACS, NSQIP/AGS Best Practices Guidelines*²⁷.

Anaesthesia in the elderly

As highlighted above the physiologic changes in various organ-systems, may affect drug pharmacokinetics and pharmacodynamics. Many of the effects of anesthetic agents tend to be exaggerated, necessitating reductions in drug doses in the elderly⁴⁷⁻⁴⁹.

Apart from the dosage another crossroads is selecting the kind of anaesthesia to use for a surgical procedure. This should usually depend on the type of procedure, the duration, requirements as well as the physiologic changes and their clinical implications as summarized above, particularly the cardiovascular function. In addition, thorough monitoring of patients in the entire perioperative period is important. There has been so much talk⁵⁰⁻⁵³ about the benefits of regional anaesthesia over general in elderly patients undergoing surgery, although both have short and long term cardiac morbidity. The issue of the choice of anaesthetic agent to use, is a major subject of research to date and the final decision on what modality to use should be multidisciplinary, involving the anaesthetist, surgeon and possibly the geriatrician⁵⁴.

Commonly used perioperative analgesic techniques include intravenous/oral opioids, other non-opioid analgesics, regional techniques like peripheral nerve blocks and alternative methods e.g acupuncture. It has been found that the elderly are more sensitive to some of the adverse effects of opiates, and dosages in them need to be adjusted. Opioids have been found to be associated with certain complications like cognitive dysfunction or delirium in older adults. They are also at increased risk for hemodynamic and respiratory impairments⁵⁵⁻⁵⁷. The ACS NSQIP/AGS best practices guideline recommends among other things that an appropriate analgesic plan should be developed in older adults undergoing surgery. This plan should be multimodal and accomplish the following²⁷:

- Be appropriately titrated for increased sensitivity and altered physiology of the older adult.
- Regimen should include a pharmacologic bowel regimen for example a stool softener or stimulant laxative where appropriate.
- Potentially inappropriate medications should be avoided, as defined by the American Geriatric Society Beers criteria. These include: Oral mineral oils, barbiturates, benzodiazepines, Nonbenzodiazepine hypnotics e.g eszopiclone, pentazocine, meperidine, Non-COX NSAIDS, skeletal muscle relaxants.
- Employ alternatives to opioids, such as perioperative, intraoperative and/or scheduled postoperative acetaminophen.

Other important intraoperative considerations include the risk of developing decubitus ulcers, perioperative nausea and vomiting, and intra-operative hypothermia. Malpositioning and lying for hours on a hard operating table predispose to decubitus ulcers. The risk is further increased by skin atrophy and decreased skin integrity, associated with aging. This should be prevented by proper positioning and padding of bony prominences. Nausea and vomiting is a very common complication in the immediate post-operative period. In tackling the problem, proper risk stratification, implementation of prevention strategies and avoidance of medications that may cause confusion and post-operative delirium are essential²⁷. Risk factors may be assessed using the Apfel and Koivuranta tools⁵⁸⁻⁶¹. Those at moderate or high risk are then given prophylactic treatment, taking caution not to administer medication that is inappropriate for use in older adults²⁷.

Perioperative hypothermia is defined as temperature of less than 36°C²⁷. The central effect of most anesthetic agents on thermoregulatory function as well as the direct vasodilatory action is exacerbated by the cold

operating room, which puts the patient at risk of hypothermia, and moreso in the elderly due to altered thermoregulation from decreased muscle mass, metabolic rate and vascular reactivity^{47,62}. Hypothermia itself has been found to be associated with certain complications, including surgical site infections, cardiac events^{47,62}. To prevent these, core temperature monitoring and patient warming using warm intravenous infusion in surgeries lasting more than 30 minutes have been advised²⁷.

POST-OPERATIVE MANAGEMENT

After a successful surgery, the next critical period is the post-operative period and patients must be closely monitored to prevent complications and ensure best outcomes.

The recommended postoperative amendments to WHO Surgical Safety Checklist for all patients aged over 75 years are as follows:

Table 4: Postoperative rounding checklist, modified from ACS/NSQIP Best Practices Guidelines.²⁷

Daily Evaluation	Prevention/Management Strategies
Delirium/cognitive impairment	Pain control Optimize physical environment (for example, sleep hygiene, sleep protocol, minimize tethers, encourage family at bedside) Vision and hearing aids accessible Remove catheters Monitor for substance withdrawal syndromes Minimize psychoactive medications Avoid potentially inappropriate medications (for example, Beers criteria medications)
Perioperative acute pain	Ongoing education regarding safe and effective use of institutional treatment options Directed pain history Multimodal, individualized pain control Vigilant dose titration
Pulmonary complications	Chest physiotherapy and incentive spirometry Early mobilization/ambulation Aspiration precautions
Fall risk	Universal fall precautions Vision and hearing aids accessible Scheduled toileting Appropriate treatment of delirium Early mobilization/ambulation Early physical/occupational therapy if indicated Assistive walking devices
Ability to maintain adequate nutrition	Resume diet as early as feasible Dentures made available Supplementation if indicated
UTI prevention	Daily documentation of Foley catheter indication Catheter care bundles, hand hygiene, barrier precautions
Pressure ulcers	Reduce/minimize pressure, friction, humidity, shear force Maintain adequate nutrition

Sign out: before patient leaves the operating theatre

- What is the patient's core temperature?
- What is the patient's haemoglobin concentration?
- Have age-adjusted and renal function-adjusted doses of postoperative analgesia been prescribed?
- Has a postoperative fluid plan been prescribed?
- Can the patient be returned safely to a general care ward?

For all elderly patients potential problems must be envisaged and addressed accordingly. The following checklist by the ACS NSQIP/AGS best practices guidelines may be helpful for daily evaluation of patients:

Postoperative Delirium

Post-operative delirium is a very important age-related complication. It is characterized by an acute decline in cognitive function and attention, with evidence from the history the problem is due to physiologic derangement, a medication or multifactorial⁶³. Delirium must be differentiated from dementia which causes a chronic cognitive decline, and a diagnosis of dementia preoperatively is important for risk stratification and has implications in diagnosing delirium postoperatively²⁷. Risk factors for post-operative delirium include: age > 65 years, chronic cognitive decline/dementia, poor vision/hearing, severe illness for example an ICU admission or presence of severe infection. These risk

factors have been shown to interact with precipitating factors in a cumulative way³⁸ and patients must be assessed for these risk factors. The prevalence of delirium varies depending on the population, but very high rates have been found associated with high risk procedures²⁷.

Post-operative Pain

Pain is a major problem in the post-operative period; adequate pain control will help prevent other post-operative complications because it will permit early mobilization coughing and deep breathing. In essence, treating pain helps avert other problems. Assessment of pain is done using the World Health Organization pain ladder, which assigns specific medications for different levels of pain. A commonly used group of drugs are the opioids, though constipation among other side effects is common. Other methods of pain control include the patient controlled analgesia, (but the patient

Table 5: Risk factors for DVT

Factor	Specific Examples
Venous stasis	Heart Failure, Myocardial Infarction, Varicose veins, Obesity, Stroke (leading to immobility)
Hypercoagulability	Cancer, Oestrogen use
Endothelial Injury	Severe infection, Trauma

Table 6: Pressure ulcer prevention and treatment.²⁸

Measures	Methods of achieving them
Reduce/minimize pressure, friction, humidity, shear force	Turning patient every one to two hours Avoid sliding patients Use of lower pressure air mattress or air-fluidized chronic pressure- shifting bed Higher specification foam mattresses Consultation with physiotherapist and/or physical therapy
Restoration of nutrition	Evaluate nitrogen exchange and food choices to estimate requirements and adequacy of current intake. Vitamin, essential mineral, or meal supplements (for example, protein shakes) . Tube feeding or parenteral nutrition, if indicated. Evaluate and treat other chronic illnesses, including anemia, diabetes, heart failure, HIV, kidney/ liver disease
Wound care	Recognize and debride nonviable and/or devascularized tissue. Allow healing by secondary intention with dressing changes, negative pressure therapy. Indwelling/sheath catheter or colostomy in incontinent patients, to increase likelihood of healing

has to be mentally alert to benefit from this. It has been shown to be effective in the elderly frail patient³⁹), use of non-steroidal anti-inflammatory drugs, epidural anaesthesia.

Deep Venous Thrombo-embolism (DVT)

DVT is a common complication in the post-operative period, especially in orthopaedic cases³². A number of predisposing factors exist, some are summarized in the table 5.

Commonly associated with venous thromboembolism is pulmonary embolism. Patients should be assessed for risk and prophylaxis instituted. Low dose subcutaneous heparin could be used. Warfarin is also used and has been found to be effective in preventing DVT in hip surgery³². Non-pharmacological methods which may also be used include, use of thromboembolic device (TED) stockings, early ambulation. These may be particularly helpful in patients at significant risk of bleeding from anticoagulants.

Urinary Incontinence

It occurs commonly in the elderly patient. One study showed a 17% prevalence in a general surgery ward⁴⁰. Immobility, fecal impaction, sedation among other factors precipitate incontinence. Untoward consequences resulting from this include decubitus ulcers, falls, insertion of indwelling catheter which predisposes the patient to urinary tract infection (UTI). UTI are among the most common post-operative complications, representing 32-40% of all nosocomial infections⁴¹⁻⁴³. Thus, if patients must be catheterized, then measures must be put in place during and after insertion to prevent infection and there should be a daily review of its indication to assess if there is still a need for it. Efforts should also be made to remove it as soon as possible²⁸.

Pressure Ulcer

They constitute a major problem in up to two-thirds of patients >70 years. Majority occur in the acute hospital setting usually during the first 2 weeks of hospitalization^{44,45}. Certain scales are used in assessing risk for developing pressure sores: The Braden risk, Waterlow scale and the Norton risk assessment. Table 6 summarizes measures to put in place to prevent its occurrence/treat it.

CONCLUSION

Elderly patients are uniquely vulnerable and particularly sensitive to the stress of trauma, hospitalization, surgery and anaesthesia in ways that are only partly understood.

Individualized care; consultation with specialists in multiple disciplines such as nurses, social workers, pharmacist, psychologist/counselors; and physical and occupational therapy whenever possible promote an optimal patient outcome especially the geriatric patients.

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THE IMMUNE SYSTEM AND THE ELDERLY

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INTRODUCTION

This article takes a cursory look at the immune system, describes its state in the elderly and examines possible mechanisms for its rejuvenation in old age.

The Immune System

The immune system is the body's defensive network and protects individuals against billions of microorganisms in the environment. The system is complex, being made up of many types of cells and proteins that perform different functions in fighting foreign substances. Foreign substances are called antigens. The response of the immune system to the introduction of foreign substances is called the immune response. The immune response takes place within the peripheral lymphoid tissues. These include the lymph nodes, spleen and un-encapsulated tissues lining the respiratory, and genitor-urinary tracts. The lymph nodes filter off, and if necessary, respond to foreign materials entering body tissues. The spleen monitors the blood while un-encapsulated lymphoid tissues defend the mucosal surfaces. Communication between these tissues and the rest of the body is carried out by re-circulating lymphocytes which pass from the blood into the lymph nodes, spleen and other tissues; and back to the blood by the major lymphatic channels. The immune response can be innate or acquired.

Innate or natural immunity involves mechanisms that pre-exist the invasion of foreign substances. These include physical barriers like the skin and mucosal surfaces, chemical substances (e.g. complement proteins and lysozymes) that counteract microorganisms and other foreign particles; and specialized cells (phagocytes) that engulf and digest foreign particles. The mechanisms of innate immunity are non-specific, i.e., they treat different foreign substances alike. Complement proteins meet foreign invaders early on invasion. They flow in the blood and quickly reach the

site of invasion. They require activation to perform their functions which include the triggering of inflammation, attraction of phagocyte cells to the area of invasion and coating of intruders for easy access to them by phagocytes. They can also kill foreign bodies by cytolysis. Phagocytes are immune cells with characteristics of locating and engulfing of microorganisms and dead or injured body cells for destruction. Phagocytes include the granulocytes, macrophages and dendritic cells. Macrophages also play a key role in alerting the rest of the immune system to the presence of invaders. Like macrophages, dendritic cells help with the activation of the rest of the immune system. They also filter body fluids to rid them of foreign organisms and particles.

Acquired immunity is generated strictly in response to a given foreign agent. The immunity improves in Cytotoxic T cells specialize in attacking virus-infected cells and cancer cells. B cells are produced, and mature, in the bone marrow. They form plasma cells when activated by contact with antigen and help from helper T cells. Plasma cells produce antibodies which are capable of destroying the antigen type responsible for their production. Antibodies link foreign antigens that they coat to phagocytes and also to complement proteins. They also neutralize toxins and incapacitate viruses from infecting new cells.

The Immune System in the Elderly

Immune functions decline with age, i.e., immune competence declines as people grow old. Ageing affects the immune system at multiple levels including reduced B cell and T cell production in the bone marrow and

thymus. Furthermore, mature lymphocytes in peripheral lymphoid tissues are characterized by diminished function. As a result, elderly people do not respond to immune challenges as actively as do the young. For instance, individuals of 70 years of age and older people have increased vulnerability to influenza infection¹.

One major change that occurs during ageing is the process termed thymic involution. The thymus naturally atrophies as humans age. Although T cells are produced throughout the life span, the progressive decay of the thymus causes significant decrease in the number of T cells and alters their sub-type distribution. The progressive loss of the thymus has profound effects on the immune system of the aged. Ageing affects the functions of T cells in many ways. This includes depletion of the population of naïve T cells since fewer T cells are produced as the thymus progressively deteriorates. Consequently, the aged immune system cannot respond as well as a young one to new antigens.

The cell surface of all T cells undergo significant changes during ageing. When a T cell binds to an antigen, the stimulus must be communicated to the interior of the T cell for activation of the cell to take place. The process of transmitting the antigen-binding signal across the cell membrane into the cell is called signal transduction. Signal transduction is a cascade of chemical reactions involving many molecules. Aged T cells do not display the surface CD28 antigen, a molecule that is critical for signal transduction and T cell activation². Such T cells remain quiescent and do not respond to foreign agents. A decrease in calcium is another defect of T cell activation in the elderly. Calcium is crucial for many biochemical reactions, including signal transduction. Calcium deficiency results in failure of stimulation of required enzymes that need it to function properly². As T cells age, their capacity to produce or respond to the cytokine IL-2 is lost, thus greatly impairing T cell function.

Reduced function of T cells in old people affects B cell function as well since helper T cells are required for the activation of B lymphocytes. Activated B cells develop into plasma cells which produce antibodies. The presence of auto-antibodies (i.e., antibodies that react to self components, against normal principles), is more prevalent in the aged, even in healthy aged without auto-immune disease. Although the exact role of auto-antibodies in ageing is not fully elucidated, they may cause slowly progressive tissue damage which contributes to physical ageing.

Modulation of the Immune System in the Elderly

The cellular and molecular changes that occur in the immune system during ageing have been defined and form the basis for the design of strategies to rejuvenate the immune system in the elderly. An increased mortality rate associated with impaired delayed hypersensitivity responses was obtained in old Australians³ indicating that modulation of cellular immune responses may lead to a prolonged life-span. There is correlation between age, immune competence and survival. However, the decline in immune response with age is not an invariable occurrence as about one-third of the healthy elderly have immunological function at levels seen in younger age groups⁴.

Also, studies have obtained significant positive correlation between circulating immune complexes concentrations (complexes of antigen and antibody) and age plus age-associated increase in auto-antibodies including anti-nuclear antibodies and rheumatoid factor⁵.

It would appear that auto-antibodies contribute to increased prevalence of circulating immune complexes in old individuals. It has been observed that caloric restriction in rodents leads to a decline in both circulating immune complexes and auto-antibodies⁶ and also to amelioration of overt auto-immune disease⁷ suggesting that the immune system can be manipulated to advantage during ageing. Elevated immune complex concentrations in sera from old subjects could result from the age-associated increase in the prevalence of auto-antibodies. Although immune complex disease is usually more likely to occur in chronic than in acute infections and in those who produce low affinity antibodies, auto-immunity is a chronic condition and elderly subjects produce antibodies with poor antigen avidity.

One approach to the care of the elderly is preventive health care through vaccination. Influenza and pneumonia are two infections to which the elderly are particularly vulnerable, and providing vaccination for these is a high priority. Reduced caloric intake is known to slow the ageing process and maintains higher naïve T cell count and increased levels of IL-2². Zinc in particular and vitamin E are important for the proper functioning of the immune system. In the elderly, long-term zinc deficiency leads to decreased cytokine production and impaired regulation of helper T cell activity. There are indications that vitamin E supplementation may boost the immune system as a daily dose has been found to improve T cell function in cell mediated-immunity². Vitamin E is also an anti-oxidant that can protect lymphocytes and other tissues from destructive free radicals.

CONCLUSION

Ageing affects many components of the immune system. A clear understanding of the immunological changes due to ageing is important for the designing of effective health care for the elderly.

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GYNAECOLOGICAL PROBLEMS IN THE AGEING WOMAN: A REVIEW

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ABSTRACT

Gynaecological problems in the ageing woman are one of the areas of research into the health challenges of the elderly which need critical attention. There are various problems that concern ageing women which affect them physically, psychologically and socially. These problems usually accompany gynaecological symptoms. Healthcare providers in developing countries often have limited information about these problems and their complementary gynaecological symptoms possibly due to under reporting of symptoms by these ageing women.

This makes evaluation of these gynaecological challenges, a necessary step in the management of geriatric patients. This article provides a brief overview of these problems and enlightens physicians and physicians-to-be with relevant information about the prevalence, aetiological factors, diagnosis and treatment of these conditions.

INTRODUCTION

Globally, the elderly population is increasing, with elderly women constituting a majority as they tend to live about 5 years longer than their male counterparts ^[1]. Elderly women have an increased risk of developing gynaecological problems due to the influence of various biological factors in organs and organ systems in the body. Most gynaecological problems are due to hormonal imbalance, while others are due to structural disorders. Studies have shown that elderly women especially those of African descent often ignore symptoms of gynaecological diseases and are unlikely to present at the hospital primarily because of these symptoms but only mention them when asked if they had any other health problems ^[2,3]. Therefore, there is significant under-reporting of these symptoms encountered by these elderly women ^[3]. Assessment and treatment in some cases is aimed at identifying and correcting biological imbalances, other cases may require surgery, while chemotherapy or radiotherapy is required in malignant lesions. There are many problems experienced by the elderly woman but only particular relevant ones will be focused on. They include atrophic vaginitis, sexual dysfunction, pelvic floor disorders, and various gynaecological malignancies.

ATROPHIC VAGINITIS

Oestrogen plays a vital role in maintaining the integrity and lubrication of the endometrium, vagina, vulva and other organs in the body. With the onset of menopause, there is a decreasing level of circulating oestrogen. This chronic oestrogen depletion causes thinning and inflammation of the vaginal walls ^[4-6]. It is associated with discomfort/pain during intercourse (*dyspareunia*) and/or vaginal dryness, burning, itching, and irritation ^[5-7].

The urinary tract is not spared from the effect of postmenopausal declining oestrogen. There is thinning of the bladder and urethral linings, development of urethral caruncle, urethral stenosis, stress incontinence and eversion of urethral mucosa. All these may further lead to chronic dysuria and urinary tract infections ^[8]. Atrophic vaginitis may be accompanied by pelvic organ prolapse^[9, 10].

Assessment and Treatment

Affected women may present with genital symptoms such as dryness, burning, dyspareunia, vulvar itching, yellow malodorous discharge or urinary symptoms of urethral discomfort, frequency, hematuria, urinary tract infection, dysuria and stress incontinence ^[5-7]. Exogenous agents such as perfumes, powders, soaps, deodorants, panty liners, spermicides and lubricants which could cause or aggravate symptoms must be explored in the history taking ^[11].

The external genitalia may reveal sparse pubic hair, dryness of labia, vulvar lesions, fusion of the labia minora, decreased elasticity and skin turgor on examination. The epithelium of the vagina appears pale, smooth, shiny and occasionally, areas of patchy erythema, petechiae and increased friability may be present. Vaginal examination or sexual activity may provoke vaginal bleeding or spotting. The vulvar may become irritated by urinary incontinence and may show signs which would be identifiable on pelvic examination^[9, 10].

Laboratory diagnostic testing including serum hormone levels and Papanicolaou smear, can confirm the presence of urogenital atrophy. Cytological examinations of smears from the upper one third of the vagina show

an increased proportion of parabasal cells and a decreased percentage of superficial cells. An elevated pH level (postmenopausal pH levels exceeding 5), monitored by a pH strip in the vaginal vault may also be a sign of vaginal atrophy. In addition, a vaginal ultrasonogram of the uterine lining that demonstrates a thin endometrium measuring between 4 - 5 mm signifies loss of adequate oestrogenic stimulation. On microscopic evaluation, loss of superficial cells is obvious with atrophy, but there may also be evidence of infection with *Trichomonas*, *Candida* or bacteria vaginitis [9, 12].

Hormone replacement therapy has been the mainstay and most logical choice of treatment. Routes of administration of hormone replacement therapy include oral, transdermal and intravaginal. Contraindications to oestrogen therapy include oestrogen-sensitive tumors, end-stage liver disease and a history of cardiovascular diseases [9]. Side effects of oestrogen therapy should be noted and include breast tenderness, vaginal bleeding and a slight increase in the risk of an oestrogen-dependent neoplasm [13]. Exogenous oestrogen intake is also invariably related to an increased risk of developing endometrial hyperplasia and endometrial carcinoma [14]. Duration of therapy, dosage and method of oestrogen delivery all establish the extent of risk. The amount of oestrogen and the duration of time required to eliminate symptoms vary among patients [15].

SEXUAL DYSFUNCTION IN THE AGEING WOMAN

Sexual function remains a vital component in every woman's life; hence, there is increasing focus in maintaining sexual health throughout the decades. Ageing women endure the effects of sexual bias and low social status, which is quite prevalent in developing countries [16]. In a study in Nigeria, about a third of women of the elderly age group regarded sex at their age as a taboo and do not consider themselves as having sexual dysfunction. In addition, the same study found out that women are less likely than men to discuss these matters with their physicians [17]. However, as old age sets in, many biological and psychosocial factors which may affect physical and mental health impact the quality and quantity of sexual activity in the elderly woman. Other factors such as the availability of a willing partner and the previous level of sexual activity also affect sexual activity [18]. The problem may also be structural or functional, possibly relating to decreased oestrogen levels, which results in decreased pelvic support, decreased lubrication of urogenital tissue, and changes in body configuration. Bodily changes due to oestrogen loss also lead to alterations in the skin, breasts, muscles

and skeleton. This may lead to development of poorer self-image, diminution of self-esteem and, eventually, a loss of sexual desire [19]. As a result of these many factors involved, ageing is almost invariably associated with sexual dysfunction [20].

Classification of Sexual Dysfunction

Sexual dysfunctions are a heterogeneous group of disorders that are typically characterized by a clinically significant disturbance in a person's ability to respond sexually or to experience sexual pleasure. They could be transient or lifelong and an individual may have several sexual dysfunctions at the same time. Over the years sexual dysfunction in females had been classified into four groups but the recent Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) classifies sexual dysfunction into three categories [21]. These are:

- (a) **Sexual Interest/Arousal Syndrome:** This comprises of the previous Hypoactive Sexual Desire Dysfunction (HSDD) and Female Sexual Arousal Dysfunction (FSAD). The diagnosis of HSDD is made when the patient has persistently or recurrently deficient (or absent) sexual fantasies and desire for sexual activity, which cause marked distress or interpersonal difficulty and are not better accounted for by a mental disorder, general medical condition, or substance [21]. Similarly FSAD is a persistent or recurrent inability to attain, or maintain until completion of sexual activity, an adequate lubrication-swelling response of sexual excitement. It is estimated that approximately 36% to 43% of women 57–85 years of age report difficulty with vaginal lubrication during sexual activity [22].
- (b) **Female Orgasmic Disorder (FOD):** Female orgasmic disorder (FOD) is defined as a persistent or recurrent delay in, or absence of, orgasm following a normal sexual excitement phase [21]. Among women, there is significant variability in the type and intensity of sexual stimulation that results in orgasm [18]. In addition, orgasm may vary within an individual over her life cycle [18].
- (c) **Genito-pelvic Pain/Penetration Disorder:** This was previously termed sexual pain disorders in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) and includes dyspareunia and vaginismus [18]. The two disorders are characterized by difficulty with vaginal penetration. Dyspareunia is defined as

recurrent or persistent genital pain associated with sexual intercourse. Vaginismus is defined as recurrent or persistent involuntary spasm of the musculature of the outer third of the vagina that interferes with sexual intercourse [21]. Studies have shown that a considerable number of women 57–85 years of age report pain during intercourse [18].

Assessment and Treatment

Patient consideration and meticulous evaluation of the various biological and psychosocial factors that affect the elderly patient and the sexual response cycle, including prior and current levels of function is an important step in patient assessment. Symptoms of oestrogen deficiency should also be evaluated. In addition, history of drugs use, general and undiagnosed medical conditions including gynaecological examination and relevant investigations might reveal significant findings [18].

Treatment depends on if the problem has been persistent throughout her life or one which she developed recently [18]. Oral or transdermal oestrogen in combination with progestogen is normally used when female sexual dysfunction are linked to climacteric symptoms such as sleep disturbances, hot flushes, palpitations, depressed mood and urogenital symptoms. Local oestradiol or oestriol therapy is applicable when pain disorders are caused by atrophic vaginitis. Absolute and relative contraindications to hormonal treatments apply in these cases [23].

PELVIC FLOOR DISORDERS

Female pelvic floor disorder is a term applied to a wide variety of clinical conditions, including urinary incontinence, pelvic organ prolapse, fecal incontinence, sensory and emptying abnormalities of the lower urinary tract, defecatory dysfunction, sexual dysfunction, and several chronic pain syndromes. Only the first three will be discussed here because they are most commonly seen by physicians [24]. In a research into pelvic floor disorders among thirty developing countries, the mean prevalence for urinary incontinence (UI) was 28.7%, pelvic organ prolapse was 19.7% and faecal incontinence (FI) was 6.9% [25].

Urinary incontinence: This is quite a common condition in the older woman and prevalence rates depend on the definition adopted. Non-conventional definitions of urinary incontinence include “ever, any, or at least once in the past 12 months” and show prevalence rates in women over 65 years to be 10–59%. When a stricter definition of “daily” urinary

incontinence is used, the prevalence rates are quite lower [26]. Incontinence may be classified as: Stress urinary incontinence (SUI), the complaint of involuntary leakage on effort such as sneezing or coughing; Urgency urinary incontinence (UII) which is involuntary leakage accompanied by urgency; and Mixed urinary incontinence (MUI) which refers to the complaint of involuntary leakage associated with both stress and urgency. Other classes include nocturnal enuresis which is any involuntary loss of urine while sleeping. Post-micturition or terminal dribbling and continuous urinary leakage denote other symptomatic forms of incontinence. Overactive bladder (OAB) is characterized by the storage symptoms of urgency with or without urgency incontinence, usually causing frequency and nocturia. Continuous incontinence may develop as a byproduct of a postsurgical operation such as repair of vesicovaginal fistula or a pelvic organ prolapse repair [27].

Assessment and Treatment

Behavioural therapy using fluid and dietary modification, bladder training coupled with pelvic muscle exercises or pelvic floor rehabilitation are effective treatment options for stress and urge incontinence and should be considered first-line treatment. Pessaries are usually used for managing stress incontinence in older women [26]. Surgery has also been shown to improve stress urinary incontinence. Common approaches to the surgical treatment of urinary incontinence include the midurethral sling (retropubic or transobturator), colposuspension, and the pubovaginal sling (autologous, synthetic or allograft) [26, 27].

Pelvic organ prolapse (POP): Pelvic organ prolapse is the downward descent of any of the female pelvic organs, including the bladder, uterus and the intestine resulting in protrusion of the vagina, uterus, or both. Epidemiological studies of the incidence and prevalence of this disorder are uncommon, though studies have shown that cystocele is the commonest form [28]. It is common for women to be affected by more than one pelvic floor condition. Many older women have both urinary incontinence and POP [28].

The aetiology of POP involves potential injury to the ligaments, muscles, connective tissue and nerves of the pelvis. Associated risk factors for pelvic organ prolapse include advancing age, parity, vaginal birth, abdominal circumference and body mass index [29].

Assessment and Treatment

Elderly women who develop pelvic organ prolapse can present either with a single symptom of vaginal bulging or pelvic pressure, or with several complaints

including back ache, bleeding from the prolapsed area, lower urinary tract symptoms, and abdominal or intestinal symptoms. A sensation of “bulging or protrusion in the vagina”, “seeing or feeling of something falling out”, fullness, and heaviness are symptoms of worsening pelvic organ prolapse. Women presenting with this complaint should undergo a full pelvic examination [28].

Non-surgical modalities like pelvic floor exercise, hormone replacement therapy and the use of pessaries exist for the treatment of POP. However, patients not satisfied with more conservative treatments may seek surgical correction as an option. Surgery is also indicated for women in whom medical therapy has failed [28]. The ideal procedure in the older woman would robustly repair symptomatic pelvic floor defects, allow for rapid postoperative recovery including return to baseline and improved functional status, and ensure conformity with the sexual activity desires of the patient.

Surgery to correct POP should address the specific pelvic floor defects that are present including the anterior vaginal wall, posterior vaginal wall, lateral vaginal wall and apical vaginal support defects. Anterior defects are repaired by anterior colporrhaphy and paravaginal repair. Posterior colporrhaphy is advocated to correct posterior defects. Paravaginal repair is also advocated to correct lateral defects. Surgical techniques to address apical vaginal defects include the abdominal sacrocolpopexy (ASC), uterosacral ligament suspension (USS), ileococcygeus fixation, and sacrospinous fixation [30].

Although not a life-threatening condition, pelvic organ prolapse can affect quality of life and impact daily activity including urinary, vaginal, bowel and even sexual symptoms [30].

Fecal incontinence (FI): This is defined as an involuntary loss of mucous, liquid or solid stool that is considered a social or hygienic problem [31]. Risk factors in women include chronic diarrhoea, parity, urinary incontinence, high body mass index, and previous anorectal surgery [31].

Fecal incontinence may be classified as: Passive incontinence (which is the involuntary discharge of fecal matter or flatus without any awareness suggestive of a loss of perception and/or impaired recto-anal reflexes either with or without sphincter dysfunction), and urge incontinence (which is the discharge of fecal matter or flatus in spite of active attempts to retain these contents). The latter is usually due to disruption of the sphincter function or the rectal capacity to retain stool [32].

Assessment and Treatment

Relevant investigations include anorectal manometry and sensory testing, anal endosonography, defecography, balloon expulsion test and saline infusion test [32].

Dietary modification such as high fiber diet may be adopted as a first step in management. The muscle tone could be improved using exercises, biofeedback therapies, vaginal balloons, sacral nerve stimulation, transcutaneous electrical nerve stimulation (TENS) or other modalities. Specific surgical options are overlapping sphincteroplasty and neuromodulation. Choice of surgery would depend on patient-related factors [32].

GYNAECOLOGICAL MALIGNANCIES IN ELDERLY WOMEN

Advanced age is an important risk factor for cancer incidence with the incidence of most gynaecological malignancies rising significantly with increasing age. With an ageing world's population, the proportion of women over the age of 65 with cancer is expected to rise substantially over the next decade [33]. In concordance with this, elderly women represent a significant percentage of patients with gynaecological malignancy.

Ovarian, endometrial and vulva cancers are the most commonly encountered gynaecological malignancies in post-menopausal women. These malignancies often present in their advanced stages as elderly women often fail to undergo and maintain routine gynaecologic examinations and screening procedures which are necessary for early detection and prevention of these malignancies, as studies have shown [33-38]. They also delay presentation to the hospital despite the presence of symptoms [36]. Thus, any physician visit should be taken as a major opportunity to educate patients and offer screening services. Physician recommendation is a major predictor of compliance with screening tests [39].

OVARIAN CANCER

Ovarian cancer is a relatively rare disease before the age of 40 years and its incidence rises steeply with age thereafter, peaking at 65-75 years [40]. In the African setting, it is more common to diagnose an advanced stage ovarian cancer in an elderly woman compared to a younger one possibly due to the low socio-economic status, poor health seeking behaviour, late presentation and scarcity or short screening centers [40]. This may also be due to a decreased awareness of this condition and the neglect of these symptoms by these elderly women [3]. It has also been observed that younger women with

epithelial ovarian cancer have a survival advantage when compared to older patients despite adjustment for race, stage, grade and surgical treatment ^[41].

Risk factors for ovarian cancer include advancing age, nulliparity, and genetic factors. Symptoms are nonspecific and include abdominal pain, symptoms of intestinal obstruction, a feeling of abdominal fullness, dyspepsia, nausea, fatigue and weight loss ^[40].

Screening and Prevention

Screening methods for ovarian cancer continue to be investigated, though commonly used investigations are CA-125 blood test and transvaginal ultrasound (TVUS). Early detection is important as stage I ovarian cancer has an excellent outcome with any intervention^[42]. CA-125 Screening: CA-125 is the most extensively studied antigen associated with ovarian cancer. A normal value is generally known to be less than or equal to 35 U/ml. It is mildly elevated in women with stage I disease and moderately elevated in most women with advanced ovarian cancer. CA-125 is nonspecific for ovarian cancer as levels may be elevated in other malignancies like pelvic and gastrointestinal malignancies, and in benign conditions like pelvic inflammatory disease, endometriosis and fibroids. Therefore, CA-125 has little or no role in early ovarian cancer diagnosis ^[42].

Transvaginal Ultrasonography: Transvaginal Ultrasonography can detect early morphologic changes that cannot be detected by physical examination. The size or volume of the ovaries, the presence of papillary projections and the complexity of the cyst include the morphological criteria that have been developed to increase the specificity of transvaginal ultrasound ^[43].

Diagnosis and Treatment

Staging laparotomy with histologic diagnosis of the type is the initial step for treatment. The treatment modality commonly involves surgical intervention combined with adjuvant combined chemotherapy. Radiotherapy may be used for radiosensitive variants. Generally, treatment is more effective for early disease stages ^[43].

ENDOMETRIAL CANCER

Endometrial cancer is one of the most frequently encountered gynaecological malignancies worldwide. It is more common in women between the ages of 50-65 years ^[40]. Elderly patients tend to have worse outcomes in endometrial cancer when compared to younger patients with identical tumour stage ^[41]. Associated risk factors include nulliparity, obesity, late menopause, hypertensive disease, diabetes mellitus, uterine fibroids, excessive exposure to exogenous oestrogen and history

of previous endometrial hyperplasia. Symptoms of endometrial cancer are nonspecific and include vaginal bleeding, fatigue and weight loss ^[40].

Screening and Prevention

Currently, there is no standard or routine screening technique for endometrial cancer. Tests that may detect endometrial cancer include Papanicolaou test, transvaginal ultrasound and endometrial sampling. Papanicolaou test from the posterior fornix may reveal malignant endometrial cells. Transvaginal ultrasound has not been shown to be cost effective as a screening device because the rate of false-positive results is high ^[44].

Diagnosis and Treatment

Endometrial biopsy is an accurate diagnostic tool with good correlation to surgical curettage ^[41]. For treatment, many elderly patients will require intervention in the operating room for a dilatation and curettage procedure due to significant cervical stenosis. For stage I and II disease, total abdominal hysterectomy and bilateral salpingo-oophorectomy is recommended. For stages III and IV, treatment is more of palliative with external beam radiotherapy. The tumour has also been shown to be responsive to progestogen ^[42].

CERVICAL CANCER

Cancer of the cervix, a potentially preventable disease is the leading cancer in women in developing countries including Nigeria and other West African countries. Cervical cancer usually occurs in the fifth or sixth decade of life with a mean age of 54 years ^[40]. Women over age 65 years have the highest percentage of late-stage cervical cancer at diagnosis regardless of race or ethnic background ^[41, 45].

Risk factors include early coitarche, multiple sexual partners, nulliparity, long term use of oral contraceptive pills, and immunocompromised states. In early stage the patient may be asymptomatic or present with vaginal bleeding and discharge, while in late stage, patients may present with pain, diarrhoea, constipation, haematuria and urine incontinence ^[40].

Screening and Prevention

Papanicolaou test (Pap test): The Papanicolaou test is the gold standard screening test for cervical carcinoma which has significantly reduced the incidence of cervical carcinoma in women all over the world ^[40, 43, 46]. Elderly women often do not undergo Pap test screening, and this results in an increase in cervical cancer prevalence and late stage presentation among the elderly population ^[45]. Most patients diagnosed with

invasive cervical carcinoma have not had a recent Pap test ^[46] even at early stages of the disease ^[47, 48]. Human papillomavirus (HPV) testing: HPV testing has proven to be a sensitive marker for detecting dysplasia in the presence of a minimally abnormal Pap test result ^[49]. Persistent HPV infection has been associated with a higher risk of cervical carcinoma ^[50]. The rate of HPV positivity and distribution of HPV types has been found to be similar between tumors developing in younger and older patients ^[51].

Diagnosis and Treatment

With a clinical suspicion of cervical carcinoma, diagnosis must be confirmed by histological examination and the extent of the lesion must be determined by examination under anaesthesia. Treatment modalities include surgery, radiotherapy or combined surgery and radiotherapy ^[40].

VULVAR CANCER

Vulvar cancer is a relatively rare malignancy which occurs most commonly in post-menopausal women ^[52]. It is probably the fourth most commonly seen malignancy of the female genital tract in Nigeria after carcinoma of the cervix, choriocarcinoma and carcinoma of the ovary ^[40].

The aetiology of vulvar cancer remains unknown although it has been associated with human papilloma virus (HPV) ^[40, 52]. Symptoms include vulva sores, foul smelling vaginal discharge, pain, dysuria and bleeding. Pruritus vulvae may be present in some cases.

Screening and Prevention

There is currently no screening modality for vulvar cancer. The use of HPV testing is currently under investigation.

Diagnosis and Treatment

Diagnosis is confirmed by biopsy. Treatment is most often by radical surgical excision/vulvectomy while chemotherapy, radiotherapy or chemo-radiation is done as adjuvant or for technically inoperable or recurrent lesions ^[40].

CONCLUSION

As women live longer, healthier lives, gynaecological problems are an important concern for the female geriatric population. Adequate care and follow-up by physicians and surgeons can improve the quality of life in the female geriatric population.

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The DOKITA Editorial Board met with Professor Temitope Alonge, a passionate administrator and advocate for Geriatric Medicine in Nigeria.

Introduction

I am Temitope Oluwagbenga Alonge, a life member of **DOKITA** Editorial Board and a past Editor-in-Chief when I was a medical student. I began my medical career in the 1977/78 session and graduated June 1983. I had an automatic appointment as House Officer and then proceeded to Rural Comprehensive Health Centre, in the Old Bendel State for my NYSC. I joined the residency programme in 1988 and on passing my Part 1 Examinations in 1990, I proceeded to England under the Overseas Doctor Training Scheme and completed my Fellowship of the Royal College of Surgeons in 1991, West African College of Surgeons in 1994 and then Doctor of Medicine in 2000 at the University of Leicester. I resumed in 1995 as Lecturer I and Consultant in Orthopaedic Surgery. In 1999, I was appointed a Senior Lecturer and in 2005, I became the first Professor of Orthopaedics and Trauma in the University of Ibadan. In my pursuit, I also engaged in administrative duties as I was Dean of Undergraduate Studies and Sub dean of Postgraduate studies. I was also Deputy Chairman, Medical Advisory Committee (CMAC), University College Hospital (UCH) from 2006 to 2010; and Head of Orthopaedics Department, UCH from 2004 to 2006. I was appointed Chief Medical Director (CMD) of UCH and began on March 1, 2011.

What does Geriatrics and Gerontology mean to you?

Geriatrics is an aspect of medical care that involves prevention, promotion and management of health issues relating to the elderly. There is a thin line between the degenerative changes that occur with ageing and disease processes in the elderly which requires a geriatrician to identify. On the other hand, gerontology is just the science of ageing. They are thus two distinct but interacting fields.

Could you give us a brief account of how the Geriatric Centre in UCH came into existence and your role in its creation?

When I was Deputy CMAC under the previous administration, it was apparent to me during my routine clinic sessions that the number of elderly patients visiting the clinics was increasing- both in the Orthopaedic clinic and elsewhere. I then went ahead to look at the statistics from the medical records and found that this was not just anecdotal. However, the way they were being attended to left a lot to be desired, particularly the long waiting hours. On becoming the CMD, I was asked to put up proposals for capital projects to be implemented in the hospital. After the ramps were put in place to circumvent the problems with the elevators, the next things were a geriatric centre, a multipurpose hall and a new block for interns to reside. While the construction was going on, the available funds were dwindling and so I approached the Minister of Health at the time, Professor Onyebuchi Chukwu and sought permission to interact with well-meaning Nigerians to fund the completion of the Centre. Chief Tony Anenih was magnanimous enough to provide all the equipment and complete the structure. The Centre was then commissioned on November 17, 2012. To date, he continues to be very generous and supportive in ensuring the running of the Centre.

Could you give a brief account of how the Sir Kessington Adebutu Rehabilitation Centre came into existence and the reason for its creation given the success of the Tony Anenih Geriatric Centre?

The two centres serve different purposes, although they are related. The Geriatric Centre provides acute care for ill old people with medical conditions. It also provides surgical and physiotherapy services. However, patients may require long term care and this was the genesis of the Rehabilitation Centre. We approached Sir Kessington who then opted to fund the entire project. The Centre also serves as a home for elderly people to be looked after by carers. This is the first Rehabilitation Centre in the setting of a teaching hospital in Africa.

Could you enlighten us on the current day practice of Geriatrics in Nigeria, the challenges as well as the efforts being made to surmount these challenges?

I believe there are policies put in place by the government describing how the elderly should be treated. Unfortunately, these are not necessarily being practised. Transport systems and public places should have special facilities for the elderly. There are also policies on health related issues affecting the elderly. At the time he was Minister of Health, Professor Onyebuchi Chukwu stated that he wanted fifteen geriatric centres in teaching hospitals in the country.

Sadly, the Chief Tony Anenih Geriatric Centre is still the only existing one and this is probably due to poor perception of the field and the lack of geriatricians nationwide. The country currently does not have up to ten trained geriatricians and this has to be addressed. Also, elderly people often do not have the financial wherewithal to receive necessary care. In UCH however, they only have to pay half of the cost of their treatment and there are social insurance packages that cover a large percentage of their care. We hope that with time, treatment will be completely free.

Could you tell us briefly about the African Society for Ageing Research and Development (ASARD) and her activities?

ASARD is a very good concept. I served as the first president of the organisation. The intent at the onset was to have regional coalitions of people looking after the elderly. This began in the South West, Nigeria via a programme run by UCH and FRCN. A programme is held on October 1 annually, at which these elderly people are given health talks and allowed to have fun among themselves. The second initiative was through Non-Governmental Organisations (NGOs) in the South West engaged in care of the elderly to further improve care.

Why are you so passionate about Geriatrics and could you have been a geriatrician, if you were not an orthopaedic surgeon?

I think I would have loved to be a geriatrician if I had not gone on to be an orthopaedic surgeon. I believe that the elderly people have contributed a lot to the lives of the young generation in various capacities- as parents, teachers, civil servants, doctors or farmers. As such, they need to be looked after. My passion however came from my great grandmother who nursed me as a child. She began to look after me at 104 years and she died at 107. She was very caring, walked me to school daily and she told me lots of stories at bedtime, all these fondly recalled with nostalgia.

What does the future hold for the practice of Geriatrics in Nigeria?

The future is very bright. As an institution, we are pleading with the National Postgraduate Medical College and West African College of Physicians to integrate training for geriatric medicine in their programme. We hope this will commence soon and help to train enough geriatric physicians to help care for the elderly.

What is your advice for medical students who would like to go into the field of Geriatrics?

At the moment, some medical students have volunteered to offer services at the Geriatric Centre. This helps them to appreciate the care of the elderly adequately. Geriatric medicine is one which also requires a lot of compassion. If I were a medical student in this current age, I would most likely consider specializing in Geriatrics.

Thank you.

PERSPECTIVES IN GERIATRICS: TRAINING AND EDUCATION – C Ade-Ajayi

The DOKITA Editorial Board met with Chief (Mrs) Christie Ade-Ajayi, a renowned teacher and advocate for good education.

Introduction

I am Chief (Mrs) Christie Ade-Ajayi, a native of Ile-Oluji in Ondo State. I am eighty seven years old. I was brought up by my grandmother because I lost my mother when I was three years old. She raised me till I was six years old after which I went back to my father to start school at that time. I attended All Saints Primary School in Osogbo, Osun State, and thereafter, a missionary secondary school which is now called Saint Annes' Secondary School. I subsequently moved to United Baptist Church Teachers' Training College to further my education and got transferred to the old Anglican Girls' School in Ondo State when I finished my training in 1952. I met my late husband during this period and he was about concluding his tertiary education in the University of Ibadan. I taught in this school for two years before I got transferred to Ibadan Anglican Girls' School, Oritamefa to teach for another two years.

In 1955, I went to Teachers' Training College in England for training and post graduate studies on Early Childhood Education in Fun Bell College, England and the University of London. I taught for a year in London before I came back to Nigeria and got married to Professor Jacob Festus Ade-Ajayi in 1956. I got an appointment to start working in the University Staff School, University of Ibadan, Ibadan as soon as I got back to Nigeria. I worked for 35 years and retired as the Headmistress of the school in 1991.

Awards

I was awarded as one of the best fifteen teachers that Nigeria has ever had by *This Day Newspaper*. It was a pleasant surprise for me. I cannot explain why I was selected but I see it as a way God chose to reward my efforts while I was still in service.

Life after retirement

I have been involved in many activities since my retirement. I belong to an organisation called Organisation *Mondiale pour l'Education Prescolaire* (OMEP). It is an international, non-governmental and non-profit organization, which has worked for all aspects of Early Childhood Education and Care (ECEC) since 1948. I have attended some of her international conferences and have also served as the President of her branch in Ibadan.

Contributions to the field of Geriatrics and Gerontology

I am a member of African Gerontological Society (AGES) Nigeria. It is a society established to honour and respect senior citizens by putting in place structures that would sustain the fundamental human rights, and facilities that ensure dignity, good health, security, participation and contribution of old people to their societies. It also ensures economic and social fulfilment as well as the satisfaction of older persons within their families and communities.

What can be done to improve the care for the elderly in Nigeria?

Medical doctors in training should be given the opportunity to rotate through geriatrics, just as they rotate through paediatrics, obstetrics and gynaecology and so on. This would help them to be passionate about their care for the elderly ones when they start practice.

The government should allocate certain amount of money dedicated to the care of the elderly and also create a suitable environment for them. Non-governmental organizations should also focus on the care of the elderly people by building homes where these old people can be sheltered and well taken care of.

Advice for DOKITA Editorial Board

DOKITA Editorial Board is on the right track and I want to applaud her efforts. The Board should make more effort to contact senior colleagues in the profession, especially those that are abroad and invite them to programmes where they can learn from their experiences.

PERSPECTIVES IN GERIATRICS: RESEARCH – O Gureje

The DOKITA Editorial Board met with Professor Oyewusi Gureje, a renowned researcher and one of the fore-runners in the Ibadan Study of Ageing (ISA).

Introduction

I am Oye Gureje, a Professor of Psychiatry at the University College Hospital (UCH), Ibadan and a Director of the World Health Organisation Collaborating Centre. I have been a professor about 17 years now, actively involved in research and I engage in diverse areas of mental health, especially epidemiology among the general adult population and the elderly as well as in health system strengthening. We have conducted the largest study of ageing in Africa and also the largest National Survey of Mental Health in Nigeria and we are doing some interventional studies which involve identifying the best kind of treatment for some conditions. In addition, we are testing some collaboration programs between conventional practitioners and complementary health providers like the traditional faith healers, in the treatment of mental disorders. In the last decade, I have been actively involved in the revision of International Classification of Diseases (ICD). The ICD 10 is going to become ICD 11 later this year. These are some researches for which I have had association with various organizations around the world. Many other publications are accessible online.

Your profile showed that you have held a number of positions including the Director of WHO Collaborating Centre for Research and Training in Mental Health, Neurosciences and Substance Abuse and President of the Association of African Psychiatrists and Allied Professionals; and have won many awards. Why psychiatry as a field of specialty?

We all choose to be doctors for one reason or the other. After medical school, like any other young inexperienced doctor, I was a bit confused about what area to specialize. I had several interests in quite a number of areas and after much combinations and permutations based on opportunities for career development, opportunities for private practice, and whether the field was interesting to me among other factors, I zoomed down on the nervous system – neurosurgery, neurology or psychiatry. Neurosurgery was excluded because at the time I was of the opinion that there were not many opportunities for doing the kind of neurosurgical interventions that would interest me. There was that huge trouble drilling a hole to relieve blood! (laughs). Neurology was excluded because of some of my interest that extended outside the field of medicine such as human nature, sociology and philosophy of health. Psychiatry seemed to offer that future, hence I ended up with psychiatry. During my Youth Service at the Neuropsychiatry Hospital, Abeokuta, where my primary survey to train me on as a resident began, I did and passed the primaries (West African and National examinations). I passed the West African part I examinations fairly quickly as the system was less rigid with number of years in training at the time and I subsequently got an opportunity to study in the United Kingdom, Manchester University and was there two and a half years, where I did a Diploma and then a Masters in psychiatry. During the training in the UK, I came back to take the West African part II examinations, such that when I came back as a lecturer here, I was also already a consultant. I also took the National examinations upon my return and started my Doctorate degree (PhD) program within a few years. All the time while I was in Abeokuta working under the mentorship of Professor B.O. Osuntokun, I had this foundation in research and I actually started writing papers as a trainee. Some of my early papers were written as a resident and I took some data to England, some of which I used for my Masters program. With the quality of the data I had collected, I was permitted to go on with the dissertation. Professor B.O. Osuntokun had encouraged me to come back to Ibadan, although I got the opportunity to be a senior lecturer in Jos which was tempting, albeit I proceeded with the Doctorate degree (PhD) program. There was this ‘June 12 struggle’ that paralyzed the system for a long time and disrupted my work which was mainly clinical research on in-patients. I had started working with WHO at the time, so I took a sabbatical to do Australia’s first National Survey of Mental Disorders. I had met a lady professor in Australia some time before who encouraged me to come there, although I had preferred England where I trained. Eventually, I spent some of my accumulated leaves, sabbatical and some period of leave without pay there, even though to me, Australia seemed like the end of the world! It was a big study and I was one of the senior persons involved. When I returned in 1999, I registered for the Doctor of Science (DSc.) programme and completed that in 2004. I had also become a professor already, which was backdated to 1995, and I have continued ever since to build a very large network around the world, collaborating and also providing mentorship to younger colleagues. These have been very motivational and rewarding.

I have been Head of the Department of Psychiatry, UCH twice (1993-2003 and 2004-2011). I also had the responsibility as Chairman of the Postgraduate Committee, University of Ibadan for about 10 years among other responsibilities but I was never keen on taking any position like being dean or provost. It never really interested me. That is the story!

How fulfilling has this adventure been?

On the scale of 1-10, it is 9. Not 10 because nothing is perfect. For the sake of modesty, it would be 8 but with the acknowledgement of all the opportunities and luck that I have enjoyed, I would say 9.

What is geriatrics and gerontology and why are you interested in this area? What do you think about the current state of geriatrics in Nigeria?

I am not a psychogeriatrician and my work in geriatrics has been mainly epidemiology. In terms of my clinical work, I am a general adult psychiatrist, however, my relationship with Professor B.O. Osuntokun got me involved in a study in 1993. Professor B. O. Osuntokun and a colleague of his in Indiana University initiated Ibadan-Indianapolis Dementia study, a comparative epidemiological study between Nigeria and African-americans living in Indianapolis which went on for about 20 years, all through till 2012 when the program was concluded and the funding stopped. That was specifically an introductory exposure which stimulated my interest in dementia as well as old age health generally. With the conclusion of the previous project, the idea of the Ibadan Study of Ageing came about, where a cross-sectional study to assess the health of elderly people using a large sample was done, then another study on follow up was later assessed and analyzed. It has become a large health study of a kind. Dementia research is going on everywhere in the world although this is relatively new in Africa.

In terms of clinical service, we are just beginning to have a Geriatric Unit in Ibadan. We have had old age psychiatry with Professor O. Bayeiuw leading on but in terms of geriatric medicine as a unit, it is a new development and there is no other centre in Nigeria yet. The state of clinical practice and research in this area is relatively low except in dementia where research may be said to be active.

One of your captivating publications relating to the subject at hand is – *Epidemiology of major depressive disorder in elderly Nigerians in the Ibadan Study of Ageing: a community-based survey*. This topic is not well understood by the majority of the populace, what are the ways to overcome these challenges?

There are identified risks for depression in adulthood and in old age. In our setting, social deprivation, loneliness, lack of social support and inadequate or irregular income have been identified. Old people who were in the informal labour market have little support while those in the formal go through troubles of getting their pensions. Like other non-communicable diseases, there is also the predisposition to depression – a nature versus nurture situation, in addition to the environmental and social factors – hence physical and health conditions also form biological component of the risk factors for mental disorders. For example, diabetes mellitus is a risk factor for developing depression as depression is a risk factor for developing diabetes mellitus.

The rate of depression among elderly people reported in that study is higher than any other reported elsewhere. A holistic approach is needed to redress these issues. Poor social support is a tragedy because young people lack employment and cannot fend for themselves, even though their parents have invested in their education, hoping they would be catered for in future but these older people end up neglected. Many other countries have age related health policies which would take into account all of these. Here, for instance, in Ekiti State, during the tenure of Governor Fayemi, a program of social (financial) support for the elderly people was initiated where a token of five thousand naira per month was given to each old person. The sustainability thereafter may be difficult for subsequent governors if they are not passionate about the policy. Opportunities to network and socialize is good for old people as is early detection of chronic illnesses and effective treatment among them.

How can the average Nigerian or a medical students ensure proper care of the elderly?

Generally, doctors need to know and develop a better understanding of mental health irrespective of specialty. Early detection is a major challenge among health professionals. The endocrinologist, cardiologist or nephrologist may have patients presenting with depression and should be able to identify, treat or refer them as appropriate. Knowledge must increase among health care providers which should start by developing programs to empower the primary health care providers, so must services be scaled up by the government for effective outcomes.

Health education in form of psychosocial support or counseling can alleviate mild to moderate depression. Active development of primary care is important as is community participation especially in the support of elderly people who may be lonely or who live alone. We have been able to demonstrate here that those common conditions could be managed well by primary care providers if they are trained to identify them. An elderly person with psychosis is easily identified than one with depression.

What are the other psychiatric disorders elderly people are prone to?

Dementia is a secret one and it is more common among elderly people especially degenerative long term dementing process like Alzheimers. This is the most active area of research in old age mental health as so much is being done across the world to understand dementia. Although, its rate is not as high as depression, it has much more debilitating impact. At 70, the impact may be about 5%, at 80-89 it would double to about 10%, particularly more so because we do not have very effective prevention or treatment strategies. Provision of palliative nursing care and some medications may help slow down the disease progression.

Elderly people may also present with psychotic illnesses, schizophrenia in old age and delirium in the context of other biophysical problems. They may present with acute confusional state if there are poorly controlled comorbidities or infections because their brain reserve is very low when compared to that of the general adult population. Anxiety is also a problem in elderly people.

What would you say the future holds for the field of geriatrics?

It is one of the areas in which there is epidemiological transition. More people will get to their 70s and 80s which is good but also means that there will be more age related conditions. Hence, geriatric medicine and other related specialties would become more prominent just like we have in Europe and America, and the research interests and services would also grow. So it is an area that is certainly expanding.

What advice do you have for medical students who are interested in going into this field and also for the DOKITA Editorial Board?

Psychiatry is a broad field. They could gain an entrance through the mental and behavioural section by specializing in psychiatry and then subspecializing in old age psychiatry. Through the neurology route, they may specialize in neurology and later subspecialize in neurological ageing, especially dementia and age related neurological condition. As geriatricians, that is, internist, they may start as physicians, more like general practitioners but with specific interest in geriatrics and subsequently subspecialize in say diabetes of old age, hypertension of old age or any other area of interest. But like I emphasized, it is an area that will offer opportunities whatever the route of entry.

Thank you very much.

PERSPECTIVES IN GERIATRICS: EXPERIENCE AS AN ELDERLY PERSON

The DOKITA Editorial Board met with some members of the Elders' Forum – an organization comprising of elderly people and created as a platform for social interaction among them.

The DOKITA Editorial Board interviewed Mr. Adebowale, the Social worker in charge of the Elders' Forum and two (2) representatives of the Elders' Forum – Mrs. Adeshakil Mercy (here on referred to as *Mama*) and another who requested anonymity (here on referred to as *Baba*), on February 23, 2018.

Section 1: About Elders' Forum

What is the Forum about?

Mr. Adebowale: The Forum consists of people aged 60 years and above. It is for Social interaction.

For how long has it been operating?

Mr. Adebowale: Four (4) years.

What is/are the goal(s) of the Forum?

Mr. Adebowale: The goal is to avoid loneliness and boredom, and also to learn from one another's past experiences.

Section 2: Personal Experience as an Elderly Person

How old are you, sir/ma?

Baba: I am 84 years old.

Mama: I am 73 years old.

Before your retirement, what was your occupation?

Baba: Construction worker.

Mama: Chief Nursing Officer/Health.

What have your experiences been with ageing?

Baba: Well, it has not been easy. The first problem is problem with memory. For example, I could be seating in my room and decide to pick something from the seating room. Before I get there, I would have forgotten why I went there. The second thing is limitation of activities, all the things you were able to do before, you cannot do them as well again. But I thank God it has been so much better with Chief Anenih and our *Olori ebi* (administrator in Yoruba language) (smiles) –our Papa Alonge, may God bless them. In relation to some of the experiences of my colleagues, I thank God and ask Him to take control.

Mama: Thank God for being alive. When I first retired, I found it hard to sleep and was also bored. This became worse after I lost my husband but thank God depression did not come in. This was because I was involved with Church activities and it has been helping me. It has become even better when I was introduced to the Elders' Forum, such that instead of sitting alone, we can communicate with one another. Thanks to GSM for this because communication, especially with the children, is also possible. If it were in the time of NITEL, one could have passed away.

With reference to salary, for the first two (2) years before retirement, I was not paid anything. They later started paying our pension. It was regular then, but now, oh my God! without the funds, it can make one go mad. Ageing is good but if one does not have what one needs, it would be the other way round.

What are your expectations from the society towards the elderly? What are the challenges of the elderly in Nigeria and how do you think we can overcome them?

Baba: I expect that the people who set up this platform (Chief Tony Anenih Geriatric Centre, University College Hospital, Ibadan) know what we need. We need the care and support old people enjoy in other countries where things work well.

Mama: Make us comfortable – good roads, water, electricity, electricity, I mean electricity. You see I need to emphasize electricity. Also, communication is very important. When elders have something in mind and have

put it down, the Government should make it happen. From home, parents should teach their children to respect the elderly. For instance, when you want to board commercial vehicles, you see how young people would be pushing the old people. This is not fair and it does not happen in developed countries. When people see elders that need help, they should help them and not run away.

What do you think are the roles of medical doctors and medical students in ensuring the care and security of the elderly?

Baba: Like I mentioned before, I see how things go on here in Chief Tony Anenih Geriatric Centre, University College Hospital, Ibadan as the standard. Medical care has been made easy for us. They should keep up the good work while others should emulate them.

Mama: First of all, whoever takes care of another human being should be kind-hearted and have human feelings because if a patient is seeing a wicked doctor or nurse, the patient's problem would be doubled. They should always smile. It means a lot to us. If you do not smile, you may get nothing from the patient. The hospital must also provide enough hands, in the sense that a doctor should only see a certain number of patients.

Medical students should learn to be patient, especially with the elderly. With ageing, one cannot be very reasonable at all times. So, learn to be patient with us. May God help you all. We would continue to pray for you.

Section 3: Conclusion

What advice do you have for the youth and middle aged, who would one day become old too?

Baba: They should commit their works into the hands of God. Without God, they cannot do anything good. They should also remember that in the pursuit of wealth, good name is very important. They should be good and make good names.

Mama: They should know their God, whether Christians, Muslims or Traditional worshippers. They should shun greediness. People should aim high but if I know that the high place would be detrimental, I better stay here. They should not live fast and die young. They should take care of the elderly because one day, they would become old too. God would help them.

What advice do you have for DOKITA Editorial Board?

Baba: Thank you! Keep up the good work.

Mama: With this programme you have embarked on (Geriatrics), aim to always improve upon what you met. God bless you!

THE BEAUTY OF BEING OLD

Olaitan Olaniran

The beauty of being old is forgetting.
Your head becomes the rolling stone that gathers no moss.
You toss memories like clothes, shuffling them about,
Sometimes forgetting something as dear as your spectacles
In a old pile that peculiarly interests you
Only to later find it in your hand.

So you said to the doctor
As figuratively as optimistically possible
Careful to keep your shaking hands in the bag
Fumbling for his last shreds of humanity, before
He got to mention something like Parkinson's.

Of course that wouldn't be the case,
It's just the nervousness that's tied to doctors' appointments.
You had entered four wrong offices
Asking for directions each time, only to land
In some other knot and limp back to the welcome banner.

It's old age. Forgetting. Technically.
You picked an object and investigated.
It felt strange, a bunch of keys.
Oh goodness, your house keys, the florist was locked out.
The doctor was talking to you
But you were gone
Floundering through a jumble of pictures
For one that felt like keys...

Until you found it in your doctor's hand.
He waved it, mindlessly playing your puzzle for you
He asked if you got it, and you did
Just as well a Z could stand for A
Each time your spectacles fell in your mental oblivion.
He was holding his keys and your confusion
And telling you you could go.

You got to the car hoping to see the maid.
She wasn't there, only your driver stood tired.
He was carrying your bag, smiling sheepishly.
Another miracle had happened,
Events of the day had reshuffled themselves for real.

You had carried his bag and his house keys.
You had asked the maid to stay back and conduct the florist around.
How could you have carried a man's bag? You asked yourself.
That was what the doctor hadn't figured
But it surely wasn't Parkinson's.

NOT MUCH LONGER

Bunmi Oke

My umpteenth visit here in 52 weeks
If yesterday it wasn't due to blurry eyes
Tomorrow my knees would be all weak
Or today, some heaviness in my thighs
And each time, after writing me a drug
Doc'd say, "It's old age, Ma'am." Ugh!

Yes, the years are showing, I do know
Face and body, now fat and wrinkled
All that's left of me is but an afterglow
Vestige of the days my smiles twinkled
Not now that hair's all shades of grey
Black since gone on indefinite holiday.

Oh, the changes this body did witness!
Is it how bosom no more defies gravity
And its bagginess distorts my fitness?
[Now, I'm one flabby, amorphous cavity
Or the cellulite dotting flagging buttocks
And the crow's feet that scoff at Botox?

Trudging home, cane in hand, limp in leg
Two lovebirds on the horizon catch my eye
Airborne laugh, dainty love—fragile as egg
But I hear too, surer than the years gone by
A rich sound from life, louder and stronger
Assuring me I won't be here much longer

OH MARRIAGE, THE UNENDING BEAUTY

K I Egbuchulem

A sacred bond of Union:
 An oath expected to be taken twice,
 Its joy like the garden of roses and sadness
 Like the river bed of the black sea
 Its joy envelopes the two souls at its start
 As the darkness envelopes darkness fiercely,
 When the Oath is taken then the riddle unfolds,
 Its processes and stages are diverse,
 Like a journey along the plains of the earth,
 Like the plain grasslands of Kenya'
 Variety is its brother and hopes its mother,
 Plants and animals like the common air.
 Then comes the mountainous rocks, high and tall
 It offers only discomfort,
 A decision to back out looks beautiful,
 But you have to climb, climb, climb and climb,
 Then comes the seed,
 oh! what a source of joy;
 This is like descending the mountain in graceful
 strides
 Raring them is like finding a thick forest under this
 mountain,
 Where the sun knows no superiority over the moon;
 For underneath those trees is always dark but cool,
 Children reduces and increases the stress in
 marriage,
 They are the topic of the day,
 Until they begin to leave one by one,
 You then realize you have approached the desert,
 Where nothing offers solace from the sun,
 You begin to realize your partner is still here;
 Where have you been all this while?
 Marriage begins to slack
 Sex and romance that was a bond
 Now becomes like the soles of the tired foot.
 Geography seems to be failing,
 Would this wilderness ever end?

But the end is really what matters,
 A coward backs out at this stage,
 Becoming like the runner, savage in the desert
 No water to drink, hopeless and hungry,
 Fading until he makes agreement with the dust
 Dead and forgotten
 But the brave, knew what he wanted from the start
 They would run, walk, run and walk
 To the world, he looks like a fool;
 What else could you find in this part of the earth?
 But they are stunned at this new mystery,
 For he finds an oasis, like a dream, like a reward,
 A better place than the very start,
 The partner becomes a source of joy and happiness;
 A resting place when the lights are off,
 And when the pains of agony begins,
 Two they say is better than one,
 Until death do them part,
 Then the journey, the mystery,
 The riddle called marriage would be solved.
 Dare it and ready to make this race,
 Down the plains of the earth.

To all yet unmarried residents I call up solace to find
 you and locate you within the perimeter of an
 unending Love.

Dare it! Dare it, I say to my fellow compatriots and
 it shall become a mystery. look for the black goat
 while it is dark and it is possible while in training.

A WORD, THEY SAY, IS ENOUGH FOR THE
 WISE.

*K I Egbuchulem is a resident doctor,
 Department of Surgery, University College
 Hospital, Ibadan*

THE WORDS OF AN AGED COMPUTER AGE MAN

Ogwijib Ehi-kowochio B

I looked into my dim crimson eyes
 Through the lens of my acquired eyes
 I had never believed that four eyes
 Were better than two
 Until all the ripened grains of my hair
 Were harvested by the finger of time

 Leaving my face in rumbles and creases
 Which many of you call wrinkles
 But it actually is the resultant effect
 Of the incessant pressures exerted on me by life

 The screams from the screen of memory
 Feeds my ears with sour truths
 That reverberates,
 And echoes
 As it hits the soft wall of this paper

 I understand you are in haste
 But spare one minute to listen
 For I may have wizened by reason of age
 But I am yet wise by reason of age

 Pull your ears to its elastic limit
 And allow the broom of wisdom
 To clean the cobwebs of youthful exuberance
 That houses the spider of foolishness
 Which resides at the door of your eardrums

 Young man do you know
 That youthful experiments hatch
 Into the bitter experiences
 That plagues every old man?
 Ask your grandfather, he will attest to this

 I live in awe of this age
 For buttons,
 I mean mere buttons
 Responds to stimulus of gentle taps
 Which displays beautiful results in split seconds
 And atrophies many brains along side

 Don't quote me wrong....

I love the catalytic effect of technology
 But why does it save time in a bank account
 Where it can never be retrieved?
 I love the catalytic effect of technology
 But why does it save enormous energy
 In the heart of an unbreakable *kolo*
 Storing up energy
 That is completely worthless
 In the grave wither I go?

 I love the shortcut your machines afford
 But why don't we have such illusionary shortcuts
 Which your virtual life captures so perfectly?
 I love the artificial height your stiletto gives you
 Concealing your dwarfism in a thick veil

 But now,
 I can only look back
 At the fancy apparel of youthfulness
 That I had long outgrown
 I can only look back
 At the exoskeleton of strength
 That collapsed with the emergence of my grey hair

 Sadly...
 The errors of today's young man
 Metamorphoses into the horrors
 That sneaks into the life
 Of tomorrow's old man

 I miss the good old days
 But oh no!
 There are many things
 Ctrl Z cannot undo

 Geriatrics,
 It is the voice of time
 Reminding you that you can not
 Eat your cake and have it

 Geriatrics,
 Is life telling yesterday's young man:
 "I knew all the tricks you played on me"

IT BEGINS WITH YOU AND I

Oluwafeyikemi Adewole

I was at the balcony in my house few nights ago, staring into space, I then realized that I was thinking about the happenings right from the past till present, I realized that things have changed from better to worse and we are doing nothing, I mean nothing, to take charge or change the situation. Why is this happening at a time like this, when our nation should have graduated from the class of developing country to the class of a developed country? I sensed danger and chaos when I thought about what our future will look like.

We call ourselves the leaders of tomorrow, right? But as youths today, are we doing the right things that can change our future? Do we feel jealous about other people's achievement or do we feel happy for them and think of how to achieve greater things? Attitude goes a long way in molding our behaviors in the world. Also, do you feel bad about cheating? If someone cheats you, you feel bad, don't you? I know your answer is yes. Exactly! The way you feel is the way others feel when you cheat. Therefore, we have to ensure we do good at all times, so that good deeds will return to us and we all would be happy.

Fact is that many people are now of the opinion that if you cannot beat them, join them. Who says you cannot make it in life by doing the right. I know, it might take a while but do you not think it is good enough to have a long life in peace? And change that mentality because the world can only get better if we do right.

This is a charge to us all. Let us work together to clean the mess of corruption and insecurity in our nation. Thereafter, we will then be happy with ourselves and become the great leaders that we dream of becoming

Before I drop my pen, let me leave you with the words of Dr. Suess –
“Unless someone like you cares a whole awful lot, nothing is going to get better. It is not!”

IT GETS BETTER WITH YOU AND I

THE 48TH ANNUAL SYMPOSIUM OF DOKITA EDITORIAL BOARD

The symposium held on Tuesday, November 18, 2014 under the chairmanship of Professor V.A. Adetiloye (Chief Medical Director, Obafemi Awolowo University Teaching Hospital, Ile-Ife) at Paul Hendrickse Lecture Theatre, University College Hospital, Ibadan.

Theme: NOW A CENTURY IN A ROCKING CRADLE: WHAT DOES THE CENTRE HOLD?

Sub-Themes:

1. SYNOPSIS OF THE PAST AND PRESENT

Speaker: Professor Femi Ajayi, Professor, Policy, Management and Conflict Resolution, Babcock University

2. THE DUTY OF THE STATE AND THE OFFICE OF HER CITIZENS

Speaker: Professor Adeniyi Olatunbosun, Dean, Faculty of Law, University of Ibadan

3. 2015 BECKONS: HOW PREPARED ARE WE?

Speaker: Mr Edmund Obilo, Splash 105.5 FM, Ibadan

During the symposium, the latest issue of DOKITA, Emeritus Professor O.O. Akinkugbe Edition, Volume 37 No. 1 was launched.

PROFESSOR O.O. AKINKUGBE NATIONAL INTER-MEDICAL SCHOOL QUIZ COMPETITION

The DOKITA Editorial Board's 8th Biennial Professor O.O. Akinkugbe Quiz competition took place at the University College Hospital(UCH), Ibadan, Oyo State between 21st-24th January, 2015. The following schools participated in the event:

College of Medicine, University of Lagos, Idi-Araba, Lagos State.

College of Medicine, University of Ibadan, Oyo State.

College of Medicine, Lagos State University, Ikeja, Lagos State.

College of Medicine, University of Ilorin, Kwara State.

College of Medicine, Ladoke Akintola University of Technology, Ogbomoso, Oyo State.

College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Osun State.

College of Health Sciences, Olabisi Onabanjo University, Ago Iwoye, Ogun State.

College of Medical Sciences, University of Benin, Benin-City, Edo State.

The closing ceremony was held under the chairmanship of Professor Babatunde Salako, Provost, College of Medicine, University of Ibadan, Oyo State, with the following schools emerging as winners:

First Position: College of Medicine, University of Ibadan.

Second Position: Obafemi Awolowo College of Health Sciences.

Third Position: College of Health Sciences, Olabisi Onabanjo University.

ANNUAL GENERAL MEETING

This held on Saturday, 16th May, 2015. Executives for the 2015/2016 Board year were elected. They are:

Editor-in-Chief: Mr. Ibrahim Olukunle

Board Secretary: Ms. Abisola Sumah

News and Quiz Editor: Mr. Babasola Opaneye

Production Manager Ms. Esther Okoro

Distributions Manager Ms. Vivian Magboh

Business Manager Ms. Idowu Oladigbo

Financial Controller Ms. Joy Oluwaniyi

Publicity Editor Ms. Omotoyosi Akinbami

ADMISSIONS

The Editor-in-Chief, on behalf of The Board hereby congratulates the following medical students on their admission to the DOKITA Editorial Board

August 2015

Mr Chidike Ezegwui

Mr Uyiose Iyoke

December 2015

Miss Morohunmubo Ibiyo

May 2016

Miss Eunice Olusoji

July 2016

Miss Oluwatosin Emmanuel

Miss Faith Kowe

Compiled by:

Babasola Opaneye

News and Quiz Editor 2015/2016

DOKITA Editorial Board

The 50th Executive Council, Senate and Congress of the University of Ibadan Medical Students' Association (UIMSA) were sworn in a memorable event on Saturday, July 17, 2016 at the Famewo Common Room, Alexander Brown Hall, University College Hospital, Ibadan, with the motto of the Executive tenure as *moving forward*. The newly inaugurated President, Mr. BAMIDURO ADEDOTUN, made his inaugural speech laying much emphasis on the need for all UIMSITES to continue to support the Executive Council, Senate and Congress towards the progress of the Association.

The list of the Sworn-in officers is as follows:

EXECUTIVE COUNCIL

Mr. Adedotun Bamiduro	President
Mr. Kolapo Olugboye	Vice President
Mr. Olakorode Ojo	General Secretary
Mr. Jefferson Esebame	Asst. Gen. Secretary
Miss. Chidimma Ezeilo	Financial Secretary
Miss. Damilola Akanni	Treasurer
Miss. Jomiloju Ajiboye	Pub. Relations Officer
Mr. Daniel Onobun	Sports Secretary
Mr. Kingsley Ugoagwu	Special Duties Officer (Clinicals)
Mr. Boluwatife Aderohunmu	Special Duties Officer (Pre-Clinicals)

SENATE OFFICERS

Mr. Santus Unuovoraye	Senate Chairman
Mr. Mmadunbuchi Ozioko	Dep. Senate Chairman
Mr. Abdul'fawaz Oyebamiji	Senate Registrar
Miss. Oluwaseun Bello	Dep. Senate Registrar
Mr. Michael Akande	Senate Chief Whip

CONGRESS OFFICERS

Miss. MofeOluwa Lagunju	Congress Chancellor
Mr. Oghenelukome Jerry-Ogeme	Dep. Congress Chancellor
Miss. Morohunmubo Ibiyo	Congress Scribe

ACTIVITIES OF THE EXECUTIVE COUNCIL SINCE INCEPTION

The following news about the Association is dated from the inception of this tenure in July, 2016 and January, 2017.

COURTESY VISITS

The Executive Council paid courtesy visits to Emeritus Prof. O.O. Akinkugbe, our distinguished Patron. Dr. Kayode Obembe was also visited. We were warmly received by them. These were done in line with the traditions and ideals of the Association. It was an avenue to appreciate their various efforts which the Association enjoys at all times and also to intimate them on the plans

and ideas of the new tenure. They all promised to continue to support the Association. More so, we paid courtesy visits to the Deputy Governor of Oyo State, the Speaker, House of Assembly Oyo State and the Honourable Commissioner for Health, Oyo State. They all promised to support the Association in their capacities.

The Executive Council also paid a courtesy visit to the Orangun of Oke-Ila, Oba Adedokun Abolarinwa on the 18th of September, 2016. The Executive Council also attended the 87th edition of the Annual Reunion Programme of the Government College, Ibadan being invited by one of our one of our Honourary Members, Engineer Femi Babalola on the 21st of October, 2016.

CONGRATULATORY MESSAGES

The Executive Council sent out congratulatory message to Prof. E.O. Olapade-Olaopa as he became the new Provost of the College of Medicine, University of Ibadan. He sent us a reply wherein he pledged his continued support for the Association.

The Executive Council also sent Welfare message and provided Examination Welfare package to the members of the 2012 Class for their MB;BS Part IV Final Examination in keeping with our great tradition of striving for Excellence in all that we do. The members of the Class promised to support the Association as they were about to draw the curtain as Medical Students.

More so, we provided provided Examination Welfare package to the members of 2016 Class for their MB;BS Part I and the 2013 Class for their MB;BS Part III and also to the members of the 2014 Class for their MB;BS Part II. Members of these Classes were grateful and promised their continued support for the Association.

CELEBRATION OF INTERNATIONAL DAYS

Since the inception of this tenure, the Association has marked the following International Days;

1. World Heart Day on the September 29, 2016.
2. World Sight Day on the October 13, 2016 in partnership with FAMSA Headquarters Board, the Societies of Ophthalmologists and Optometrists of Oyo State and Ophthalmic Nurses of Oyo State in partnership with Lions Club International District 404B1 and the department of Ophthalmology, College of Medicine, University of Ibadan.
3. World Breast Cancer awareness Month in 2016 in the Month of October in partnership with the FAMSA Headquarters Board and the Students' Union, University of Ibadan.

4. World AIDS Day on the December 1, 2016 in partnership with Oyo State Action Committee on HIV/AIDS, AIDS Prevention Initiative in Nigeria.

COMMUNITY HEALTH AWARENESS PROGRAMS (CHAPs)

Since inception of the tenure, the Association has staged Community Health Awareness campaign to the following where Medical checks were done for the people;

1. Independence Hall, University of Ibadan.
2. Queen Elizabeth Hall, University of Ibadan.
3. Mellanby Hall, University of Ibadan
4. Students' Union Health Day.
5. Bello hall, University of Ibadan
6. The Federal Co-operative College, Eleyele, Ibadan.

ACTIVITIES WITH OTHER MEDICAL STUDENTS' ASSOCIATIONS

1. First inter-Medical School Sports Competition against Babcock University Medical Students' Association held in Babcock on the 3rd of October, 2016. UIMSA won the competition by 4 points to 3.
2. UIMSA had 8 Delegates to the NiMSA South-West Convention hosted by the Unilorin Medical Students' Association between August 17-22, 2016.
3. The Association was represented by two Delegates to the NiMSA 2016 General Assembly hosted by the University of Zaria Medical Students' Association between November 9-13, 2016.

WELCOME PROGRAMMES/ORIENTATION FOR MEMEBERS

1. Frehers welcome and orientation for the 100L Students was held on the 10th of September, 2016
2. Orientation for the 300L Students into Clinical School was held in the third week in September for the different groups in Medicine 1 and Surgery 1.
3. Another orientation programme was held for the 100L Students on the 9th of Dcember, 2016 after their

second Semester Examinations to prepare them for 200L while enjoying their break at home.

QUIZ COMPETITIONS

The University of Ibadan Medical Students' Association Quiz Team contested at the Association of Medical Students of the University of Lagos (AMSUL) intercollegiate Quiz competition which was part of their annual Health Week. UIMSA Quiz Team came third.

UPCOMING EVENTS

1. The 17th edition of the Late Dr. V.O. Awosika Memorial Symposium and the first Late Dr. V.O. Awosika Memorial Inter-Secondary Schools Quiz Competition.
2. The first edition of UIMSA Press Conference.
3. Provost Games
4. Second Inter-Medical Schools Sports Competition against the Obafemi Awolowo University Medical Students' Association to be hosted by UIMSA.
5. Distinguished Alumni Guest Lecture.
6. Publishing of the Ibadan Medscion Magazine.
7. Health Week and the 57th Anniversary.

CONCLUSION

On behalf of all members of the Executive Council, the Senate and the Congress, we appreciate all UIMSITES for their continuing support for the progress of the Association. We look forward to more of this as we together *move* our dear Association *forward*.

Signed:

OJO, Olakorode Jacob

UIMSA General Secretary, 2015/2016 Session

BAMIDURO, Adedotun Daniel

UIMSA President, 2015/2016 Session

COLLEGE NEWS

1. APPOINTMENTS

The following appointments have been made:

a. Department of Environmental Health Sciences

Dr. Elizabeth O. Oloruntoba - Acting Head, for a period of two (2) years with retrospective effect from 01 August, 2016

b. Department of Health Promotion and Education

Dr. F. O. Oshiname - Acting Head, for a period of two (2) years with retrospective effect from 01 August, 2016

c. Department of Biochemistry

Professor E. O. Farombi - Head, for a period of four years with retrospective effect from 01 August, 2016

d. Department of Physiology

Professor Y. Raji - Head, for a period of four years with retrospective effect from 01 August, 2016

e. Department of Epidemiology and Medical Statistics

Dr. Bidemi O. Yusuf - Acting Head, for a period of two (2) years with retrospective effect from 01 August, 2016

f. Department of Paediatrics

Professor Ikeoluwapo A. Lagunju - Head, for a period of four (4) years with retrospective effect from 01 August, 2016

g. Department of Oral and Maxillofacial Surgery

Dr. Victoria N. Okoje-Adesomoju - Acting Head, for a period of two (2) years with retrospective effect from 01 August, 2016

h. Department of Anaesthesia

Dr. B. B. Osinaike - Acting Head, for a period of two (2) years with retrospective effect from 01 August, 2016

2. PROMOTIONS

The Appointments and Promotions Committee for Academic Staff approved the promotions of the following:

S/N	NAME	DEPARTMENT	PREVIOUS POSITION	POSITION ON PROMOTION	EFFECTIVE DATE OF PROMOTION
1	Dr. O.S. Arulogun	Health Promotion and Education	Reader	Professor	01 October, 2012
2	Dr. Eme T. Owoaje	Community Medicine	Senior Lecturer	Professor	01 October, 2012
3	Dr. I.A. Lagunju	Paediatrics	Reader	Professor	01 October, 2013
4	Dr. G.N. Odaibo	Virology	Reader	Professor	01 October, 2013
5	Dr. J.O. Taiwo	Periodontology and Community Dentistry	Reader	Professor	01 October, 2013
6	Dr. A.O. Oluwasola	Pathology	Reader	Professor	01 October, 2013
7	Dr. J. K. Ladipo	Surgery	Senior Lecturer	Reader	01 October, 2003

3. HONOUR AND DISTINCTION

Professor A.R.A. Alada, Department of Physiology, was elected and inducted as a fellow of the Physiology Society of Nigeria (FPSN) on 05 September, 2016.

4. LECTURES

a. An Inaugural Lecture titled “*In Search of an Antidote for a Poisoned World*”, delivered by Professor J.I. Anetor of the Department of Chemical Pathology on behalf of the Faculty of Basic Medical Sciences, held on Thursday, 01 September, 2016 in Trenchard Hall, University of Ibadan.

b. An Inaugural Lecture titled “*Danger, Men at Work: the pitfalls, the perils and the panacea*”, delivered by Professor Folashade O. Omokhodion of the Department of Community Medicine on behalf of the Faculty of Clinical Sciences, held on Thursday, 08 September, 2016 in Trenchard Hall, University of Ibadan.

c. A Faculty Lecture titled “*A Tale of Creation and Destruction: Oral Cancer in Focus*”, delivered by Dr. Bukola F. Adeyemi of the Department of Oral Pathology on behalf of the Faculty of Dentistry, held on Wednesday, 30 November, 2016 at Paul Hendrickse Lecture Theatre, College of Medicine.

5. EVENT

The Ceremony of Admission into the Medical and Dental Professions for the MB;BS/BDS 2015/2016 graduating class held on Tuesday, 01 November, 2016 at the Paul Hendrickse Lecture Theatre. The ceremony was chaired by the Vice-Chancellor, Professor A.I. Olayinka, who was ably represented by the Deputy Vice-Chancellor (Academics), Professor Gbemisola Oke.

6. COURTESY VISITS

- | | | | |
|----|--------------------|---|---|
| a. | 19 September, 2016 | - | College Management’s visit to the Olubadan of Ibadan, His Royal Majesty, Oba Saliu Adetunji, led by the Provost, College of Medicine, Professor E. Oluwabunmi Olapade-Olaopa, <i>Esq.</i> |
| b. | 22 September, 2016 | - | Courtesy visit to the Provost by a team from Pharmacy, University of Ibadan, led by the Dean, Professor Chinedum Peace Babalola |
| c. | 06 October, 2016 | - | Courtesy visit to the Provost by the MB;BS/BDS class of 2002/2003 |
| d. | 07 October, 2016 | - | Courtesy visit to the Provost by the MB;BS/BDS class of 1976 |
| e. | 18 October, 2016 | - | Courtesy call on the Provost by a team of Faculties from San Diego State University, Graduate School of Public Health/Institute for African Culture and International Understanding, U.S.A. |
| f. | 19 October, 2016 | - | Courtesy call on the Provost by the Executives of the West African College of Surgeon, led by Professor A.O. Omigbodun |
| g. | 19 October, 2016 | - | College Management’s visit to Chief Olabode Amao, OON led by Provost, College of Medicine, Prof. E. Oluwabunmi Olapade-Olaopa, <i>Esq.</i> |

5. OBITUARY

The Provost, Professor E. Oluwabunmi Olapade-Olaopa, *Esq.*, on behalf of Management, announces, with deep regret, the passing away of the following members of staff:

- Mrs. Absetu Salawu, office of the Deputy Registrar/Secretary to the College on 26 June, 2016
- Dr. Modupe O. Oyetunde of the Department of Nursing on 13 August, 2016
- Mr. Patrick Obi, Faculty of Dentistry on 29 November, 2016.

May their souls rest in peace.

6. SEASON’S GREETING

The Provost, Professor E. Oluwabunmi Olapade-Olaopa, *Esq.*, on behalf of Management of the College, wishes all members of staff a Merry Christmas and a Happy, Prosperous and Fulfilling New Year in advance

PROVOST APPOINTMENT

APPOINTMENT OF PROFESSOR EMIOLA OLUWABUNMI OLAPADE-OLAOPA ESQ AS PROVOST, COLLEGE OF MEDICINE (2016-2020)

The Vice-Chancellor, Professor A.I. Olayinka on behalf of the Court of Governors of the College of Medicine and the University of Ibadan Governing Council has executively approved the appointment of Professor Emiola Oluwabunmi Olapade-Olaopa, a Professor of Surgery, as the 11th Provost of the College of Medicine, University of Ibadan for a period of four years with effect from 10 September, 2016.

Born on 24 October, 1963, Professor E. Oluwabunmi Olapade-Olaopa attended Loyola College, Ibadan (1974-1979) for his secondary school education and the International School, Ibadan (1979-1980), for his Higher School Certificate (HSC), passing out as the Best Student (Science). He proceeded to the University of Ibadan for his University Education in 1980, where he obtained a Bachelor of Medicine and Bachelor of Surgery (MB;BS) degree in 1986. Professor Olapade-Olaopa also possesses a Diploma in Urology from the University College, London (1994) and a Doctor of Medicine from the University of Leicester, Leicester, United Kingdom in year 2000.

After undergoing the compulsory Internship programme at the University College Hospital (UCH), Ibadan (1986-1987) and the National Youth Service (NYSC) at the Nigerian Air force Medical Centre, Kaduna (1987-1988), Professor Olapade-Olaopa acquired his basic and higher surgical trainings at various hospitals and medical centres in the United Kingdom and the United States of American (USA). He also holds a Fellowship in Medical Education of the Foundation for Advancement of International Medical Education and Research, Philadelphia, PA, USA as well as a Fellowship Diploma of the Royal College of Surgeons of Edinburgh, U.K. and the Fellowship of the West African College of Surgeons.

Professor Olapade-Olaopa commenced his academic career as Oncology Research Fellow (Basic Sciences) in the Department of Urology, Leicester General Hospital/University of Leicester, U.K. (1996-1998). Between July 1999 and June 2000, he was Lecturer at the Urology Section of the University of Michigan Medical Centre, Ana Arbor, Michigan, U.S.A. He joined the services of the University of Ibadan, Ibadan in November 2000, having been appointed Lecturer in the Urology Division of the Department of Surgery, College of Medicine, University of Ibadan where he rose through the ranks to become Professor in 2007. Professor Olapade-Olaopa has served the University in various capacities. He is Member, Academic Board of the College of Medicine; Member of the University of Ibadan Senate; Sub-Dean (Postgraduate), Faculty of Clinical Sciences (2004-2006); Member, MacArthur Funded University of Ibadan Curriculum Review Committee (2008-2011); Principal Investigator, John T and Catherine D. MacArthur Foundation MB;BS Curriculum Review Project of the University of Ibadan; Member, Secretariat Sub-Committee at 60th Anniversary Committee (2008-2010); Member, University of Ibadan Strategic Planning Committee (2006); Member, Committee of Internationalization of the University of Ibadan Curriculum Sub-Committee (2006); Programme Director, Telemedicine Committee of the College of Medicine (2003-2005). Chairman, Faculty of Clinical Sciences Sub Committee on Continuing Medical Education (2003-2006); Secretary, Multidisciplinary Tumor Group, College of Medicine (2001-2004) and Assistant Programme Director, Residency Training Programme, Department of Surgery among others. His contributions through the MacArthur Foundation supported revision of the Medical School Curriculum which produced the widely acclaimed first home-grown competency-based medical and dental education curriculum in Sub-Saharan Africa are perhaps the most notable.

Professor Olapade-Olaopa is a recipient of several distinctions, prizes and awards. He was appointed Programme Director, PAUSA Initiative for Urological Training for African (PIUTA) Centre for Anglophone West Africa (2011); 5th Professor Anomah Ngu Lecturer at the 51st Congress of the West African College of Surgeons (2010); 9th British Journal of Urology International Lecturer, British Association of Urological Surgeons Meeting, Glasgow, Scotland (2009); Programme Chair, Pan-African Urological Surgeons Association and Caribbean Urological Association Education Forum (2008 till date); Pan-African Urological Surgeons Association Lecturer, Centenary World Congress of the Society International Urologic, Paris, France (2007); Sir Mobolaji Bank Anthony Fellowship in Urology, and Nephrology (2006); International Network for Cancer Treatment and Research Travel Award (2004); Keystone Symposia Academic Award, National Institute of Health, USA (2000); Pfizer Academic Award, Pfizer Limited, U.K.

(1998); Best Research Prize, Leicestershire Region, U.K. (1997); Sir Sydney King Cancer Research Prize, University of Leicester (1997). Best Poster Prize at the British Prostate Group's 2nd International Symposium U.K. (1997) and Schilling Research Award American Cancer Society, USA (1997) to mention a few. Nationally, Professor Olapade-Olaopa served as Technical Advisor, Inter-Ministerial Committee on the Development of the template for the MB;BS and BDS Curricula and Medical Advisor, Coordinating Centre for the Medical Education Partnership Initiative of the United States Government.

Professor Olapade-Olaopa belongs to several Academic Professional Societies/Groups within and outside Nigerian amongst of which are: Executive Secretary, Africa Medical Schools Association (AMSA); 2-Term President, Pan African Urological Surgeons Association; Member, WHO-AFRO Advisory Committee on Health Research Development; former Council Member, West African College of Surgeon; Royal Society of Medicine, London, U.K; Honorary Secretary, Nigerian Association for Medical Educators; 1st Vice-President, Transplant Association of Nigeria; Nigerian Transplant Society; Nigeria Medical Association; American Association for Cancer Research; Medical and Dental Consultants Association of Nigeria; New York Academy of Science; Nigerian Medical Association and Nigerian Association of Urological Surgeons.

Professor Olapade-Olaopa is an accomplished broad based scholar, medical educator, change facilitator, visionary and a new generation leader who is actively involved in Basic/Translational Sciences, Clinical Sciences, academic and professional postgraduate training in Surgery, Urology, Medical Education and Arbitration. His outstanding contributions to science have resulted in close to 100 book chapters and papers in major scientific journals that have been cited over 900 times to date. He has attracted numerous grants for his research, educational and capacity building activities from industry, the University and international funding agencies. He was also instrumental to the successful application for the multi-center Medical Education Partnership Initiative in Nigeria (MEPIN) grant in 2010. He has also facilitated grants for Postgraduate students and also junior faculty. He has edited 4 books on research and surgical education and is also on the editorial board of several national and international science journals.

Signed.

Olubunmi O. Faluyi (Mrs.)

Secretary to the College

LIST OF GRADUANDS

MB;BS PART IV (FINAL) DEGREE EXAMINATION

BATCH A : JULY/AUGUST 2016

- | | |
|--------------------------------------|--|
| 1. Adebayo, Catherine Titilope | 27. Ashey, Oreka Patricia |
| 2. Adeboye, Ibukunoluwa Olufunmilayo | 28. Awe, Abiola Toluwalope |
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| 7. Adenipekun, Ayokunle Opemipo | 33. Ayodele, Kafayat Titilayo |
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| 22. Alegbeleye, Oluwatosin Wuraola | 48. Fatiregun, Adenike Oreoluwa |
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2. Adedokun, Mubarak Dolapo
3. Adegbile, Emmanuel Oluwatobi
4. Ade- Oduntan, Adedamola Olutobi
5. Adesanya, Adetola Adebayo
6. Adesina, Olufisayo Ayodeji
7. Adeyemi, Olufemi Gbolahan
8. Adisa, Temitayo Funmilola
9. Ajanaku, Olamiji Omotayo
10. Ajayi, Ifeoluwa Oluwadamilola
11. Ajibike, Okechukwu Nwabueze
12. Akapa, Omatshola Charles
13. Akeju, Eyiyeimi Toluwalase
14. Akinsiku, Temitope Olusayo
15. Amao, Kayode Tomiwa
16. Aminu, Saudat Ayomide*
17. Amos, Alex Akojima Graham
18. Atoki, Olusola John
19. Azoma, Chima Akachukwu
20. Bello, Oluwamayowa Olayinka
21. Chukwudum, Chijioke Paul
22. Dada, Ibrahim Olajide
23. Edem, Asukwo Asukwo
24. Ejegbavwo, Ejio Valentina
25. Eke, Chukwuma Ikenna
26. Enemu, Chinenye Frances
27. Enobun, Clifford Osahon
28. Folarin, Godwin Omowale
29. Ihediohanma, Oluomachukwu Nzoputa
30. Ikpassa, Michael Oghenerure
31. Kalu, Joshua Obasi
32. Kartyo, Jessica Nguher
33. Kohol, Terhemmen Dennis
34. Mpeiri, Chinwe Lilian
35. Nasir, Halimat Ajoke
36. Nnoruka, Chinnedom Mark
37. Noel, Praise Ghukwudike
38. Nwankwo, Chigozie Onyinyechukwu
39. Obiefuna, Chibueze Christian
40. Obioma, Prestige Adaberemchi
41. Odemuyiwa, Jesutomisin Adeyemi
42. Odumuyiwa, Oyindamola Sylvaria
43. Ogar, Luke Owogbalo
44. Ogunmuko, Tolulope Ayodele
45. Okemakinde, Tolulope Feyisayo
46. Okoro, Esther Chimere*
47. Oluwadara, Joshua Ifeoluwa
48. Omotoso, Adekunle
49. Onabajo, Olatunde Olujuwon
50. Oni, Mofifoluwa Aduragba
51. Onwukeme, Oyekachukwu Oke
52. Oshinor, Ugochukwu Emmanuel
53. Osunlakin, Olufemi Samuel
54. Paago, Anthony Nenubari
55. Tolorunleke, Joshua
56. Uche, Janet Ogochukwu
57. Uche-Iromaka, Charles Kelechi
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59. Zugu, Terhemba Jude

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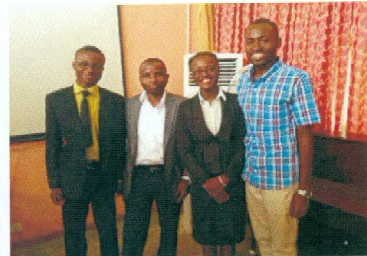
2014/2015 ANNUAL GENERAL MEETING



1.



2.



3.



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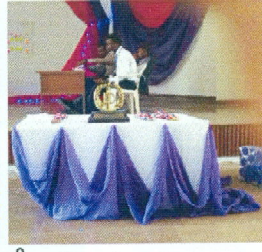
EMERITUS PROFESSOR O.O. AKINKUGBE QUIZ COMPETITION



7.



8.



9.



10.



11.



12.



13.



14.

Annual General Meeting

1. Outgoing executives L-R (Mr. Akinlolu Olawoore, Mr. Steven Adesoko, Ms Oyindamola Ogunwole, Ms Yeka Nmadu, Ms Omosalewa Koya and Mr. Victor Mike-Akinlusi)
2. Board members in a selfie
3. Incoming Editor-in-Chief- Mr. Ibrahim Olukunle flanked to the left by the Faculty Adviser, Dr. M.A. Salami, outgoing Editor-in-Chief - Dr. Yeka Nmadu and past Editor-in-Chief - Dr. Taiwo Ojedoja
4. Handover between outgoing Editor-in-Chief (Dr. Yeka Nmadu) and the incoming Editor-in-Chief (Mr. Ibrahim Olukunle)
5. Annual General Meeting (AGM) (2014/2015 tenure). Dr. M.A. Salami, Faculty Adviser (Front row, 5th) with outgoing executives. Board members and the representative of the University of Ibadan Medical Students Association (UIMSA)
6. Past Editor-in-Chief (Dr. Taiwo Ojedoja) with the outgoing Editor-in-Chief (Dr. Yeka Nmadu).

8th Edition of Emeritus Professor O.O. Akinkugbe Inter-medical School Quiz Competition

7. Board members and past board members with Professor A.O. Omigbodun, Dr. M.A. Salami and other special guests at the competition
8. The Board Chairman, Professor A.O. Omigbodun delivering his welcome address
9. The coveted trophy!!!
10. University of Ibadan emerged winner of the 8th Biennial Emeritus Professor O.O. Akinkugbe Inter-medical School Quiz Competition
11. Winners with the President of UIMSA
12. The Faculty Adviser performing his duties as Quiz Master in the Final match
13. The Editor-in-Chief signing certificates at the Quiz Competition
14. Board members in a selfie at the event

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This edition of DOKITA, being its 38th, could not have seen limelight without the wide acceptance it has received and the need to meet the need of her esteemed audience which is foremost. This volume promises to be even more gratifying and valuable for her readers.

DOKITA Editorial Board wishes to express her most sincere gratitude to the supervisor of this edition, Professor OyeGureje, for his guidance and efforts towards the successful publication of this journal.

The Board is also grateful to the following for reviewing some of the articles in the journal:

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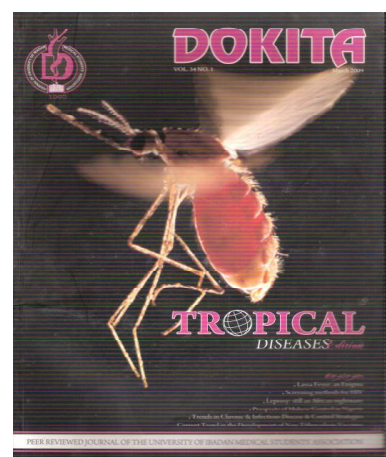
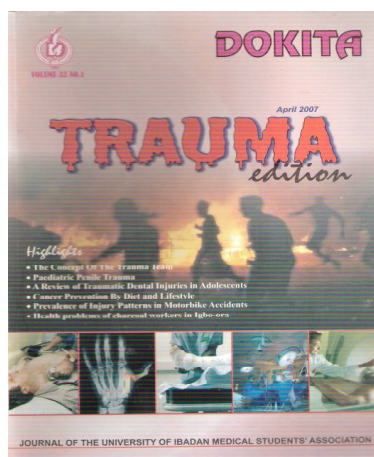
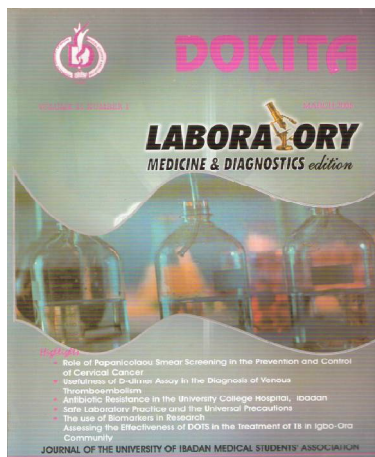
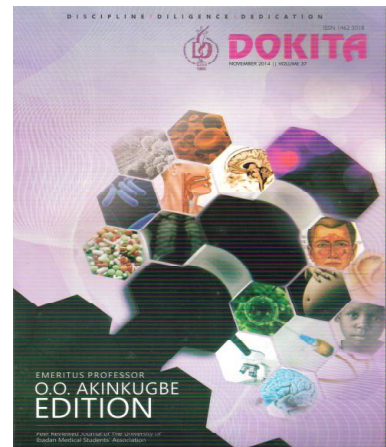
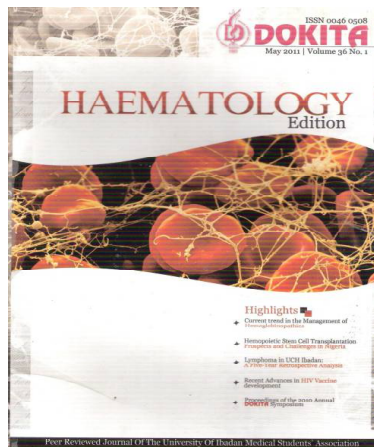
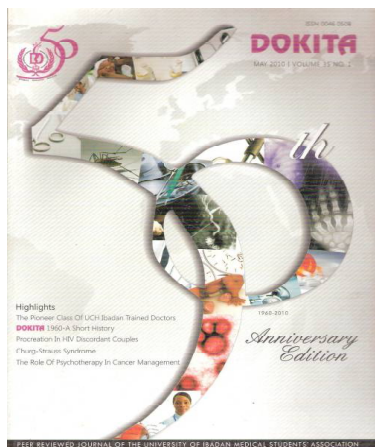
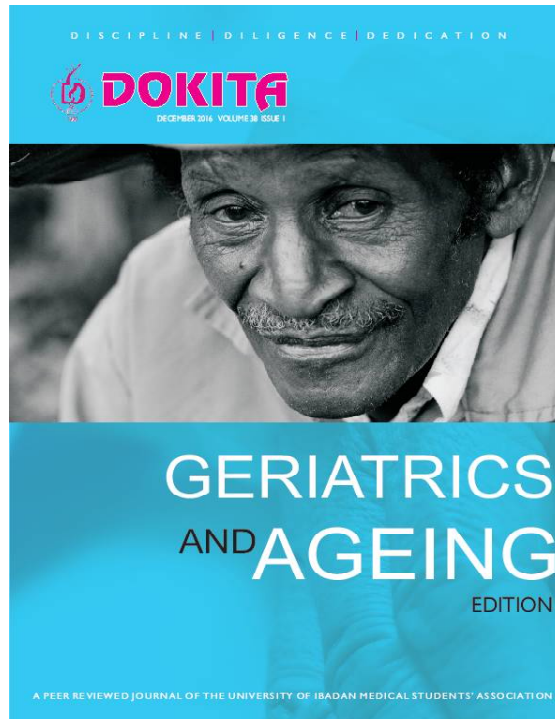
The Board is also grateful to the following individuals, institutions and hospitals for their financial support towards the production of this edition of the journal:

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Dr. A. Olawoore
Post Graduate School, University of Ibadan
Alafia Hospital
Molly Specialist Hospital
Highland Specialist Hospital
Vine Branch Hospital
Bethel Specialist Hospital
Aggrey Hospital
Beta-Life Hospital
Jobi Memorial

The Board also wishes to appreciate and acknowledge the 1977 graduating class of the College of Medicine, University of Ibadan, Ibadan and the Management of University College Hospital, Ibadan for their immense financial contribution towards this edition of the Journal.

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Thank you all for your support.

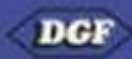


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