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Typesetting and Cover Design by Dr Oluwadiya KS.
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CASE REPORTS / SHORT REPORTS

Editorial

I thank God for the privilege to write the editorial comment of this maiden issue of the Western Nigeria Journal of Medical Sciences (WNJMS). I heartily congratulate the authorities of the Ladoke Akintola University of Technology (LAUTECH) Teaching Hospital for floating the journal and appreciate their commitment towards the same.

Some may wonder why we are floating yet another journal in health sciences with several already existing in the academic market. The base of knowledge is continuously deepening and its space widening. The WNJMS intends to cut a niche for itself within this deepening base and widening space to disseminate the results of good quality research catering for the interest of international readership and especially of relevance to those in similar socio–economic environmental, geographical and cultural settings with ours. It has the promotion of excellence as its aim and hopes to become a good medium for the cross fertilization of academic ideas.

The present issue contains articles spanning some areas of medicines. There is an invited article on laboratory diagnosis and monitoring of HIV infection. In addition, there are original investigative research articles on maternal tetanus immunization aspect of community medicine, the relationship between age and pregnancy outcome in obstetrics, cancer registry aspect in oncology, mental health and family support in family medicine and paediatric limb injuries in surgical trauma. There are also interesting review papers on chest medicine and the place of maggot debridement therapy in wound management as well as a case report on primary angiosarcoma of the breast.

Gabriel A. Oyedeji
Performance, Safety and Reliability in Nigeria’s core sectors

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- Key Sectors: Hotels, hospitals, offices and industrial buildings, automation in consumer goods industry.

- Energy efficient buildings and plants
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- Key sectors: Upstream, midstream, downstream, gas gathering plants (AGG’s), platform installations and interventions, IPP projects

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- Key sectors: Electric power generation, transmission and distribution, prepayment, Independent power projects.

- Greener electricity
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INVITED ARTICLE

Current approaches to the laboratory diagnosis and monitoring of progression of HIV infection

Fagbami A. H

Department of Medical Microbiology and Parasitology. LAUTECH, College of Health Sciences, Osogbo.

Introduction
Early diagnosis of HIV infection and effective treatment of infected individuals are the keys to the success of HIV control programme. In the last two decades, significant progress has been made in the diagnosis and treatment of HIV infected patients as a result of the development of new diagnostic techniques. This has facilitated the rapid identification of many new cases of AIDS and HIV infection, accurate monitoring of disease progression, and the efficacy of antiretroviral therapy. Laboratory diagnosis of HIV infection is based on the demonstration of the antibodies in the plasma or serum, and of the viruses in the blood. HIV antibodies are detectable within four to six weeks of infection (figure 1), and within 24 weeks in virtually all infected individuals. In primary HIV infection, there is a period during which the level of viraemia is high, but antibody is absent. This period of absent antibody in the presence of established HIV infection is called the “window period”. Antibody tests are usually negative at this time; therefore, tests for virus or its components in the blood are used for diagnosis. The virus can be demonstrated in the blood with nucleic acid-based tests (PCR for proviral Deoxyribonucleic Acid (DNA) and Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) for plasma viral Ribonucleic Acid (RNA), culture and p24 antigen assay.

![HIV antibody/Viral Load/CD4 count levels](image_url)

Figure 1  Time course and stages of HIV Infection
ANTIBODY TESTS

The standard test for diagnosis of HIV infection is antibody detection in the blood. The objectives of HIV antibody testing are;

i. To enable individuals know their HIV status and provide those with positive results access to treatment and care (antiviral and prophylaxis against opportunistic infections)

ii. To prevent mother to child transmission by testing pregnant women and their newborns, and provide treatment and care to those with positive results.

iii. To guide clinicians on medical management of patients.

iv. To screen blood and organ donors to ensure public safety

v. To carry out epidemiological surveillance and research.

Several different HIV antibody assays are now commercially available including Enzyme Linked Immunosorbent Assay (ELISA) and rapid tests. The latter are the most widely used in developing countries. Antibody tests for HIV diagnosis consists of screening and confirmatory tests. Because of the serious consequences of false positive and false negative test results, it is imperative to use assays that are very sensitive and specific.

Screening Test

Rapid Tests: Rapid Tests are available in small test packs and therefore, are suitable for a laboratory testing of few samples. They are technically simple to perform, do not require any equipment but have a sensitivity and specificity comparable to ELISA. The commonly used rapid antibody tests in laboratories are based on the principles of dot immunoassay, or particle agglutination test. Dot blot assays utilize recombinant or synthetic peptides spotted onto nitrocellulose paper or micro particles. The antigen containing matrix is placed inside a plastic device containing absorbent pads to collect reactants. These assays are useful for single test applications such as in an emergency, during autopsy, or in labor rooms or in peripheral blood banks. Agglutination assays utilize antigen – coated carriers such as red blood cells, latex particles, gelatin particles and micro beads. The particles are used to support or carry HIV antigens by non – specific attachment. In this assay, HIV antibody in the patient’s serum binds to the HIV antigens and a lattice network between antigen and antibody is formed that can be seen macroscopically. Agglutination tests are very sensitive, easy to perform and do not require sophisticated equipment and washing procedures.

ELISA: The ELISA procedure is carried out to screen for HIV IgG antibodies in plasma or serum. The principles of ELISA are classified as direct, indirect and competitive test. The competitive principle is not popular because of the low sensitivity. Antigens derived from HIV grown in human T – lymphocytes or recombinant proteins or synthetic peptides are used to coat beads or micro titer plates. To perform an indirect ELISA, the patient’s serum is incubated with the antigens on the beads or in the micro titer plates. A conjugate, i.e. enzyme – labeled antibody specific for human immunoglobulin is then added. Detection of the enzyme – labeled antibody is carried out by the addition of a substrate that produces a colour reaction.

ELISA requires a plate washer, a reader, and ELISA test kit which contains the reagents for the test and the micro titre plate. It is a suitable test for laboratories where more than 30 samples are tested at each time. A good ELISA kit should have a specificity and sensitivity that exceeds 98% to 99%. A specimen that is reactive in ELISA is usually retested in an ELISA kit that uses an antigen made from another source. If the sample is reactive in the second ELISA, it is considered to be repetitively
reactive. Repetitively reactive samples are usually subjected to confirmatory tests such as western blot. False positive sometimes occur in western blot, especially in persons infected by other retroviruses, or in individuals with immunological disorders. False negative reactions are often seen during the ‘window period’ of primary HIV infection.

Confirmatory Test

**Western blot:** standard confirmatory test for HIV antibody assays. The test utilizes HIV antigens from purified viruses that have been electrophoretically separated and “blotted” (transferred onto a nitrocellulose paper). The paper is then cut into stripes, each containing all the separated HIV antigens. To carry out a western blot assay, a stripe is incubated with the patient’s serum. Antibody in the serum binds to the HIV antigens on the strip, and is detected with the aid of a conjugate consisting of labeled anti – human immunoglobulin. Using the CDC criteria for interpretation of results, a Western blot is interpreted as positive, if two or more of the following bands are present on the strip: p24, gp41, gp 120/160. It is interpreted as negative, if no band is present, and indeterminate, if the result is not consistent with the criteria set for positive result. Western blot should only be used to resolve discordant results and diagnosis of HIV – 2. A major drawback in the use of Western blot is its high cost and the high frequency of the occurrence of indeterminate results in specimens, especially those obtained during the early stages of HIV infection.

**Indirect Immunofluorescent Antibody Assay (IFA):** Indirect Immunofluorescent antibody assay employs HIV – infected cells (lymphocytes) fixed to the microscope slide. The patient serum is added and reacts (if antibody is present) with the intracellular HIV. After washing the slide, a conjugate consisting of anti – human immunoglobulin labeled with FITC is added, and the reaction is visualized under a fluorescent microscope. IFA has been used to confirm diagnosis in sera producing indeterminate results in Western blot.

**NUCLEIC ACID – BASED TESTS:** These consist of DNA Polymerase Chain Reaction (PCR) and reverse transcriptase PCR (RT – PCR)

**HIV DNA polymerase Chain Reaction (PCR)**

The DNA PCR involves the amplification of specific DNA sequences in the proviral DNA that has been integrated in the host cell. This test is the preferred procedure for diagnosing HIV infection in infants less than 18 months of age. Because of the high sensitivity of the test, false positive results may occur as a result of contamination by minute quantities of extraneous DNA. A positive test result is indicative of HIV infection; however, it must be confirmed by a repeat test. Negative tests should similarly be confirmed.

**RT – PCR:** RT PCR is used to detect and quantify the amount of HIV RNA in plasma. The assay requires the conversion of viral RNA to DNA and amplification of specific sequences in the DNA produced by a process known as reverse transcriptase chain reaction (RT – PCR).

**OTHER LABORATORY TESTS**

**Antigen Detection:** Detection of p24 antigen is an ELISA – based test. It is useful for diagnosis during the ‘window period’ of early infection and in the newborn. It was the major assay used to measure viral replication directly before viral load assays became available. The disadvantage of this assay is that it has low sensitivity, therefore it may not detect p24 antigen in many positive individuals.

**Virus isolation:** HIV is usually isolated in peripheral blood mononuclear cells (PBMCs). The procedure involves co – cultivating uninfected, mitogen – stimulated PBMCs with the PBMCs obtained from the test specimen. After several days, the supernatant culture fluid is assayed for reverse transcription activity, p24 antigen or HIV RNA. HIV isolation in PBMC is quite sensitive and is comparable to DNA PCR in
sensitivity. Positive results may be obtained within 1 – 2 weeks, but a negative result is not reported until after 30 days. Both negative and positive results should be confirmed with a second test. HIV culture is an acceptable technique for the diagnosis of HIV infection in infants and children under 18 month’s age. Virus isolation is time – consuming; it generates a large number of infectious particles. Therefore, it should be carried out in laboratories with adequate facilities for biocontainment.

**WORLD HEALTH ORGANISATION (WHO)/UNAIDS HIV TESTING ALGORITHMS**

An algorithm describes the sequence of tests to be performed during laboratory testing of Specimens. Because of the high cost of Western Blot and the frequent occurrence of indeterminate results, especially when used to test specimens collected from patients in the early stages of HIV infection, the WHO and UNAIDS, the organ of the United Nations for the control of HIV/AIDS recommended algorithms for HIV antibody testing that, ordinarily, will not require confirmation of test results with Western Blot. This involves the use of two or three rapid test or ELISA kits that are based on different antigen sources. WHO/UNAIDS Testing Algorithm for Scaling Up Voluntary HIV Counseling and Testing (HCT) in Resource – Limited Settings. A serial or parallel double rapid testing protocol was recommended by WHO in order to scale up voluntary HCT and enhanced access to ART in resource – limited countries as illustrated. Serial testing algorithm refers to the use of 2 screening tests sequentially to test for HIV antibody. If the initial screening is negative is negative, no further testing is required. If the initial is positive, it is followed by one more test. The first test should be the most sensitive test and the second test should be very specific, and be based on antigen source different from that of the first test. Samples that produce discordant results in the two tests are subjected to further testing.

![Figure 2A: WHO parallel testing algorithm](image)

Parallel testing involves the use of two screening tests performed simultaneously. Samples reactive in both tests are regarded as positive; however, those with discordant results require further testing. Parallel testing is performed to minimize the chances of false negative results. It ensures sensitivity and
guards against technical errors. It is often used when a very sensitive test is not available for the initial screening, and when the concordance of two tests is to be evaluated.


The objectives of HIV antibody testing have been outlined on page 1, under the section on Antibody Tests. Three different HIV testing algorithms were recommended by WHO/UNAIDS based on these objectives and the prevalence of infection in the population. Test algorithm 1 makes use of only test kit, algorithms 2 and 3 utilize 2 and 3 test kits, respectively.

**HIV Testing Algorithm I:** This testing algorithm is used when the objectives of HIV antibody testing are screening of blood and blood products for transfusion, or surveillance in a population where the prevalence of HIV infection is > 10%, or diagnosis in population where the prevalence of HIV infection is > 30% and clinical signs and symptoms of HIV infection are present. In this algorithm, a sample is tested with one rapid test or ELISA kit, and if it is repetitively reactive, it is considered positive and no further testing is required. If it is non-reactive, it is regarded as negative.

**Figure 3: WHO/UNAIDS Testing Algorithm I**

**HIV Testing Algorithm II:** This HIV testing algorithm is used when the objectives of testing are surveillance in a setting where the prevalence of HIV infection is < 10%, for diagnosis where the prevalence of infection < 30%, and for identification of asymptomatic individuals where the prevalence of infection is > 10%.

In this algorithm, samples are screened for HIV antibody with a rapid test or ELISA (Test A). Reactive samples are retested in a different assay (Test B). If a sample is reactive in both tests, it is regarded as positive for HIV antibody (Figure 4). A sample that is reactive in test A, but is non-reactive in test B should be retested in both assays. A sample with concordant reactive results is indeterminate. Any sample with concordant non-reactive result is negative.

**Figure 4 WHO/UNAIDS HIV Testing Algorithm (Strategy) II**

**HIV Testing Algorithm III:** This algorithm (Figure 5), an extension of strategy II, is recommended for identification of asymptomatic individuals in setting where the prevalence of HIV infection is < 10%. All samples that are regarded as positive
after tests A and B and all indeterminate samples are subjected to Test C. If they are reactive in all the three tests, they are regarded as positive. A sample that is reactive in two of the tests is considered to be indeterminate, if the individual tested is from a high-risk population, but is regarded as negative if he is from a low risk population. Individuals whose samples yielded indeterminate results should be requested to have a repeat test done after 2 weeks with a fresh sample.

CLINICAL LABORATORY MONITORING OF HIV DISEASE PROGRESSION AND OF HIV/AIDS PATIENTS ON ANTIRETROVIRAL THERAPY (ART)

The progression of HIV infection to AIDS varies widely in different individuals. It varies from non-progression to rapid progression with death occurring within a few years. Once an individual is identified as positive, it is important to assess the stage of infection, especially if therapy is being contemplated. It is also necessary to monitor disease progression in patients undergoing ART. The two test procedures most commonly used for monitoring are viral load, also known as plasma RNA load, and CD4+ lymphocyte count. In developed countries, a combination of HIV viral load assay and CD4 counts are used as markers of progression. However, in resource-limited settings, the use of CD4 counts alone has been recommended because of the high cost of viral load assays.

Figure 5. WHO/UNAIDS HIV Testing Algorithm (Strategy) III

CD4+ T lymphocyte Assay: T lymphocytes account for 70 – 90% of all lymphocytes. They are about 1600 per mm³, with CD4 accounting for approximately 1,000 and CD8 approximately 500. The decline in CD4 count in HIV infection is gradual, about 50 – 100 cells per year. It is believed that a CD4 cell count of less than 500 mm³ is indicative of immunodeficiency. The lower the CD4 count, the more severe the
disease progression and the less favorable is the prognosis. Enumeration of these cells is the most important parameter for assessing the immune system of HIV/AIDS patients (19,20). Accurate and reliable measurements of CD4 T-lymphocytes is very essential for monitoring the rate of progression to AIDS, and for initiating prophylaxis for opportunistic infections as well as monitoring the success or failure of ART. T-lymphocyte enumeration is performed by flow cytometry or by manual methods.

Flow cytometry is a laboratory procedure used for differentiating and counting cells and micro particles. It involves staining of lymphocytes in whole blood with monoclonal antibodies conjugated to fluorochromes (21, 22) followed by an analysis of the cells. Fluorescent antibody – stained cells in suspension pass through a nozzle in a narrow stream into a focused light beam, usually a laser. Light that is scattered and emitted by cells is then separated into constituent wavelengths by a series of optical filters and mirrors. This separated light is then translated into electrical signals that are subsequently detected and processed for cell distribution analysis.

Flow cytometers are the equipment used in this assay. They fall into two groups: classical flow cytometers and simplified flow cytometers. Examples of classical flow cytometers are FACS Calibre (Becton Dickinson) and FASCAlibre. Examples of simplified flow cytometers are partec cyflow, FASCount and Guava Easy CD4.

Manual methods of enumerating CD4+ T-lymphocytes are microscopic methods using Dynabeads or Cytospheres (Coulter). Other manual assays include Opti – CIM (CIMA), Zymmune (Zynaxis), TRAxCD4 (T cell Dxs and Innogenetics), CD4 Count Chips (SemBio), the Capcellia (Sanofi), and the CD4 Biochip (Lab Now).

**Viral Load Assay:** Detection and qualification of HIV – 1 RNA in plasma is carried out with reverse transcriptase polymerase chain reaction (RT PCR). There are three stages of this test:

1. Conversion of viral RNA to DNA by reverse transcription, amplification of the DNA and detection of the amplified DNA with the aid of oligonucleotide probes.

2. HIV viral load measurement is a strong predictor of disease progression and death. For example, studies have shown that infected patients with viral levels of > 100,000 copies / ml at 6 months of infection are 10 – fold more likely to progress to AIDS in 5 years than those with viral load measurements of <100,000 copies per ml. 350, cells/mm, therapy should be considered when the viral load is up to 100,000 copies/ml. The procedure is also used to monitor the success or failure of ART and whether or not there is need to change the treatment regimen.

3. Viral load assay, in conjunction with CD4 enumeration, is an important tool used by clinicians and researchers to assess the virological status of a patient (23,24,25). This assay must be performed on HIV positive patients to determine the amount of HIV in their plasma and the need to initiate ART.

Three types of assay kits have been approved by Food and Drug Administration (FDA),USA and NAFDAC for the measurement of viral load. They are Roche Amplicorr HIV – 1 Monitor version 1.5 and Roche Amplicor HIV – 1 Monitor Utrasensitive version 1.5, the NucliSens HIV – 1 QT, a nucleic acid sequence – based assay and VERSANT HIV – 1 RNA 3.0 a branched DNA assay.

There are two types of the Roche Amplicor HIV – 1 Monitor version 1.5: the standard and the Ultrasensitive. The range of assay sensitivity using the standard Roche Amplicor HIV – 1 Monitor is 400 – 750,000 copies per ml, and that of the Ultrasensitive assay is 50 – 75,000 copies per ml. The Standard Roche Amplicor HIV – 1 Monitor Assay should be used for new patients , and if viral load is greater than 75,000 copies per ml. Ultrasensitive assay should be used when the upper limit of viral load is less than 75,000 copies per ml, or when the lower
limit is anticipated to be less than 400 copies per ml.

**NucliSens HIV – 1 RNA QT:** Marketed by bioMerieux, the NucliSens HIV – 1 RNA QT, selectively and directly amplifies HIV – 1 RNA without PCR in a one-step sandwich hybridization procedure, resulting in the production of single – stranded RNA. This assay may use specimens that include tissue or body fluids such as secretions and blood spots.

**Branched Chain DNA (bDNA):** Branched chain DNA, also known as Versant, is marketed by Bayer Diagnostics. Initial steps in this assay require concentration of virions by centrifugation and release of the RNA by disruption of the virus with detergent and protease K. The test has good reproducibility, requires fewer hands – on time and amplifies HIV subtypes.

**Viral Load Interpretation:** Baseline Measurement of viral load should be obtained prior to commencement of therapy; another measurement of viral load should be obtained after initiation of therapy, and repeated every 24 weeks during therapy, if the level is < 400 RNA copies per ml. The test should also be repeated if there is a clinical event or a decline in CD4 count. Successful ART is defined as a decrease to < 400 RNA copies per ml and an increase of > 50 cells/ mm³ in the CD4+ T-lymphocyte count by week 24 of treatment failure is defined as a viral load that is 400 RNA copies per ml at 24 weeks or that increases by 0.5log₁₀ at any time.

**MONITORING OF DRUG RESISTANCE IN HIV/AIDS PATIENTS ON ANTIRETROVIRAL TREATMENT (ART)**

The scaling up of ART worldwide has made a dramatic impact on longevity and quality of life of many AIDS patients. However, a considerable number of patients receive suboptimal doses of the drugs used for treatment, or fail to adhere to the treatment regimen due to a variety of factors including drug toxicity, lack of money to purchase the drugs, inconvenient appointments with the clinic, etc. This creates an in vivo selection pressure on the virus resulting in the emergence of drug resistant mutants [27, 28, 29]. Knowledge of the nature of drug resistance of the indigenous HIV strains is absolutely essential so that clinicians may be properly guided in the use of antiretroviral drugs for the management of HIV / AIDS patients. Two methods are used for the assessment of drug resistance: Phenotypic Susceptibility Testing and Genotype assays.

Genotype testing detects specific mutation in the reverse transcript and protease genes. Phenotypic testing on the other hand, determines the relative amount of drug needs to suppress viral growth compared to a reference wild-type virus. Genotype test are less technically demanding to perform; they are relatively less costly and have a shorter turnaround time. Phenotypic testing requires elaborated facilities for viral culture and may therefore be difficult to set up in laboratories without a virology unit.

Antiretroviral drug resistance testing is carried out to determine whether a patient has been exposed to a resistant virus so that the physician could be guided on the choice of drugs to use for treatment. It should also be performed promptly in case of virological failure i.e. when viral load levels does not fall despite ART or in cases of incomplete virus suppression and when patients have been off therapy for a considerable length of time.

**THE LABORATORY AND HIV IN NIGERIA**

The HIV / AIDS pandemic has made an enormous impact on the Nigerian population because of the morbidity, mortality, and socioeconomic problems it causes in the society. Despite the efforts to contain it, many new HIV infections continue to occur daily. In an effort to stem the spread of HIV infection in the country, the Federal government of Nigeria launched the AIDS prevention initiative in Nigeria (APIN) in which it proposed a scaling-
up of HIV counseling and testing (HCT). Prevention of mother to child transmission (PMTCT) antiretroviral treatment (9ART), and care and support of people living with HIV and AIDS (PWLHA) and increase the health budget devoted to these activities. The success of this scale – up requires major contributions from the laboratories.

In supporting the Federal government’s initiative on prevention of HIV / AIDS, the laboratory is responsible for carrying out diagnosis of HIV infections and clinical laboratory monitoring of disease progression and of patients on ART. It is important that the processes of testing clinical specimens be monitored through quality control and quality assurance to ensure that accurate and reliable test results are obtained. This will enable physicians to establish correct diagnosis quickly, thus facilitating good clinical management of the patients.

The launching of APIN and the provision of development assistance from the International donor agencies considerably improved the laboratory facilities for HIV diagnosis in the country. This led to an improved monitoring of the AIDS epidemic through sentinel surveys (29), an increase in the number of donated blood units screened for HIV in the blood banks, identification of more cases of HIV infection in voluntary HIV testing and counseling centres and the recruitment of more HIV infected patients into the ART programme. The progress made in the Prevention of Mother to Child Transmission (PMTCT) Programme also increased considerably.

The increase in the number of patients undergoing ART has led to the establishment of more treatment centres all over the country. This effect of this is a widespread use of antiretroviral drugs and an improvement of the longevity and quality of life of many Nigerian AIDS patients. Unfortunately, this has been accompanied by the development of resistance to some of the drugs (27, 28). Monitoring and prevention of the development of resistance to antiretroviral drugs by the laboratories should be an important goal of the National HIV / AIDS control programme.

A lot still needs to be done by government before success can be achieved in the fight against HIV / AIDS. Recent need assessment of diagnostic laboratories carried out in parts of the country revealed that infrastructural facilities such as laboratory space, water and electricity supply, etc are grossly inadequate. Both major and minor equipment as well as consumables are in short supply. Also, there are not enough well trained personnel to perform certain laboratory procedures for HIV diagnosis. It is therefore necessary for the Federal and State government to better equip the laboratories and train laboratory personnel in adequate numbers to perform these laboratory procedures, especially those for diagnosis of infection and monitoring of patients undergoing antiretroviral therapy and emergence of drugs resistant HIV strains. This will contribute in no small measure to the effective management of AIDS patients by clinicians and the success of HIV / AIDS control programme of the Federal government.

References

5. Constatine N. T. HIV Antibody assays, HIV Insite Knowledge Base Chapter, Center for HIV information pp. 1-21
Advanced maternal age and pregnancy outcome

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Abstract

Background: Advanced maternal age is considered relatively more hazardous from both the maternal and fetal perspectives. In our society today, increasing numbers of women are delaying childbearing into their thirties and early forties, making the consequence of older maternal age an important public health concern.

Objective: To assess the effect of Advanced maternal age on pregnancy outcome.

 Patients and Methods: This was a comparative study of pregnancy outcome in 250 women aged 35 years or more, and an equal number of women aged 20-29 years, at the Aminu Kano Teaching Hospital, Kano, Nigeria, a modern health care delivery centre, between January 2003 and December 2005. They all booked before 20 weeks of gestation, and were followed up until the end of the puerperium. The outcome measures were obstetric complications, maternal medical complications, mode of delivery and fetomaternal outcome.

Results: There was no statistically significant difference in the mean parity and mean birth weight between the two groups. There was higher occurrence of obstetric and medical complications and caesarean delivery in the study group compared to the control group. The overall pregnancy outcome did not show significant difference between the two groups.

Conclusion and Recommendations: Despite higher occurrence of obstetric and medical complications among the older women, the overall pregnancy outcome did not show significant difference between the younger and the older women. Older women that are managed and delivered by modern obstetric care facilities should expect similar pregnancy outcomes to that of the younger women.

Keywords: Maternal age, Pregnancy, Obstetric outcome

Introduction

In today's society, it has become more common place for women to desire pregnancy at age 35 or older for a variety of reasons. Some have pursued education, careers, or have married later in life than women did decades ago. Some are simply choosing to have more babies in their lifetime, even after one or two pregnancies. Infertility problems are more prevalent as a woman gets older, yet modern technology has helped many women to succeed in achieving a much desired pregnancy, thus there are more pregnant women over the age of 35 now than in any other era. Pregnancy beyond the age of 35 years is considered to have more adverse outcomes compared to those in younger women. Health care providers have traditionally viewed any woman over the age of 35 years, especially one having her first pregnancy as a high risk one. Age alone does not predict risk, but several lifestyle factors, such as family history, genetics of the parents, socioeconomic status, child spacing, prenatal care of the mother, and demographics have major impacts on the wellbeing of the mother and infant. It is imperative, for all of these reasons that benefits and risks for the mother and the baby be considered, especially now that the perfect age to become a mother, and who makes a better mother between younger and older mothers is not clear.

The definition of what constitutes advanced maternal age in obstetric literature is variable. Most authors have agreed on a lower limit of 35 years, while others have used 40 years, and some more, but pregnancies in women age >35 years are considered to be high risk. As we progress into the future with campaign for female education and empowerment, which is encouraged by Universal Basic Education in Nigeria, this will reduce maternal mortality rate, and ensure success of safe motherhood initiative. We should be aware that much as
growing literacy among our women would reduce population growth rate, the high risk category of unbooked status, grandmultiparity, and maternal mortality rate, it is giving rise to growing number of women with advanced maternal age. It is against this background that this study was conceived in order to review the effect of advanced maternal age on pregnancy outcome in our hospital, and to make recommendations on how to improve its outcome in today’s obstetric practices.

**Patients and Methods**

Two hundred and fifty pregnant women who were aged 35 years and above (study group) were recruited and their reproductive performances were compared with those of an equal number of women who were aged 20 to 29 years (control group) and, each booked immediately after a recruited woman with advanced maternal age. The recruited women (subjects and controls) booked before 20 weeks of gestation, attended antenatal clinic regularly and delivered in the hospital’s labour ward. Women in the age group of 20-29 years were taken as control, because it is an age group with favourable obstetric outcome. Informed consent was obtained from each of the participants.

Antepartum haemorrhage (APH) was defined as bleeding from the genital tract after the 28th week of gestation and before delivery of the baby. Pregnancy induced hypertension (PIH) was the development of hypertension (a blood pressure of 140/90 mmHg and above in the second half of pregnancy on two or more occasions at least 4 hours apart), in a woman who was previously normotensive, and in whom blood pressure returned to normal within 6 weeks of delivery. Intrauterine growth restriction (IUGR) was diagnosed in babies, whose birth weights were below the 5th percentile of the expected weights for their period of gestation in our population. These women were followed up prospectively and the required data were obtained and recorded on a proforma. Where a woman could not volunteer all the information, such was obtained from her relatives.

The outcome measures were, modes of delivery, obstetric complications viz: preterm labour, pregnancy induced hypertension (PIH), antepartum haemorrhage (APH), intrauterine growth restriction (IUGR), multiple pregnancy and malpresentation. Others were bad obstetric history/previous history of infertility, history of uterine fibroids, postpartum haemorrhage and maternal medical complications viz: diabetes mellitus, essential hypertension, heart disease, anaemia, epilepsy and asthma. The maternal and neonatal outcome recorded were birth asphyxia (Apgar score < 7 at 5 minutes), low birth weight, congenital malformations, mean birth weight, maternal and perinatal mortality. The data obtained were recorded in tabular forms. Qualitative data were expressed as frequencies and percentages. Statistical analysis of test of significant differences was done using Chi-square test and Z-test. A P-value of <0.05 was considered significant. The odds ratio and 95% confidence interval were determined where appropriate.

**Results**

There were 6842 pregnant women that were managed in the hospital during the period under review. Among them, were 264 women who were aged 35 years and above, giving prevalence rate of 3.9%. Of these women, only 250 met the inclusion criteria. The mean age in the study group was 36.8 ± 4.4 years, while in the control group it was 23.4 ± 2.5 years. The mean parity in the study group was 2.74 ± 0.62 (range 0 to 9), while in the control group it was 2.68 ± 0.38 (range 0 to 7). There was no statistically significant difference in the mean parity between the two groups (Z = 0.94, P > 0.05).
TABLE I: Occurrence of obstetric complications amongst the groups

<table>
<thead>
<tr>
<th>Complications</th>
<th>Study group n = 250 (%)</th>
<th>Control group n = 250 (%)</th>
<th>OR</th>
<th>CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preterm labour</td>
<td>67 (26.8)</td>
<td>36 (14.4)</td>
<td>2.18</td>
<td>1.36 - 3.5</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>PIH</td>
<td>26 (10.4)</td>
<td>18 (7.2)</td>
<td>1.50</td>
<td>0.77 - 2.94</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>APH</td>
<td>11 (4.4)</td>
<td>3 (1.2)</td>
<td>5.26</td>
<td>1.41 - 23.13</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>IUGR</td>
<td>19 (7.6)</td>
<td>8 (3.2)</td>
<td>2.49</td>
<td>1.01 - 6.32</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>Multiple pregnancy</td>
<td>3 (1.2)</td>
<td>2 (0.8)</td>
<td>1.51</td>
<td>0.2 - 12.97</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Malpresentations</td>
<td>13 (5.2)</td>
<td>11 (4.4)</td>
<td>1.19</td>
<td>0.49 - 2.92</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Bad obstetric history/ Previous history of infertility</td>
<td>54 (21.6)</td>
<td>7 (2.8)</td>
<td>10.25</td>
<td>4.38 - 25.18</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>History of uterine fibroids</td>
<td>53 (21.2)</td>
<td>9 (3.6)</td>
<td>7.20</td>
<td>3.33 - 16.09</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>PPH</td>
<td>11 (4.4)</td>
<td>3 (1.2)</td>
<td>3.79</td>
<td>0.97 - 17.32</td>
<td>&gt;0.05 (NS)</td>
</tr>
</tbody>
</table>

NS = Not statistically significant  S = Statistically significant

TABLE II: Occurrence of maternal medical complications amongst the groups

<table>
<thead>
<tr>
<th>Complication</th>
<th>Study group n = 250 (%)</th>
<th>Control group n = 250 (%)</th>
<th>OR</th>
<th>CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td>9 (3.6)</td>
<td>1 (0.4)</td>
<td>9.30</td>
<td>1.20 - 197.45</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>Essential hypertension</td>
<td>8 (3.2)</td>
<td>1 (0.4)</td>
<td>8.23</td>
<td>1.04 - 176.78</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>Heart disease</td>
<td>4 (1.6)</td>
<td>3 (1.2)</td>
<td>1.34</td>
<td>0.25 - 7.60</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>1 (0.4)</td>
<td>2 (0.8)</td>
<td>0.50</td>
<td>0.02 - 7.03</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Anaemia</td>
<td>3 (1.2)</td>
<td>7 (2.8)</td>
<td>0.42</td>
<td>0.09 - 1.83</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Bronchial asthma</td>
<td>2 (0.8)</td>
<td>4 (1.6)</td>
<td>0.50</td>
<td>0.06 - 3.17</td>
<td>&gt;0.05 (NS)</td>
</tr>
</tbody>
</table>

NS = Not statistically significant  S = Statistically significant

TABLE III: Comparison of modes of delivery

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>Study group (%)</th>
<th>Control group (%)</th>
<th>OR</th>
<th>CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous vaginal delivery</td>
<td>139 (55.6)</td>
<td>167 (66.8)</td>
<td>0.62</td>
<td>0.43 - 0.91</td>
<td>&lt; 0.05 (NS)</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>102 (40.8)</td>
<td>70 (28.0)</td>
<td>1.77</td>
<td>1.20 - 2.62</td>
<td>&lt; 0.05 (S)</td>
</tr>
<tr>
<td>Instrumental delivery</td>
<td>9 (3.6)</td>
<td>13 (5.2)</td>
<td>0.68</td>
<td>0.26 - 1.74</td>
<td>&gt; 0.05 (NS)</td>
</tr>
</tbody>
</table>

NS = Not statistically significant  S = Statistically significant
TABLE IV: Maternal and neonatal outcome among the groups

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Study group n = 250 (%)</th>
<th>Control group n = 250 (%)</th>
<th>OR</th>
<th>CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth asphyxia</td>
<td>34 (13.6)</td>
<td>11 (4.4)</td>
<td>3.42</td>
<td>1.62 - 7.37</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>Congenital malformations</td>
<td>4 (1.6)</td>
<td>1 (0.4)</td>
<td>4.05</td>
<td>0.43 - 95.78</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>59 (23.6)</td>
<td>21 (8.4)</td>
<td>3.37</td>
<td>1.92 - 5.96</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>Perinatal mortality</td>
<td>12 (4.8)</td>
<td>8 (3.2)</td>
<td>1.53</td>
<td>0.57 - 4.16</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Mean birth weight</td>
<td>2.83 ± 0.64</td>
<td>2.76 ± 0.45</td>
<td></td>
<td>Z = 0.76</td>
<td>P &gt; 0.05 (NS)</td>
</tr>
</tbody>
</table>

NS = Not statistically significant  S = Statistically significant

Bad obstetric history/previous history of infertility, intrauterine growth restriction, preterm labour, antepartum haemorrhage, history of uterine fibroid were statistically significantly higher (P< 0.05) among the study group compared to the control group (Table I). Diabetes mellitus and essential hypertension were statistically significantly higher (P < 0.05) among the study group compared to the control group. (Table II).

Caesarean delivery was statistically significantly higher (P < 0.05) among the study group compared to the control group, while the reverse was the case with vaginal delivery (Table III).

Low birth weight babies and birth asphyxia were statistically significantly higher (P < 0.05) among the study group compared to the control group. Perinatal mortality and mean birth weight did not show statistically significant difference (P > 0.05) between the two groups. There was no maternal mortality in the two groups. (Table IV)

Discussion

The overall pregnancy outcome in this study did not show statistically significant difference between the younger and older aged women, despite higher rates of complications among the older women. This is in agreement with recent studies. However, some reports have shown that older women do face special risks in pregnancy, most of which agree with the findings in the study. The older women were 8 times more likely to develop essential hypertension, and 9 times more likely to develop diabetes mellitus in pregnancy than the younger women, as was found by Gilbert et al. This is probably because of the increasing incidence of medical disorders with increasing age.

The risk of bearing a child with congenital abnormality, especially trisomy 21 (Down’s syndrome), has been found to increase with increasing age because of abnormality in DNA transcription. This was not the case in our study where there was no statistically significant difference in the incidence of congenital abnormalities between the two groups, although there was higher frequency of congenital abnormalities among the older women.

Uterine fibroid has been associated with delay in childbearing, and women with previous infertility. It is not clear if infertility is the cause of uterine fibroid or vice versa, but there is an association between the two, which could have accounted for why the older pregnant women had an odd 7 times more compared to the younger women.
Antepartum haemorrhage has been reported in many studies to be commoner among older women than younger ones,\textsuperscript{1,2,16,18,19} This conformed to the finding in this study. Increase incidence of medical disorders in pregnancy with increasing maternal age,\textsuperscript{12} especially hypertensive disorders, may predispose the older women to having abruptio placentae,\textsuperscript{9} while the presence of uterine fibroids in the upper uterine segment may predispose the older women to having placenta praevia because of unfavourable endometrium at the site of the fibroids.\textsuperscript{6} Although repeated pregnancies among those of high parity may predispose them to having placenta praevia because of replacement of smooth muscles and elastic fibres by fibrous tissues in the upper uterine segment,\textsuperscript{9} the mean parity in this study did not show statistically significant difference between the two groups.

The higher frequency of preterm labour, intrauterine growth restriction, low birth weight babies, birth asphyxia and delivery by caesarean section among the older women compared to the younger ones, agree with the findings in other studies.\textsuperscript{1-6,14-19} This may have been due to the higher incidence of medical disorders in pregnancy among the older women with its associated uteroplacental insufficiency and intrauterine growth restriction.\textsuperscript{12} Despite this, there was no statistically significant difference in the mean birth weight between the two groups, probably because of higher numbers of big babies among the diabetic mothers in the older aged group. These medical disorders may necessitate preterm delivery of the fetus in order to terminate the progression of the disorders and to salvage the fetus, which in most cases is preferably done by caesarean section.\textsuperscript{12,18,19} Also elderly primigravidae may have incoordinate uterine action in labour with prolonged labour and higher risk of caesarean delivery.\textsuperscript{14} In women with bad obstetric history and previous long history of infertility, the threshold for caesarean delivery is low in order to ensure take home of a live baby.\textsuperscript{13,14} These may have contributed to the higher frequency of caesarean section among the older women.

Contrary to reports from other studies,\textsuperscript{1,2,18} there was no statistically significant difference in the frequency of instrumental deliveries in this study.

Anaemia in pregnancy, malpresentation and postpartum haemorrhage did not show statistically significant difference between the two groups as reported in other studies,\textsuperscript{3} probably because no significant difference was found in the mean parity between the two groups in this study. Active management of the third stage of labour with intravenous oxytocics, and the use of rectal misoprostol tablets 400-1000µg, may have prevented higher frequency of postpartum haemorrhage among the older women despite the higher number of uterine fibroids in pregnancy among them.\textsuperscript{18,19} Clinical observation has shown that administration of rectal misoprostol increases muscle tone in the uterus in as little as 3 minutes, and has successfully prevented postpartum haemorrhage without additional intervention.\textsuperscript{18,19}

The incidence of multiple pregnancy has been found to increase with increasing maternal age.\textsuperscript{12} This was not the finding in this study, probably because of the low incidence of multiple pregnancy in our community of North West Nigeria compared to South West Nigeria, which has the highest incidence in the world.\textsuperscript{12} The frequency of pregnancy induced hypertension was not significantly different between the two groups, probably because it is a disease which is parity related, and not an age related medical disorder like essential hypertension.\textsuperscript{12} There was no statistically significant difference in the mean parity of the two groups in this study.

Maternal and perinatal mortality did not show statistically significant difference between the two groups. This does not agree with earlier studies where pregnancy in women aged 35 years or more was associated with excess risks of fetomaternal mortality compared to those in younger women.\textsuperscript{5-7,17} However it agrees with recent studies, where it was found that advances in medical care now help women in their late thirties and forties to have safer
pregnancies and deliveries than in the past.\textsuperscript{1,2,16-19} Aminu Kano Teaching Hospital being a centre that delivers modern obstetric care, might have accounted for why there was no significant difference in the overall pregnancy outcome between the two groups in this study.

Conclusion and Recommendations
Pregnancy outcome in older women is as safe as in younger women if they are managed by modern antenatal care methods. They should be encouraged to register in centers that offer modern antenatal care. Despite this, women should be aware of the risks that are associated with delay in child bearing, so that they can make informed decisions on when to start their families.

References
43. Oboro VO, Dare EO. Pregnancy outcome in nulliparous women aged 35 or older. WAJM. 2006;25(1): 65-68
47. Roman SA, Reharber A. Seven ways to control postpartum haemorrhage. Contemporary Ob/Gyn. March 2003:34-53
Asekun-Olarinmoye: Barriers to implementation of immunization policy

Immunization practices among mothers whose babies developed Neonatal Tetanus: Need for Review of the Nigerian National Policy on Immunization.

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Abstract
Objective: To identify the major problems encountered in the implementation of the policy on immunization of pregnant women against tetanus in Ibadan, Nigeria.

Methods: In a descriptive cross-sectional study design, 140 mothers whose babies were admitted for neonatal tetanus into the major referral hospitals in the city of Ibadan over a 12-month period were recruited into the study.

Results: Ante-natal clinic (ANC) was attended by 121 (86.4%) of mothers but only 31 (25.6%) of these mothers received full immunization. Nearly three out of four mothers attended ANC for 5 to 20 times (mean = 8 times), indicating missed opportunities for immunization. The attendance by 74.3% of the mothers was spread over 2 or more months. Ignorance and lack of funds were the major reasons given by mothers for either not attending ANC or for not receiving full immunization. Age, 20 years or more (p=0.003), parity of one or more (p=0.004), and formal education (p=0.02) are all significantly associated with having received one or two doses of tetanus toxoid (T.T).

Conclusions and Recommendations: This study shows that the national policy on tetanus immunization of women is poorly implemented. A shift of emphasis from immunizing pregnant women with two doses of TT at ANC to that of immunizing all women of child bearing age with the WHO recommended schedule of five doses of TT to give life-long immunity is the suggested strategy to combat the present implementation problems.

Keywords: Barriers, Implementation, National Policy, Tetanus Immunization, Practices, Pregnant Women, Nigeria.

Introduction

Neonatal tetanus (NNT) is usually associated with under-development. Most cases result from failure to protect the pregnant mother against tetanus and poor hygienic obstetric procedure resulting in increased chances of exposure of the umbilicus to tetanus bacterium or spores. It is a major cause of preventable morbidity and mortality in the neonatal period in Nigeria, the African region, and many other developing countries.1,2 In Nigeria, NNT has been targeted for elimination through the implementation of the National Program on Immunization (NPI). The Nigerian National Immunization Policy gives statements that are specific for maternal and child services.3 The policy gave comprehensive guidelines for the provision of vaccines and the use of a national immunization schedule in order to attain optimal immunologic protection against the target diseases for all children as early as possible, women of child-bearing age and other at-risk groups, including HIV-positive individuals. It further states that two doses of tetanus toxoid should be given to pregnant women. A review of the immunization coverage in Nigeria however revealed that the current immunization coverage rate with two doses of tetanus toxoid in pregnant women is very low at only 26 %.4 Furthermore, a review of certain studies showed that 2%,5 9%,6 33%,7 8 and 36.4%9 of mothers in the respective studies were immunized with tetanus toxoid. This study was undertaken to identify the major factors militating against achieving high immunization coverage in pregnant women attending ANC with a view to making recommendations for improvement.

Methods

Study Area: Ibadan is an indigenous African city, the capital of Oyo state of Nigeria. It lies
between latitude 70° and 90° North of the equator and between 20° 30' and 50° 30' East of the prime meridian. The present population is well over 2 million (1991 National Population Census).  

**Study Design:** This was a descriptive cross-sectional study conducted in all secondary level health care institutions in Ibadan (Adeoyo Maternity Hospital, Oluyoro Catholic Hospital, Catholic Hospital Eleta and Oni Memorial Children’s Hospital) and the only tertiary health care institution, the University College Hospital (UCH). These hospitals are the major referral centers for the primary health care centers and all private facilities and serve all the different socio-economic sectors. All cases seen at the primary level are routinely referred to these facilities.

**Sampling technique:** A total sampling technique was utilized. All mothers of cases of neonatal tetanus admitted into these hospitals over a 12-month period were recruited into the study.

**Instrument of study:** The instrument used was a pre-tested structured questionnaire administered to the mothers of the NNT cases by trained research assistants. Demographic data, tetanus toxoid vaccination history, ANC attendance record, frequency of attendance, duration of attendance, reason for non-attendance and non-vaccination were collected.

**Data Analysis:** The details were entered into the computer using EPI INFO version 6 software package and the statistical chi-square test was used to compare proportions of categorical variables.

**Ethical considerations:** Approval for the study was obtained from the administration of the hospitals involved in the study. Informed consent was also obtained from each respondent.

**Results**

A total of 149 mothers with babies that had NNT were admitted into the hospitals during the study period. One hundred and forty (94.0%) of them that consented were enrolled into the study and the 9 (6.0%) who refused were excluded. Of the 140 respondents, twenty-two (15.7%) mothers were teenagers while 118 (84.3%) were twenty years or more. Eighty-eight (62.9%) mothers were Moslems while 52 (37.1%) were Christians. Seventeen (12.1%) of the mothers had no formal education while 123 (87.9%) had at least primary education. Seventeen (12.1%) mothers were housewives, 93 (66.4%) were unskilled workers while 29 (20.7%) were skilled and 1 (0.7%) was a professional. Eighty-eight (62.8%) mothers were primigravidas, 33 (23.6%) were primiparas, 8 (5.7%) had parity of two while 11 (7.9%) had parity of three or more.

<table>
<thead>
<tr>
<th>Table 1: Stage of Gestation of Mothers of NNT Cases at Registration in ANC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age at registration in ANC</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>First semester</td>
</tr>
<tr>
<td>Second semester</td>
</tr>
<tr>
<td>Third semester</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

One hundred and twenty-one (86.4%) mothers registered at ANC while 19 (13.6%) mothers did not. Table 1 shows the gestational stage of mothers at registration in ANC. Only 6 (5.0%) registered before the second trimester. Reasons given by the nineteen (13.6%) mothers who did not attend ANC ranged from ignorance (57.9%) and lack of funds (31.6%) to religious belief (10.5%).

Of the 121 (86.4%) mothers that attended ANC, the frequency of attendance in 34 (28.1%) was between 1 and 4 times while the majority, 87 (71.9%) attended with a frequency of 5 to 20

<table>
<thead>
<tr>
<th>Table 2: Reasons for not receiving full Immunization among respondents who attended ANC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>NONE</td>
</tr>
<tr>
<td>1 DOSE</td>
</tr>
</tbody>
</table>
Asekun-Olarinmoye: Barriers to implementation of immunization policy

<table>
<thead>
<tr>
<th>Reason</th>
<th>ANC at church house + ignorance</th>
<th>Hospital on strike</th>
<th>Vaccine out of stock in hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of funds</td>
<td>5 (11.6%)</td>
<td>0 (0.0%)</td>
<td>4 (9.3%)</td>
</tr>
<tr>
<td>ANC at church house + ignorance</td>
<td>10 (23.3%)</td>
<td>0 (0.0%)</td>
<td>5 (10.6%)</td>
</tr>
<tr>
<td>Missed appointment date</td>
<td>1 (2.3%)</td>
<td>28 (59.6%)</td>
<td></td>
</tr>
<tr>
<td>Hospital on strike</td>
<td>0 (0.0%)</td>
<td>2 (4.3%)</td>
<td></td>
</tr>
<tr>
<td>Vaccine out of stock in hospital</td>
<td>4 (9.3%)</td>
<td>5 (10.6%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43 (100.0%)</td>
<td>47 (100.0%)</td>
<td></td>
</tr>
</tbody>
</table>

The average number of attendance was 8 times. Sixty (49.6%) mothers that attended ANC did so for a duration of 3 to 6 months while 44 (36.4%) and 17 (14.0%) attended for 2 months and 1 month respectively. Of the 121 mothers that attended ANC, only 31 (25.6%) had full immunization with two doses of tetanus toxoid (TT). Forty-seven (38.8%) mothers had incomplete immunization with one dose of TT while 43 (35.5%) were not immunized at all. Furthermore, all the nineteen respondents who did not attend ANC received no immunization, bringing the non-immunized respondents to a total of 62 (44.3%) of the 140 respondents. The ratio of the percentage of respondents fully immunized against tetanus to the percentage that attended ANC (TP ratio) in this study was 1:3.3.

Table 2 shows reasons for not receiving full immunization in respondents that attended ANC. Ignorance as well as ANC care at church houses were the commonest reasons (76.8%). Association between selected socio-demographic characteristics and immunization status of respondents is shown in Table 3. Age, 20 years or more (p=0.003), parity of one or more (p=0.004), and formal education (p=0.02) are statistically significantly associated with having received immunization with either one or two doses of tetanus toxoid while occupational status and religion were not statistically significantly associated with respondents’ immunization status (p>0.05).

Discussions
This study has identified the major factors and obstacles against the achievement of high immunization rate with two doses of tetanus toxoid in mothers attending ANC whose babies fell victim to NNT. Seventy-eight (64.5%) mothers that attended ANC had tetanus toxoid immunization, but only about a quarter of them had full immunization with two doses of the toxoid. These figures even though low are higher than those reported from other parts of the country. This raises the crucial issue of the failure of the current strategy to achieve the expected immunization coverage of pregnant women that could result in a significant reduction in the prevalence of neonatal tetanus. The current national immunization coverage rate with two doses of tetanus toxoid is abysmally low at only 26%. It could be seen from the findings in this study that the practice of vaccinating pregnant women is not the best for preventing NNT in this environment. This is due to the fact that many women do not receive ante-natal care at
Table 3: Association between selected socio-demographic characteristics and immunization status of respondents.

<table>
<thead>
<tr>
<th>Socio-demographic Variables</th>
<th>Immunization Status of Respondents</th>
<th>Total</th>
<th>( x^2 ) value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>None *Freq. (%)</td>
<td>1 or 2 doses of TT *Freq. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>&lt;20</td>
<td>16 (72.7)</td>
<td>6 (27.3)</td>
<td>22 (15.7)</td>
</tr>
<tr>
<td></td>
<td>&gt;20</td>
<td>46 (39.0)</td>
<td>72 (61.0)</td>
<td>118 (84.3)</td>
</tr>
<tr>
<td>Parity</td>
<td>None(Primigravida)</td>
<td>49 (55.7)</td>
<td>39 (44.3)</td>
<td>88 (62.9)</td>
</tr>
<tr>
<td></td>
<td>&gt;1</td>
<td>13 (25.0)</td>
<td>39 (75.0)</td>
<td>52 (37.1)</td>
</tr>
<tr>
<td>Educational Status</td>
<td>No formal Educ.</td>
<td>12 (70.6)</td>
<td>5 (29.4)</td>
<td>17 (12.1)</td>
</tr>
<tr>
<td></td>
<td>Formal Educ.</td>
<td>50 (40.7)</td>
<td>73 (59.3)</td>
<td>123 (87.9)</td>
</tr>
<tr>
<td>Occupational Status</td>
<td>Unemployed</td>
<td>5 (29.4)</td>
<td>12 (70.6)</td>
<td>17 (12.1)</td>
</tr>
<tr>
<td></td>
<td>Employed</td>
<td>57 (46.3)</td>
<td>66 (53.7)</td>
<td>123 (87.9)</td>
</tr>
<tr>
<td>Religion</td>
<td>Islam</td>
<td>37 (42.0)</td>
<td>51 (58.0)</td>
<td>88 (62.9)</td>
</tr>
<tr>
<td></td>
<td>Christianity</td>
<td>25 (48.1)</td>
<td>27 (51.9)</td>
<td>52 (37.1)</td>
</tr>
</tbody>
</table>

all and a sizeable number of those that receive ante-natal care register late in pregnancy, making it impossible to ensure the administration of the required two doses of tetanus toxoid for these pregnant women. The factors of non-attendance and late registration in ANC act in synergy with many other factors militating against the elimination of NNT from the Nigerian community (for example, cultural practices on umbilical care, scarification, circumcision and ear piercing etc). So, it is not surprising that whereas dramatic decreases in the prevalence of measles and poliomyelitis have been reported, the impact of the National Program on Immunization (NPI) on the prevalence of neonatal tetanus has not been impressive. It is important that the WHO’s recommended anti-tetanus immunization schedule of five dose of anti-tetanus vaccine for all women of child-bearing age that has been adopted by the Federal Ministry of Health be implemented nation-wide. This will ensure that most of the women will already be fully immunized even before becoming pregnant and sidetrack most of the major hindrances and barriers identified in the present study. The study has revealed that the most common reasons for none or partial immunization is ignorance. Other researchers’ findings corroborate this fact. One may infer that the health delivery system is partially responsible for the low coverage via inadequate effective health education and the instances of missing the opportunities to immunize for example when vaccines are out of stock. Thus Seventy-five percent of the opportunities for tetanus immunization were missed in the study population. Similar finding was reported by Delport,14 Borges de Mattos et al,15 Kalaca et al,16 Verma et al17 Edett et al18 and Buekens et
These were mothers who had received antenatal care on a sufficient number of occasions for them to have had the opportunity of receiving the required two TT doses. Because of the serious consequences of NNT infections, every effort should be made to identify and immunize eligible women when they bring their children for immunization or when they attend either ANC or any other clinics. Of particular interest is the fact that babies of the partially immunized mothers and especially those of the fully immunized mother also had NNT. This could probably be due to mothers having received non-potent, non-viable vaccines. It is very important that the cold chain be maintained so as to ensure giving viable vaccines to the end users. This points to the fact that NNT is a disease that needs multifaceted approach; viable potent vaccines should be provided alongside other measures that ensure safe and clean delivery attended by trained personnel. Mother’s young age, being a primigravida and lack of formal education were shown to be statistically significantly related to non-immunization status. These are the identified target groups that programme planners should focus on and develop appropriate health education strategies for.

A limitation of this study is that it has focused on a selected group (mothers whose babies had NNT) and the responses to questions could have been influenced by attempts to cover their acts of negligence. Also, another population of mothers whose babies did not have NNT could have been included as controls. Further research in this area involving all mothers during puerperium is recommended. In conclusion, this study showed that policy statements on immunization of women against tetanus are poorly implemented. There is need for periodic assessment of the programs and services put in place in order to identify deficiencies with a view to correcting such. This is a very important issue if the millennium development goal of reducing maternal and infant morbidity and mortality is to be achieved.

It is recommended that health education through mass media with specific messages targeting the high risk groups identified in this study be intensified. Also, there should be provision of tetanus immunization materials in every clinic providing contact between women and health workers and concerted efforts should be made by government to reduce the out of stock syndrome in the provision of vaccines. Mobile immunization clinics should be provided by government to service the mission homes and training should be provided for their personnel. Periodic mass immunization of school girls and women of child bearing age and a shift from emphasis on immunizing pregnant women with two doses of TT at ANC to that of immunizing all women of child bearing age with the WHO recommended schedule of five doses of TT to give life-long immunity even before getting pregnant are the suggested strategies to combat the present policy implementation problems. This will of course call for increased supply of vaccines, therefore the vaccine supply lines must be strengthened by government in all the three tiers of health care delivery.

References
A review of traumatic limb injuries in children and implication for prevention

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Abstract

Background: Musculoskeletal injuries are important aspects of traumatic injuries that need to be characterized better in order to map out appropriate preventive measures in developing countries.

Method: This is a retrospective study of all traumatic injuries to the limbs presenting at the Obafemi Awolowo University Teaching Hospitals Complex over a five year period.

Results: 570 of 643 (5.6% of all pediatric trauma cases) case notes were retrieved. There were 366 (64.2%) males and 204 (35.8%) females with a mean age of 6.7 ± 3.8 years. Most injuries were sustained at home or on the way to or from school. Road crashes and falls are the two most common causes responsible for 50.5% and 41.4% respectively. Lower limb injuries were 4.8 times more common than upper limb injuries and fractures were the most common injury type. The femurs were injured in more than 50% of the cases. The tibia had the highest numbers of open fractures. 178 (31.2%) patients sustained skin injuries, majority of which were lacerations (79, 43.8%) and abrasions (30, 16.9%). There were 23 (4.0%) nerve and 13 (2.5%) tendon injuries. Associated other region injuries were to the head and the abdomen. Mortality rate was 1.8%, all deaths occurred in those with crash related injuries.

Conclusion: Musculoskeletal injuries remain a significant cause of hospitalization and morbidity in Nigeria. Preventive measures aimed at road crashes and falls should be instituted to reduce their incidence.

Keywords: Pediatric, Limb, Injury, Trauma Prevention

Introduction

Worldwide, injuries are increasingly becoming a major health problem among children. In high income countries (HIC), injuries have risen to become the most common cause of death, accounting for almost 40% of death in the age group 1-14 years. The problem is worse in low-to-middle income countries (LMIC), where traditionally, infectious diseases were regarded as the greatest disease burden and where injuries are increasingly being recognized as a very important cause of morbidity and mortality. For example, the WHO has estimated that more children die from road crashes than from HIV infection in LMIC. Also, in 1998, the UNICEF estimated that 98% of all injury related deaths occurred in LMIC.

Infants and children are not little adults; they are qualitatively different from adults in their behaviors, physical nature and biology. They are more vulnerable than adults to trauma. Most studies done on injuries from Nigeria had shown the limbs to be the most vulnerable body region to trauma. The studies looked at injury epidemiology from the global perspective; few looked at the details of musculoskeletal injuries alone and to our knowledge, none had focused on musculoskeletal injuries in children. In this study, we sought to characterize the nature, distribution and the outcome of pediatric limb trauma at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife. OAUTHC serves parts of the semi-urban and rural communities of Osun, Ekiti and Ondo states in southwest Nigeria. The findings from the study will help in identifying
risk factors and planning for appropriate preventive actions.

Method

The study was undertaken to document the pattern of limb injuries as they presented at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) Ile-Ife. The case notes of children aged from birth to 14 years seen with traumatic limb injuries over the five year period between January 1998 and December 2002 were retrieved from the medical records department. Burns injuries were not included. The following data were extracted from them: age, causes of injuries, month of presentation, laterality of the injuries, soft tissue injuries, long bone fractures, joint involvement, associated systemic injuries, admission status, duration of hospital stay, treatments and their outcomes. Outcomes are rated as satisfactory when patients had no complication from the trauma or its treatment as at the last clinic visit, unsatisfactory when patients had complications after a follow-up of at least two years, lost to follow-up, discharged against medical advice (DAMA), referred to other hospitals or dead. The data was analysed with SPSS 11.5 software.

Results

Ages and sexes: Out of 11,465 patients who attended the pediatric emergency ward during the study period, 643 (5.6%) sustained traumatic injuries to the limbs. Five hundred and seventy (88.5%) case records were available for review. The ages ranged from one day to 14 years with a mean of 6.7 ± 3.8 years. There were 366 (64.2%) males and 204 (35.8%) females. Females were significantly older than males (7.3 years versus 6.5 years; p=0.015). A greater percentage of female patients were in the adolescent/school age group compared to males.

Mechanism of injury: There were 288 injuries due to motor cars, buses and trucks. Pedestrians were injured in 250 (43.9%) instances and vehicle occupants in 38 (6.7%). Motorcycle injuries accounted for 76 (13.3%) of all crash related injuries consisting of 58 (10.1%) pedestrian and 18 (3.2%) occupant crashes. Other causes are falls (236, 41.4%), objects falling on patients (24, 4.2%), birth trauma (18, 3.2%) and gunshots (4, 0.7%). Table 1 is a cross tabulation of the mechanism of injury and the distribution of limb injuries. Sixty one percent of upper limb injuries were due to falls while about 50% of lower limb injuries were due to road crashes. Table 2 shows the mechanism of injury according to patients’ age-groups. It shows that a greater proportion of injuries due to falls occurred in the younger age groups than those due to road crashes. Four of the patients who sustained injuries in a fall had pathological fractures secondary to bone cysts. Table 3 provides details of patients’ activities at the time of injuries and the mechanism of injuries. The greatest proportion (41.5%) of injuries occurred while the patients were either at school or on their way to school. Ten of the cases of heavy objects falling on patients occurred when the wall of a school collapsed and fell on students in the classroom. Other heavy objects causing injuries include ladders, cement bags and tree branches. Most of the pedestrian accidents occurred while the patients were playing in the neighborhoods or when preschool and young school-aged children dashed across roads to pick up their balls and other playthings.

Musculoskeletal injuries: Fractures were the most common injury types. Table 4 shows that the femur is the most commonly fractured bone. Only 26 (4.7%) patients sustained multiple fractures, most often in road crashes. Open fractures were seen in 86 (16.3%) patients. The tibia has the largest number of open fractures, but the radius and ulna had the highest proportion of open fractures; 18 of the 20 patients with fractures of both radius and ulna had open fractures.

Skin injuries were the second most common form of injuries consisting of 79 (43.8%) lacerations, 30 (16.9%) abrasions, 27 (15.7%) bruises, 20 (11.2%) avulsions and 22 (12.4%) crush injuries.
Forty eight (8.5%) patients had dislocations, 20 (3.5%) were caused by falls, another 20 (3.5%) by pedestrian crashes while the remaining 8 (1.5%) were due to motorcycle/vehicle occupant crashes. The elbows, 14 (2.5%) were the most commonly dislocated joints followed by the Knee, 12 (2.1%); hip, 10 (1.8%); ankle, 10 (1.8%) and the foot 2 (0.4%). There were also 13 (2.3%) tendon and 23 (4.2%) nerve injuries.

**Associated injuries:** Only two other regions; the head and the abdomen sustained 97 (17.1%) and 5 (0.9%) injuries respectively. All the abdominal injuries were splenic and they occurred in vehicle passengers. Injuries to the head consisted of 53 (54.6%) facial and scalp injuries, 27 (27.8%) unspecified head injuries, 12 (12.4%) skull fractures and 5 (5.2%) cephalhematoma.

**Treatment and complications:** In keeping with pediatric fracture management worldwide, most of the patients with fractures had conservative management. These were tractions in 324 (56.8%) patients, cast application in 182 (31.9%), and external fixation in 9 (1.6%) patients. Surgical managements were 39 (6.8%) debridement, 28 (4.9%) primary closures, 11 (1.9%) skin grafting and 8 (1.4%) open reduction and internal fixation. The median duration of immobilization was 33 days ranging from 1 to 250 days. The median duration of hospital admission was 31 days, and the range was 2 to 125 days. The most common complications were joint stiffness 56 (9.8%), delayed union, malunion and non-union 18 (3.1%), and deep infections 11 (1.9%). Soft tissue complications included 43 (7.5%) wound sepsis, 23 (4.0%) plaster sores, 9 (1.6%) nerve palsies and 6 (1.1%) compartment syndromes. Two patients had tetanus.

**Table 1: Distribution of limb injuries and the mechanism of injuries**

<table>
<thead>
<tr>
<th></th>
<th>Vehicle occupant (%)</th>
<th>Fall (%)</th>
<th>Pedestrian (%)</th>
<th>Falling object (%)</th>
<th>Birth trauma (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lower Limb</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26 (5.9)</td>
<td>176 (40.2)</td>
<td>202 (46.1)</td>
<td>22 (5.0)</td>
<td>12 (2.7)</td>
<td>438 (77.4)</td>
</tr>
<tr>
<td><strong>Upper limb</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 (8.2)</td>
<td>60 (61.2)</td>
<td>22 (22.4)</td>
<td>2 (2.0)</td>
<td>6 (6.1)</td>
<td>98 (17.3)</td>
</tr>
<tr>
<td><strong>Both limbs</strong></td>
<td></td>
<td>0</td>
<td>26 (86.7)</td>
<td>0</td>
<td>0</td>
<td>30 (5.3)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>38 (6.7)</td>
<td>236 (41.4)</td>
<td>250 (43.9)</td>
<td>24 (4.2)</td>
<td>18 (3.1)</td>
<td>566</td>
</tr>
</tbody>
</table>

P= 0.000005

**Table 2: Age groups and the mechanism of injury**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Vehicle occupants</th>
<th>Fall</th>
<th>Pedestrian</th>
<th>Falling object</th>
<th>Birth Trauma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>12 (40.0)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>18 (60.0)</td>
<td>30</td>
</tr>
<tr>
<td>1-4</td>
<td>10 (6.5)</td>
<td>100 (64.9)</td>
<td>32 (20.8)</td>
<td>12 (7.8)</td>
<td>0</td>
<td>154</td>
</tr>
<tr>
<td>5-12</td>
<td>28 (8.5)</td>
<td>98 (29.9)</td>
<td>192 (58.5)</td>
<td>10 (3.0)</td>
<td>0</td>
<td>328</td>
</tr>
<tr>
<td>13-14</td>
<td>0</td>
<td>26 (50.0)</td>
<td>26 (50.0)</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 3: Patients’ activities at the time of injury and the mechanism of injuries**

<table>
<thead>
<tr>
<th></th>
<th>Vehicle occupants</th>
<th>Falls</th>
<th>Pedestrians</th>
<th>Falling objects</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Going to school</td>
<td>20</td>
<td>29</td>
<td>190</td>
<td>-</td>
<td>139</td>
</tr>
<tr>
<td>Playing in school</td>
<td>-</td>
<td>83</td>
<td>-</td>
<td>12</td>
<td>95</td>
</tr>
<tr>
<td>Playing at home</td>
<td>-</td>
<td>75</td>
<td>-</td>
<td>-</td>
<td>75</td>
</tr>
<tr>
<td>Travelling</td>
<td>17</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>17</td>
</tr>
<tr>
<td>Hawking</td>
<td>1</td>
<td>2</td>
<td>18</td>
<td>-</td>
<td>21</td>
</tr>
<tr>
<td>Playing in neighborhood</td>
<td>-</td>
<td>29</td>
<td>22</td>
<td>10</td>
<td>61</td>
</tr>
</tbody>
</table>
**Outcome:** Three hundred and thirty four (58.6%) patients had satisfactory outcomes, 36 (6.3%) patients had unsatisfactory outcomes, 158 (27.7%) patients were lost to follow-up, 22 (3.95%) took discharges against medical advice while 10 (1.8%) died. The ten (1.8%) patients who died all sustained their injuries in vehicle crashes. Three of these patients had associated head injury, two were referred from other hospitals with tetanus and another had associated head injury (Glasgow Coma Score was 6), splenic injury and femoral fracture. He died two days after splenectomy. The causes of death were not specified in the remaining four cases.

**Table 4: Characteristics of fractures**

<table>
<thead>
<tr>
<th>Bone</th>
<th>Close</th>
<th>Open</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lower limbs (N=440)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Femur</td>
<td>306 (96.5)</td>
<td>11 (3.5)</td>
<td>317</td>
</tr>
<tr>
<td>Tibia &amp; fibula</td>
<td>49 (51.6)</td>
<td>46 (48.4)</td>
<td>95</td>
</tr>
<tr>
<td>Foot bones</td>
<td>13 (60.0)</td>
<td>7 (40.0)</td>
<td>20</td>
</tr>
<tr>
<td>Pelvic bones</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Patella</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Upper limbs (N=112)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humerus</td>
<td>50 (91.9)</td>
<td>5 (9.1)</td>
<td>55</td>
</tr>
<tr>
<td>Radius and ulna</td>
<td>15 (45.5)</td>
<td>18 (54.5)</td>
<td>33</td>
</tr>
<tr>
<td>Clavicle</td>
<td>16</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Hand</td>
<td>5 (62.5)</td>
<td>3 (37.5)</td>
<td>8</td>
</tr>
</tbody>
</table>

**Discussions**

This study shows that musculoskeletal limb injuries are significant causes of hospital attendance and morbidity among children. While they form a small proportion of A&E attendance, they are significant in terms of length of hospitalization and subsequent morbidity. The long median duration of admission recorded in this study means that scarce bed space resources are tied down by the patients. A large percentage of these patients also had unsatisfactory outcomes due to residual disability. Thus many of the effects of these injuries continue to haunt the patients long after they have been discharged.

The most common cause of injuries are road crashes, as has been previously shown in studies from Nigeria 1, 8 in contrast to those from high income countries 2, 13. Road crashes were also implicated in all the fatal cases. Therefore in order to have meaningful reductions of pediatric injuries, preventive measures should be taken to reduce the risk of crashes on our road 4. Pedestrian injuries can be reduced by environmental modifications like the provision of sidewalks, road barriers and pedestrian bridges and the introduction of traffic calming devices such as speed bumps and rumble strips 14, 15. Majority of pedestrian injuries involved students on their way to or from school. Road safety education can be introduced into the school curriculum. Such measures have been implemented and found to be useful in reducing pedestrian injuries from such situations as children emerging from behind parked vehicles 16. Other measures include introduction and enforcement of speed limits in built up neighborhoods 15, 16. The latter measure should also help in reducing the incidence of accidents from children dashing across the road to retrieve toys and balls that had been thrown on to the road. Street hawkers are particularly vulnerable because they may be knocked down while crossing the road to answer buyers’ summons. Thus street trading by children should be discouraged.

Falls are the second most common injury category in this study. They occurred with almost equal incidence at home and at school, but the age distributions were different. Falls occurring at home affected preschool age group and are likely to be preventable by measures directed at not leaving such children alone 2. On the other hand fall injury at schools should be preventable by better playground design and adult-supervised contact sports and games. Children are particularly vulnerable to falling objects because of their curiosity and underdeveloped coordination 17. Parents should be educated on the need to securely tie down
heavy objects that can be toppled or fall on children. Further measures need to be taken to enforce the building construction codes because more than half of this category of injuries was due to collapsing walls. Many studies from middle income countries have shown that low cost improvements in training, equipment and intervention can reduce morbidity and mortality from traumatic injuries. Improving the quality of transport to the hospital can reduce both the pre-hospital as well as admission deaths. Improving hospital-based care may likely reduce disability from limb injuries. For example, two patients died because they were not given tetanus immunoprophylaxis, a simple preventive measure that is sometimes omitted by caregivers in peripheral hospitals. Thus measures should be taken to improve orthopedic and trauma care in developing countries where many trauma-related disabilities involve the limbs.

In conclusion, a hospital based study like this would most likely have missed cases that died on the spot and were probably taken to the morgue or buried at home immediately. Also limb injuries considered minor by parents may not be brought to the hospital; the true impact of trauma on mortality can only be established from population based studies.

References
Abstract

Objective: The objective of this study was to determine the relationship between family support and depression among patients attending the Family Practice Clinic in Wesley Guild Hospital, Ilesa, South Western Nigeria.

Method: Two hundred and fifty (250) subjects were assessed with a 20-item validated measure of Perceived Family Support, and the presence of depressive symptoms using a validated Yoruba version of Zung's Depression Scale.

Results: Of the 250 subjects, one hundred and forty nine (59.6%) had clinically significant depressive symptoms. The proportion of depressed subjects who lived below poverty level was significantly greater than that of non-depressed subjects (p=0.002). Subjects with poor family support were almost two times more likely to have depression than subjects with good family support (p = 0.018, O.R =1.87 (95% CI = 1.07-2.37)).

Conclusion: Family support appears to be an important factor associated with depressive illness in the study population. In developing countries like Nigeria, strengthening and preserving family networks constitute a valuable resource for promoting psychological well-being.

Keywords: Family support, depression, Family Practice, South Western, Nigeria

Introduction
The family is the most basic institution in any society. It is cherished by people born into it, and has by concept, been agreed to vary from a group of intimate individuals with a history and a future to a nuclear family with father, mother and progeny and to people sharing the same physical and economic arrangements under one roof. In many West African countries, including Nigeria, families are traditionally extended vertically into other generations and horizontally to include relatives who do not live with them. It is also extended by polygamy. Primarily, the family provides nurturance and a peculiar psychosocial support not available from outside the family for its members. Such support, especially from a spouse, is linked with health and combines the advantages of recovery from depression and emotional sharing of experience with understanding, patience, love and encouragement.

Unfortunately, all over the world, there is a decline of the family and kinship ties which in most West African societies are increasingly being weakened by urbanization. Studies have revealed the health outcomes of good social support to include lower susceptibility to disease, mortality rates and lower cardiovascular reactivity as well as better immune functions, adjustment to recovery from illnesses and psychological wellbeing. The structure of social support has been defined as the network or web of social ties surrounding an individual while its function is the emotional, instrumental and financial support given to the individual by the social network. Sarafino built on this concept to classify functional social support
into the emotional, esteem, tangible or instrumental, and the information types. Evidence abounds that lack of social support increases the risk of depression and Fujita et al have identified the lack of confidants as one of the vulnerability factors for depression. Low socio-economic status may hinder a person’s participation in social activities. Lack of social support arising from the breakdown of kinship structures consequent upon urbanization is probably the key reason for migrant labourers in African cities leaving behind millions of relatives in the villages dependent on the hope of some money being sent to them.

Patients and methods

Study population and setting: The target population for this study consisted of all newly registered patients attending the Family Practice clinic of the Wesley Guild Hospital (WGH), Ilesa in the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, south west Nigeria. The hospital provides primary, secondary and tertiary levels of care for people of all ages within its catchment area. This includes Ilesa, the surrounding towns and villages in Osun state and parts of the Ekiti, Ondo, Oyo and Edo states of Nigeria. Most of the patients, however, come from Ilesa and environs. A systematic random sampling technique was used to recruit subjects for this study. Two hundred and fifty new patients were registered each week for thirteen weeks. This translated into a sample frame of three thousand two hundred and fifty (3,250). Using a systematic random sampling technique, a sampling interval of 13 was obtained (3250/250 = 13). Subjects who were known psychotics or who were receiving treatment for psycho-affective disorders and patients who refused to give consent were excluded from the study.

Ethical consideration: Ethical clearance was provided by the OAUTHC Research and Ethical committee. Informed written consent was obtained from each subject. Confidentiality and privacy were ensured by not indicating the names of subjects on the questionnaire and only the investigators had access to the data. Participants were made to be in conditions that did not adversely affect their mood before the interview took place.

Testing Procedure: Data were collected using: i) Pre-tested, semi-structured questionnaire incorporating Zung’s Self Rating Scale. This rating scale consists of 20 questions each with answers in a likert scale format rated from 1 to 4. The questions in the scale address the presence of depressive symptoms such as low mood, anhedonia, hopelessness, helplessness and suicidal behaviour. Other questions focused on change in eating pattern, weight loss and easy tiredness. The raw scores were converted on a 100 points scale to give the index scores. Subjects were categorized into depression levels based on these converted points. A score of less than 50 denotes no depression; while a score of 50 to 59 represents mild depression; a score of 60 to 69 represents moderate depression and a score of 70 and above indicates severe depression. A high composite score has a strong correlation with diagnosis of depression. Comparison between the Zung’s Depression Scale and DSM–IV criteria for diagnosis of depression revealed a sensitivity of 97%, a specificity of 63%, a positive predictive value of 77%, and a negative predictive value of 95%. Furthermore, the study established morbidity cutoff score as a guide in determining the clinical severity of depressive symptoms. Both the Yoruba and English versions of the Zung’s scale have been validated in Nigeria with good
psychometric properties, including a high index consistency reliability of 0.64 to 0.79. A 20-item validated measure of family support was used to assess subjects’ level of family support. For items expressing support for respondents, “yes” answer was scored +1. Any other response scored zero. For items expressing lack of support for respondents, scoring was reversed; that is, a “no” response was scored as +1. Summated scores were used to arrive at a family support score. Possible ranges of scores are zero to twenty. Higher scores indicated higher levels of perceived family support. Scores equal to or greater than 11 points suggested strong family support, scores 7 to 10 points suggested weak family support while scores equal or less than 6 points suggested no family support. The Perceived Social Support-Family Scale has been found to have good reliability and validity. The original Perceived Social Support Scale has an alpha coefficient of 0.90 indicating that the scale has excellent internal consistency. The instrument was translated and administered in Yoruba (the local language spoken by majority of subjects) by a Yoruba-speaking Family Physician and a Yoruba linguistic professional who is experienced in health surveys. Precise idiomatic equivalents were employed as much as possible. The translation and back translation, which was performed independently by another Family Physician and linguist were compared with the original version and confirmed to be satisfactory before use. Total income was calculated by adding the respondent’s income from all declared sources. According to World Bank, poverty is defined as living on less than one US dollar per day. In one month, this translates to less than thirty dollars. At a conversion rate of one hundred and fifty naira per dollar (N150 = $1); poverty can be defined as living on less than (150 x 30 = N4500) per month in Nigeria.

**Statistical analysis:** All data collected were fed into the computer and analyzed using the Statistical Package for Social Sciences (SPSS) for Windows software version 11. Means, modes, medians, standard deviations, proportions and percentages were determined as applicable. Proportions and ratios were compared using the Pearson’s Chi squared ($\chi^2$) tests. A $p$ value of equal or less than 0.05 was taken as statistically significant.

**Results:**

The age of study subjects ranged from 16 to 84 years with the mean age of 49.66 ± 14.95 years. There were 74 males and 176 females showing male to female ratio of 1:2.4. Majority 174(69.6%) of the study subjects were currently married, 143(57.2%) were self-employed and 221(88.4%) belonged to Christian faith. Of the 250 subjects, one hundred and forty nine (59.6%) had clinically significant depressive symptoms.

**Table 1: Relationship between level of income and depression rating among study subjects**

<table>
<thead>
<tr>
<th></th>
<th>Non-depressed subjects</th>
<th>Depressed subjects</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(Zung SDS&lt; 50)</strong></td>
<td>n=101</td>
<td>(Zung SDS=50-100)</td>
<td>n=149</td>
</tr>
<tr>
<td><em>Below poverty level</em></td>
<td>31(29.2%)</td>
<td>75(70.8%)</td>
<td>106</td>
</tr>
<tr>
<td><em>Above poverty level</em></td>
<td>70(48.6%)</td>
<td>74(51.4%)</td>
<td>144</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>101</td>
<td>149</td>
<td>250</td>
</tr>
</tbody>
</table>

*Living on less than 1 US dollar per day (Source: World Bank*)
Table 1 shows that 75(70.8%) of subjects who lived below poverty level had depressive symptoms. There is a significant association between poverty level and depression rating while table 2 shows that depression was significantly more common among subjects (65.2%) who had weak or no family support, compared with subjects (50.0%) with strong family support (p=0.018). Subjects with weak or no family support were 1.87 times more likely to have depression than subjects with good family support.

**Discussion**

In this study, one hundred and forty nine subjects (59.6%) were found to have significant depressive symptoms: mild depression-42.8%; moderate depression-16% and severe depression -0.8%. This prevalence of 59.6% was high when compared with 49% reported by Ohaeri and Jegede in 1990 from Ibadan, South Western Nigeria but lower than 40% reported by Patel et al from Zimbabwe, a Southern African country. More recently, Dolittle and Farrell reported a slightly higher prevalence rate of 62% among urban poor in United States, the breakdown of which showed that 38% of their subjects were not depressed; 30% had mild depression; 22% had moderate depression and 11% had severe depression. Differences between the observed prevalence from this study and the values cited from US and Zimbabwe studies may be reflective of variation in local rates of predisposing factors to depression in the various communities as similarly suggested by Judd et al.

Plausible reasons for these differences beyond location and times of study include the effects of severely depressed national economy on psychological state of the populace. There has been a general decline in per capita income from $1000 in 1988, the period when Ohaeri et al conducted their studies; to $260 in 1998, and a subsequent re-classification of Nigeria from middle to a low-income country. Nigeria’s GDP for 2004 was $64.1 billion, which could make the country one of the richest countries in Africa after South Africa. However, due to Nigeria’s high population, this translates to $390 per capita, making the country one of the poorest in the continent. There is also a widespread and rising level of poverty in Nigeria. According to Mustapha, “the percentage of people living below the poverty line increased from 41% in 1992 to 80% in 1998”. Furthermore, WHO has cited poverty as a recognized factor in the increasing prevalence of depression worldwide. This may explain the high prevalence rate reported in this study. Similarly, the US study was conducted among people who were daily exposed to stressors like increased rates of poverty, crime and chronic illness.

A significant negative association existed between total income and depression in this study. This is consistent with findings of other studies. There was also a significant association between level of
family support and depression. Majority of subjects with weak or no family support had depression. This agrees with findings of other studies that investigated the effects of family support on the maintenance and promotion of health of depressed individuals\(^5,20\). Fujita \textit{et al}\(^5\) reported that the higher the level of perceived support provided by families and friends, the less the stress due to disease, leading to good outcomes in secondary prevention and prognosis of depressive symptoms. This was supported by De Leeuw and De Graeff\(^20\) who established in a cohort of cancer patients that the relationship between family support and depressive symptoms was especially apparent in patients with few general health complaints. In Africa generally and West Africa in particular, people are shielded from untoward effects of circumstances by supports from families, friends and significant others, but more recently, western culture has led to increasingly isolated nuclear families causing a breakdown in this protective kinship structure\(^2\). This may explain why a large proportion of subjects with depression had weak or no family support. It is therefore important that the family support system needs to be strengthened to cater for the health of its members. This becomes imperative in view of the prevailing poor social welfare provisions engendered by political misrule in many developing countries like Nigeria. Different stakeholders in the community, such as religious and social groups may contribute to the social support networks needed to strengthen the roles of family in promoting and protecting mental health of its members.

References:

6. Zung WWK. A self rating depression scale. Arch Gen Psychiatry; 1965; 12: 63-70
18. Kahn RS, Wise PH, Kennedy BP, Kawachi I. State income inequality, household income, and maternal


Cancer in the North - Western region of Nigeria: an update analysis of Zaria cancer registry data

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Abstract

Objective: To update the pattern of cancer in the North-western region of Nigeria

Methods: Data on new cancer cases registered at Zaria cancer registry of Ahmadu Bello University Teaching Hospital, Zaria, for a period of five years (1992-1996), inclusive of the period of previous study, were obtained and analyzed. Data was collected from various sources within the hospital complex through active reporting. Classification of primary sites of cancer was based on international classification of disease (ICD) 9th edition by WHO.

Results: From January 1992 to December 1996, a total number of 1887 new cancer cases were registered at the hospital-based cancer registry of Ahmadu Bello University Teaching Hospital (ABUTH) Zaria. There were 879 (46.6%) males and 1008 (53.4%) females with male to female ratio of 1:1.2. Malignant lymphoma, 201 (22.9%) was the commonest cancer in men. This was followed by carcinoma of the urinary bladder, 99 (11.3%) and prostate, 81 (9.2%). In women cancer of the cervix, 256 (25.4), Breast, 223 (22.1%) and malignant lymphoma, 74 (7.3%) were the commonest in that order. All the four new cases of cancer of the lung occurred in men. Brain tumor is rare and occurred during childhood.

Conclusion: Cancer, a non-communicable disease is increasingly becoming a major public health concern, hence the need for a national policy formulation for its management and control.

Key words: Cancer, Cancer registry.

Introduction

Cancer, a non-communicable disease is being recognized as a major health problem worldwide. It is likely to increase in importance in developing countries with the control of infectious disease and increased life expectancy. Cancer accounts for one tenth of deaths worldwide and the second leading cause of death in developed countries. It is no longer regarded as a problem of developed world, as Perkin in 1988 found that more than half of all cancers occurred among the three-quarters of the world’s people, who reside in the developing countries. Unless controlled, the burden of cancer in developing nations will increase in the near future, due to increase in the proportion of the elderly people, industrialization and increased population being increasingly exposed to causative factor such as tobacco. Cancer registration, which is an integral part of cancer control program, has been practiced for many years in several countries including Nigeria. The first population-based cancer registry in Nigeria was established at Ibadan in 1960. Ever since, cancer registry has not witnessed any remarkable growth in Nigeria as virtually all existing cancer registries in Nigeria are either hospital-based or departmental-based registry. Thus cancer registration has been facing a serious set-back; as a result, determination of the magnitude of cancer nationwide has been elusive.

Reports from Belgium, Canada, Finland and Norway indicate marked variation in sex and body organ distribution of the different cancers from one country to another. The same phenomenon of variation has been noted to some extent in Africa. Thus in Ibadan western Nigeria, prostate, liver, Non-Hodgkin’s lymphoma in males compared with breast
cancer, cervix uteri and ovary in females are the main types. Cancer registry data from Cameroon and central Africa\textsuperscript{10} have also recorded some variations. The Uganda report is striking with the prominence of Kaposi's tumor. Zaria Cancer registry of ABUTH Zaria, located in North western region of Nigeria, became functional as a hospital-based cancer registry in 1991. The registry has data on various types of cancer by primary sites, age and sex. Earlier, the registry data from 1992-1994 had been published \textsuperscript{14}. It was felt that an update of this data over a period of five years should be undertaken in order to provide valuable information on the magnitude of cancer, its relative occurrences and further update the existing basic data on cancer in this part of the country. This could probably accelerate and justify the need for establishment of population-based cancer registry in the other regions of the Nigeria.

**Patients and methods**

The Zaria Cancer Registry (ZCR) of Ahmadu Bello University Teaching Hospital Zaria is a hospital-based registry. The data presented for the purpose of this communication were the new cancer cases diagnosed among hospital patients and surgical tissues at ABUTH Zaria and were registered at ZCR from January 1992 – December 1996. All malignant neoplasm, (ICD-9 rubrics 140-208 of WHO), unequivocally confirmed clinically, by radiology, autopsy or verified by histology or cytology were registered. Non-melanocytic skin cancers were excluded. Notification of cancer was voluntary. To ensure completeness of data, collection of data was by active reporting. The main sources of information on cancer within the hospital were medical record department, out-patient clinics, pathology and hematology laboratories, radiology department and autopsy log books. The registry personnel regularly visited the various sources of data to abstract the following information on cancer: patient’s name, age, sex, hospital number, residential address, occupation and habits. Other information collected were date of diagnosis, topography (primary site) and sources of information. These details were recorded into the registry abstract form. Each case was given registry identification number. Incoming information was matched against the register or index card arranged alphabetically by name to avoid double registration. Where in doubt, the case would be followed back to the data source for additional information.

Coding of the primary sites of cancer was according to International classification of disease 9\textsuperscript{th} revision of W.H.O. \textsuperscript{12}. The results are presented in the form of tables and bar charts.

**Results**

Within a period of five years, January 1992 to December 1996, a total of 1887 new cancer cases were registered at the Zaria cancer registry. Averagely, 377 new cases were registered annually. Of the 1887 cases registered, 88.2\% were histologically verified. There were 879 (46.6\%) males and 1008 (53.4\%) females, giving male to female ratio of 1:1.2, Table 1. In males the leading cancers were malignant lymphoma, 201 (22.9\%), and cancers of the urinary bladder, 99 (11.3\%), prostate, 81 (9.2\%), colorectal, 73 (8.3\%) and
## Table 1. Cancer cases registered by sites and sex at Zaria

<table>
<thead>
<tr>
<th>SITES</th>
<th>ICD-9</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oro-pharynx</td>
<td>140-149</td>
<td>69</td>
<td>39</td>
<td>108</td>
</tr>
<tr>
<td>Lip</td>
<td>140</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Salivary Gland</td>
<td>142</td>
<td>10</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Floor of the mouth</td>
<td>144</td>
<td>31</td>
<td>16</td>
<td>47</td>
</tr>
<tr>
<td>Pharynx</td>
<td>146-148</td>
<td>15</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Others and unspecified</td>
<td>143,145,149</td>
<td>9</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Digestive organs</td>
<td>159-159</td>
<td>120</td>
<td>73</td>
<td>193</td>
</tr>
<tr>
<td>Esophagus</td>
<td>150</td>
<td>7</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Stomach</td>
<td>151</td>
<td>11</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Colorectal</td>
<td>152-154</td>
<td>73</td>
<td>39</td>
<td>112</td>
</tr>
<tr>
<td>Liver and Biliary passage</td>
<td>155-156</td>
<td>24</td>
<td>12</td>
<td>36</td>
</tr>
<tr>
<td>Other and unspecified</td>
<td>152,157,159</td>
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<td>3</td>
<td>8</td>
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<tr>
<td>Respiratory system</td>
<td>160-165</td>
<td>8</td>
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<tr>
<td>Lung</td>
<td>162</td>
<td>4</td>
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</tr>
<tr>
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<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Bone Tissue and Skin</td>
<td>170-172</td>
<td>96</td>
<td>62</td>
<td>158</td>
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<tr>
<td>Bone</td>
<td>170</td>
<td>19</td>
<td>18</td>
<td>37</td>
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<tr>
<td>Connective Tissue</td>
<td>171</td>
<td>56</td>
<td>26</td>
<td>82</td>
</tr>
<tr>
<td>Skin (melanoma)</td>
<td>172</td>
<td>21</td>
<td>20</td>
<td>41</td>
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<tr>
<td>Breast</td>
<td>174-175</td>
<td>3</td>
<td>223</td>
<td>226</td>
</tr>
<tr>
<td>Genital Organs</td>
<td>179-187</td>
<td>83</td>
<td>376</td>
<td>459</td>
</tr>
<tr>
<td>Cervix uteri</td>
<td>180</td>
<td>NA</td>
<td>256</td>
<td>256</td>
</tr>
<tr>
<td>Corpus uteri</td>
<td>181</td>
<td>NA</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Ovary</td>
<td>183</td>
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<td>39</td>
<td>39</td>
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<tr>
<td>Prostate</td>
<td>185</td>
<td>81</td>
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<td>55</td>
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<td>Count2</td>
<td>Count3</td>
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<tr>
<td>-----------------------------------------------</td>
<td>------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Urinary organs</strong></td>
<td>188-189</td>
<td>116</td>
<td>25</td>
<td>141</td>
</tr>
<tr>
<td>Bladder</td>
<td>188</td>
<td>99</td>
<td>12</td>
<td>111</td>
</tr>
<tr>
<td>Kidney and other</td>
<td>189</td>
<td>17</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td><strong>Eye</strong></td>
<td>190</td>
<td>23</td>
<td>20</td>
<td>43</td>
</tr>
<tr>
<td><strong>Brain and central nervous system</strong></td>
<td>191-192</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Endocrine glands</strong></td>
<td>193-194</td>
<td>6</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Thyroid</td>
<td>193</td>
<td>6</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Other endocrine</td>
<td>194</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Leukemia</strong></td>
<td>204-208</td>
<td>11</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td><strong>Other blood and Lymphoid Tissue</strong></td>
<td>200-203</td>
<td>201</td>
<td>74</td>
<td>275</td>
</tr>
<tr>
<td>Hodgkins disease</td>
<td>201</td>
<td>39</td>
<td>7</td>
<td>46</td>
</tr>
<tr>
<td>Other Lymphomas</td>
<td>200, 202 ,S203</td>
<td>162</td>
<td>67</td>
<td>229</td>
</tr>
<tr>
<td><strong>All other and unspecified sites</strong></td>
<td>195-199</td>
<td>140</td>
<td>87</td>
<td>227</td>
</tr>
<tr>
<td><strong>All cancer sites</strong></td>
<td>140-208</td>
<td>879</td>
<td>1008</td>
<td>1887</td>
</tr>
</tbody>
</table>

N A  Not applicable

1 ICD-9 refers to the ninth revision of international classification of diseases
connective tissue, 56 (6.4%). Cancer of the floor of the mouth and liver were 31 (3.5%) and 24 (2.7%) respectively. Only three cases of breast cancer in males were registered. On the other hand, in females, cancers were of the cervix, 256 (25.4%), breast, 223 (22.1%) and lymphoid tissue, 74 (7.3%), Table I. No single case of cancer of the lung was registered among the females. Table 2 shows the age distribution of the new cases registered. The peak age of incidence was the 5th decade with 376 (19.9%) cases. During the period, 206 (10.9%) children, aged 0-14 years, developed cancer. The types of cancer during childhood were different from those in later life. Burkitt’s lymphoma, 99 (48.1%), retinoblastoma, 35 (17.0%), nephroblastoma, 16 (7.8%) and connective tissue, 8, (3.9) were the commonest types. In the elderly (65 years and above), 202 (10.7%) new cases were registered 40% of which were prostate cancer. On the other hand, 1019 (54%) cases occurred in people under 45 years of age. However in the age group 25-54 years, there were 1038 (54.6%) cases, which were mainly due to cancers occurring in the female during reproductive age group (breast and cervix). The top five anatomic organs involved in this study were genital organs, 460 (24.3%), lymphoid tissue, 272 (14.4%), breast, 226 (12.0%), digestive organ, 194 (10.5%), bone tissue, and skin, 161 (8.5%). However for
selective primary sites, lymph node, 272 (14.41%), cervix, 256 (13.57%) ranged highest and these were followed by the breast, 226 (11.98%), urinary bladder, 115 (6.09%) and colorectum, (5.99%). The smallest number of cases were recorded in the lung, 4 (0.21%) and central nervous system, 5 (0.26%). All other and unspecified sites (ICD 195-199) accounted for 230 (12.2%) cases, which were mostly due to metastatic cancer of unknown primary sites.

Discussion

It is expected that non-communicable diseases will account for 54% of all deaths in 2015 while tropical infections and parasitic diseases will have decreased to 16% from the 1985 level of 35 percent. Cancer is one of the leading non-communicable diseases and is being recognized as a major health problem to mankind. Through decades of successful research, it is now known that one third of cancer cases are preventable and one third are potentially curable provided they are diagnosed early. Efforts in the fight against cancer are based on data of a properly functioning cancer registry. Cancer registry is being defined as a facility for the collections, storage, analysis and interpretation of data on persons with cancer. The values of cancer registration in any cancer control programs cannot be over emphasized. Cancer registration facilitates the determination of cancer incidence in its operational area and provides information for organization and planning of prevention and treatment of malignant neoplasm. It also provides basic data for epidemiological research, which could suggest possible etiological factors. Zaria cancer registry of ABUTH, Zaria, has steadily registered cancer for a period of 5 years (1992 – 1996). The data of the registry illustrate the cancer situation in Zaria, the age and sex distribution and the relative frequency of various cancer sites. In our previous publication from the same center, cancer occurred more in females than males and this was attributed to high incidence of cancer of the breast and uterine cervix. The commonest cancers among men in Norway were cancer of the prostate, lung and colon whereas in women, cancer of the breast, colon and lung were common. In this present communication, 378 new cancer cases registered annually is higher than the number in the previous study. This is probably due to increased public awareness on cancer and improved data collection. This also justifies the need for the establishment of a population based cancer registry in the geopolitical region for complete coverage and registration of all cancer cases.

Cancer occurs more in female than male in this present study similar to findings in some other studies but different from the findings in certain other reports. Lymphoid tissue and rectum are the leading sites in men. Prostate ranks third whereas it is the commonest in Victoria and Norway. In women, cervix, breast, lymphoid tissue, ovary and rectum are the five commonest sites in that order. The predominance of cervical carcinoma in this study is noteworthy unlike in some other countries. This justifies the need for establishment of cervical (PAP Smears) centers for its early detection in order to reduce its morbidity and mortality. Children (0-14 years) accounted for 10.9% of the new cases registered during the period. This is relatively high, compared with reports from other studies. This is attributed to high incidence of malignant lymphoma (Burkitt’s) and retinoblastoma, accounting for 71.3% of the total childhood tumour. Ten percent of the cases occur in the elderly (65 years and older), which is similar to the report from Chandigarh, but different from that from Canada where elderly patients accounted for 60% of the new cases. This is probably due to fewer people attaining old age in developing countries. Lung and central nervous system are uncommon sites of cancer in Zaria unlike other countries, such as Southern Sweden and Ontario. Under diagnosis or incomplete data collection could be some of the contributing factors. In conclusion, information on cancer in Nigeria is inadequate. Thus, there is the need for the establishment of a functioning National population-based cancer registry in order to...
correctly ascertain the cancer magnitude in the country.

References

Maggots! - Lending a helping hand in wound management - a review

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Abstract
Background: Wound care in the developing world is often problematic. From the point of delay in presentation to inability to get fund for debridement and other surgical treatment, patients often carry the wounds for a prolonged period with attendant serious economic loss. A way of solving this would therefore be finding an appropriate, cheap and safe method of attending to these wounds. Maggot Debridement Therapy (MDT) has found significant use in many countries including the developed countries like U.S.A and UK. It is safer, cheaper than surgery and enables the patient to have a faster debridement and wound healing.

Methodology: A review of the literature to assess the effectiveness, clinical applications and safety of the Maggot Debridement Therapy was done on the internet using search engines like Google, Pub Med etc.

Findings: About 400 articles and abstracts written on maggots and maggot debridement therapy were reviewed. They show different uses to which maggots have been put and the advantages especially in chronic, ischemic ulcers. Sterile larvae of the common green bottle, Lucilia sericata, have been shown to be a highly cost-effective alternative to conventional treatments for the debridement and cleansing of all types of chronic wounds.

Conclusion: Maggot Debridement Therapy has found its usefulness in dressing difficult/chronic wounds. It also debrides wound quicker than conservative wound dressings. It has been found to be safe and cheap and enhances wound healing.

Key words: Maggots, helping, wound, management.

Introduction
Chronic wounds are a challenge for modern health care. A basic principle of treatment is the removal of sloughy, necrotic, devitalized tissue to prevent wound infection and delayed healing. The problem, as many “hands on” doctors know, is how to treat the sloughing wound with tissue ischaemia in a sick or poorly nourished patient. These infected wounds are difficult to debride without causing further tissue loss and/or the need for amputation. Maggots have been known for centuries to help heal wounds. Many military surgeons noted that soldiers whose wounds became infested with maggots did better and had a much lower mortality rate than did soldiers with similar wounds not infested. Maggots, once considered an obsolete therapeutic modality, have been found to be a useful addition to the armamentarium of the foot and ankle specialist. Maggot therapy is a relatively rapid and effective treatment, particularly in large necrotic wounds requiring debridement and resistant to conventional treatment and conservative surgical intervention. Advantages of maggot therapy includes stimulation of epithelialization in clean but non-healing wounds; disinfection, odour, and drainage control; determination of tissue viability; debridement of acute burns, necrotic tumours, and ischemic ulcers; and debridement of unusual sites (i.e. glans penis, joints, pleural space, and peritoneal cavity). This review is therefore aimed at outlining the clinical application of maggots in managing difficult wounds and to bring out the significance of these “young insects” in wound management. This is also a very important subject especially in the poor developing world where the cost of surgical debridement may keep patients in bed.
for months. A cheaper and safer alternative like MDT is therefore a much more needed option to consider in wound care in developing countries. Sterile larvae of the common green bottle, Lucilia sericata, have been shown to be a highly cost-effective alternative to conventional treatments for the debridement and cleansing of all types of chronic wounds.

**Historical background**: During the 1930s, maggot debridement therapy (MDT) was routinely used in hundreds of hospitals around the world for treating bone and soft-tissue infections. In 1942 a grievously wounded soldier was forsaken in the "No Man's Land" for five days. However he totally recovered as his wound had been overrun by maggots and a decision was made by H. Fruchaud to apply maggots to all infected wounds. With the introduction of antibiotics and other improvements in wound care, by the 1960s maggot therapy was used only as salvage therapy for the most serious wounds. Maggot Debridement Therapy (MDT) is the medical use of live maggots (fly larvae) for treating non-healing wounds. In 1995, a handful of doctors in 4 countries were using MDT. Today, any physician in the U.S. can prescribe maggot therapy. Over 4,000 therapists are using maggot therapy in 20 countries. Approximately 50,000 treatments were applied to wounds in the year 2006.

The world war waged in the first half of the 20th century brought devastating and great suffering to mankind. War injuries often resulted in incurable infections of the bone. In many cases, limb amputation was the only recourse for their survival. This dark picture was slightly brightened by countless reports of soldiers whose maggot-laden wounds were free of infection. Soon it became clear that the maggots were responsible for saving many lives and limbs. Thus maggot debridement therapy was born. It is now a universally acknowledged fact that maggot therapy can be used successfully to treat chronic, longstanding, infected wounds, which have previously failed to respond to conventional treatment. The use of maggot therapy is experiencing a revival in the treatment of problem wounds.

**LIFE CYCLE OF THE MAGGOT FLIES**: Maggots, by definition, are fly larvae, just as caterpillars are butterfly or moth larvae. Blow flies and bottle flies can breed on dead rodents and birds in attics or wall voids of houses. They are sometimes known as blue or green bottle flies. They usually breed in meat scraps, animal excrement, and decaying animal matter around houses. The adult flies are quite active inside and are strongly attracted to light. The mature larvae are often a problem when they migrate from breeding areas to pupate. Blow flies usually lay eggs on dead animals or decaying meat. Garbage cans have been known to produce 30,000 blow flies in one week. The life cycle usually lasts 9-21 days from egg to adult. Blow fly larvae (maggots) develop rapidly in warm weather, and maggots often reach their full size on the second or third day after hatching. There are thousands of species of flies, each with its own habits and life cycle. *Phaenicia sericata* (green blow fly) larvae is used in clinical work, since this species has been used successfully in maggot therapy for many decades.

Although treatment with maggot is overall cheaper and safe, production of larvae need a well equipped laboratory and for this purpose. This is often unavailable in developing countries where this therapy is likely to be of great assistance to patients. Larvae are raised in the laboratory. Fly larvae ingest contaminated foods from their immediate surrounding soon after hatching and can no longer be sterilized. However the embryo inside the blowfly egg is sterile and the membrane (chorion) enveloping the egg is extremely resistant. Therefore fly eggs can be sterilized by disinfecting the surface of the eggs and allowing the sterile larvae to hatch in a sterile container with sterile culture media. The optimal disinfectant should have high antibacterial potency but a low level of egg toxicity. A microbiological laboratory must routinely test the sterilized eggs and hatched larvae for sterility within 24-48 hours. Until the microbiology results are available the eggs are
kept in a refrigerator at low temp to slow the further development of the larvae and to increase their shelf life. After hatching the disinfected maggot will survive for 3-7 days depending primarily on the adequacy of air moisture temperature and food. Transportation often shortens their life span because of increased pressure or extremes temperature or insufficient oxygen or nutrients. A drawing of the life cycle of this fly appears in Figure 1.

A drawing of the life cycle of this fly appears in Figure 1.

Figure 1: Blow Fly life cycle

Preparation for maggot therapy

The flies most often used in larval therapy are the facultative calliphorids, with the greenbottle blowfly (Lucilia sericata) being the most widely used species. Sterile larvae of the common green bottle, Lucilia sericata, have been shown to be a highly cost-effective alternative to conventional treatments for the debridement and cleansing of all types of chronic wounds. Sterilization techniques used to prepare maggots include utilization of ultra-violet C (UVC) and maggot sterilisation with disinfectants. Egg sterilisation with UVC had the lowest hatching rate (16+/-0.00%) while egg sterilisation with disinfectants showed high hatching rate (36.67+/-4.41%) but low maggot survival rate (31.67+/-1.67%). Sterilization of the maggots has been found to be most suitable. Maggots are less commonly used in traumatic injuries, although in these wounds their remarkable wound cleansing properties could be of considerable value. Up to 1000 maggots are introduced in the wound and left for 1 to 3 days. MDT could be used for any kind of purulent, sloughy wound on the skin, independent of the underlying diseases or the location on the body for ambulatory as well as for hospitalized patients.

Clinical applications of maggot debridement therapy

When modern medicine fails, it is often useful to draw ideas from ancient treatments. Debridement is an essential component of wound care as the presence of devitalised tissue can impede the healing process. The therapeutic use of fly larvae to debride necrotic tissue, also known as larval therapy, maggot debridement therapy or biosurgery, dates back to the beginning of civilization. The medicinal use of maggots for the biological debridement of chronic wounds is increasing around the world, due to its efficacy, safety and simplicity.

The most common indications for using maggot therapy were to effect debridement and control infection, especially if the wound failed to respond to conventional medical and/or surgical therapy. The nature of the antibacterial materials extracted from maggots not only indicates their ability to ingest the necrotic tissue on the wound, but also their potential significance in wound healing. With Maggot Debridement Therapy, the offensive odour emanating from the necrotic tissue and the intense pain accompanying the wound decrease significantly.

The commonest application of maggots is once or twice, and since one set of maggots are in place for 3-4 days, this means that for many patients, the treatment was complete in just 1 week or a little over. Up to 1000 maggots are introduced in the wound and left for 1 to 3 days. A higher number of maggots are needed not only for a larger wound or a wound with a higher percentage covered with slough, but also for a wound infected with gram-negative bacteria. Maggots are either allowed as free range in the wound or contained. With the free-
range technique, the mean number of maggot applications and the total number of maggots per treatment have been found to be significantly lower than with the contained application technique. The mechanisms by which maggots enhance tissue formation within wounds may be via the promotion of fibroblast motility, acceleration of extracellular matrix remodeling and coordination of cellular responses. Maggots cause wounds to become alkaline and in this way diminish growth of pathogenic bacteria. Maggot Debridement Therapy has led to massive growth of granulation tissue and microbiological cleaning of the wounds. The beneficial effects of maggots on chronic wounds may be explained in part by inhibition of multiple pro-inflammatory responses of activated neutrophils by Excretion/Secretion (ES). Cambal et al. observed that maggot therapy was more effective and efficient in debriding non-healing leg ulcers than a conservative treatment and another report also reveals that maggot treated wounds follow the normal phases of wound healing. A single maggot has been found to be capable of debriding approximately 0.15 g of dead tissue per day with application intervals of 4 days being more appropriate than those of 3 days. The nature of the antibacterial materials extracted from maggots not only indicates their ability to ingest the necrotic tissue on the wound, but also their potential significance in wound healing. Maggot Debridement Therapy has been found to be of great help in the management of many types of wounds. Maggot therapy was more effective and efficient in debriding chronic pressure ulcers than were the conventional treatments. The potential benefit of Maggot therapy has been highlighted in diabetic wound care in developing countries and has been proved to be a rapid, simple and efficient method of treating the ulcers. Maggot debridement therapy reduces short-term morbidity in non-ambulatory patients with diabetic foot wounds. Successful maggot treatment of chronic foot ulcer has been reported with its effectiveness in many chronic wound in Spain. Maggot therapy has been used in locations—e.g. perineal—which are difficult to provide with hydrocolloid wound dressings. In Gynaecological practice maggots can clear wounds of staphylococci and streptococci populations, are successful in wounds caused by radiation therapy and can be used after chemotherapy. Maggot therapy has also been successfully used in the debridement of a severely infected wound after forearm replantations as well as in necrotizing fascitis. Fewer amputation and more antibiotic free days were observed in "lower-extremity hospice" wound care with the use of maggots. In certain clinical situations, such as eliminating methicillin-resistant Staphylococcus aureus, larval therapy is considered to be a proven alternative in modern wound management. Presurgical MDT was effective in preparing the wound bed for surgical closure, without increased risk of post surgical wound infection.

Complications of maggot therapy.
Patients readily accepted maggot therapy, and adverse events are uncommon. Noted drawbacks include the time and effort needed to train personnel and convince administrators of the need for treatment. Although pain has been a topic of some controversy in the use of MDT (and this occurs as a result of crawling of maggot over the wound), a study has shown that 78% of patients pain can be adequately treated with analgesic therapy and where associated pain is unmanageable in the outpatient department, hospital admission, using the contained method of application or, in the worst case scenario, cessation of treatment has been suggested. A standardised but individually tailored pain management protocol is mandatory. Most of the few patients who had increased pain while on MDT in a study wanted to continue the treatment because of subjective and objective visual improvement in wound debridement. Tickling irritation, rejection due to some psychological disturbance by some patients,
are some of the drawbacks of this method of wound care.

CONCLUSION
Maggot therapy is a cheap, safe and highly effective treatment of wounds and patients' acceptance is very high and psychological stress has been rare\textsuperscript{15}. Although initially repellent, larval therapy is acceptable once treatment starts. The nurse-patient relationship was a significant factor in acceptance, along with autonomy and informed choice\textsuperscript{40}. Maggot Debridement Therapy is therefore a method of wound care that should have relevance in developing and poor countries where patients present with severe and neglected chronic wounds which often result in amputation. This cheap method of wound debridement is also very relevant as most of the patients are poor and tend to have prolonged wound dressing period with absenteeism in their various jobs and attendant economic loss.

References
A review of tobacco-related diseases in Africa
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Abstract

Objective: To highlight the problem of tobacco and tobacco-related disease which has reached alarming proportions on the African continent.

Methods: A literature search on tobacco and tobacco-related disease in Africa was carried out through the internet (Medline) and locally. Data synthesis was carried out and synchronized under the headings: introduction, tobacco-related disease, and recommendations.

Conclusion: Diseases such as chronic obstructive lung disease, lung cancer, chest infections, hypertension, atherosclerosis, stroke and ischaemic heart disease (among others) have been on the increase due to the increasing smoking rate on the continent. Smoking also worsens the degree of poverty of the individual smoker in an already impoverished African setting. But tobacco-related diseases are eminently preventable, hence African governments, legislators, health-care providers, sociologists, teachers, community and religious leaders need to work together with strong determination to prevent and control this man-made killer.

Keywords: Tobacco-related disease, Africa, review

Introduction

Tobacco (Nicotiana tabacum) has been grown in Africa for over three centuries after its introduction to the continent by white explorers, and by the year 1993, about half of a million tons of tobacco were grown in 33 African countries with only 2 countries exporting more than they import1. It is used by people either as raw tobacco (licking chewing or smoking) or the processed tobacco in the form of cigarettes, cigars, pipes and snuff. The most common form of tobacco use is cigarette smoking. Cigarette smoke contains over 4000 chemical compounds comprising both gaseous and particulate phases2. The gaseous phase includes carbon monoxide (CO), ammonia, dimethylnitrosamine, formaldehyde, hydrogen cyanide and acrolein, while the particulate phase includes the addictive drug nicotine, tar, the sticky brown substance condensing out of tobacco, and many chemicals including benzene and benzo(a) pyrene2. While nicotine, tar and CO are the most outstanding in causing disease, about sixty other substances present mainly in tar (including benzo(a) pyrene and dimethylnitrosamine) have been shown to be carcinogenic2.

While the high prevalence of cigarette smoking is on the decline in the more technologically advanced parts of the world, the relatively low prevalence in the developing countries is on the increase. For example, in the United States of America, smoking rate declined from a peak of 53% in men and 34% in women to 33% and 28% respectively in 19854, while a survey in Nigeria (the most populous country in Africa) found a prevalence rate of 24.4% in males and 6.7% in females3. In 1976, a study at the University of Lagos, Nigeria showed that about three quarters of male and one quarter of female medical students were tobacco users5. More recent studies (2003) in the general Nigerian population have revealed smoking rates of 17.6% among rural dwellers in South West Nigeria, and 7.7% among young female secondary school students in South Eastern Nigeria6.

Among patients attending the chest clinic of Ladoke Akintola University of Technology Teaching Hospital, Osogbo, also in Nigeria, Tanimowo found that 19.2% of them were ex-smokers7. Studies from Zambia also show that
tobacco and alcohol are the most commonly abused substances by students. Environmental tobacco smoke (passive smoking) also constitutes an important health hazard in Africa, and this has necessitated legislation against smoking in public places in some countries, e.g. Nigeria.

**Methods**

A literature search on tobacco and tobacco-related disease in Africa was carried out through the internet (Medline) and locally. Data synthesis was carried out and synchronized under the headings: introduction, tobacco-related disease and recommendations.

**Tobacco-related diseases**

Tobacco can adversely affect virtually all the systems of the body (Table 1). It is now the most important preventable cause of premature death, and it has been estimated that it kills more people than AIDS, alcohol, drug abuse, car crashes, murders, suicides and fires (all combined) in the USA.

**Lung diseases:**

**Chronic Obstructive Pulmonary Disease (COPD):** Cigarette smoking is the most important (and preventable) aetiological / risk factor for COPD, a condition that is fairly common on medical wards in Africa. At our center, 76.5% of the patients with COPD had smoked cigarettes before presentation at the chest clinic. At the moment, COPD is the sixth leading cause of death and the 12th leading cause of morbidity worldwide. It has been projected that COPD will be the 3rd leading cause of death and the 5th leading cause of morbidity by the year 2020. Increased prevalence of smoking worldwide corresponds with the observed global increase in the prevalence of COPD.

**Lung cancer:** Cigarette smoking is the most important (and preventable) aetiological / risk factor for the development of lung cancer worldwide. Lung cancer, with its attendant poor prognosis also affects Africans, and the incidence will increase with the rise in smoking rate.

**Chest infections:** Pneumonia already constitutes a very significant proportion of the respiratory diseases for which patients attend hospitals in Africa, and cigarette smoking can contribute to the lowering of the body immunity, thereby resulting in increased susceptibility to infection. Legionnaire’s disease has been found to occur more commonly in smokers than non-smokers. Increased susceptibility to pulmonary tuberculosis (a disease already in epidemic proportions in Africa due to the HIV pandemic is also a possibility).

The synergistic effect of both HIV infection and smoking on the development of more severe respiratory diseases portends a gloomy picture for Africans. Other forms of interstitial pneumonias associated with cigarette smoking include desquamative interstitial pneumonia, respiratory bronchiolitis - associated interstitial lung disease and pulmonary Langerhans cell histiocytosis (eosinophilic granuloma or pulmonary histiocytosis).

**Cardiovascular diseases**

**Hypertension:** This is the most common non-communicable disease seen in most African countries. It is the commonest cause of heart failure in Nigeria, and it is also one the commonest risk factors for stroke. Its prevalence in the adult in Nigeria is about 20 percent and in Ghana up to 34.4% has been reported.

Smoking is one of the major risk factors for cardio-vascular disease (CVD) used for risk stratification and consequently one of the factors influencing prognosis in hypertension. Both cigarette smoking and hypertension are

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Table 1: Tobacco-related diseases according to body system
<table>
<thead>
<tr>
<th>Body System</th>
<th>Tobacco-related disease</th>
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<tbody>
<tr>
<td>Respiratory System</td>
<td>- Chronic Obstructive Pulmonary Disease</td>
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<tr>
<td></td>
<td>- Lung Cancer</td>
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<td></td>
<td>- Cancer of the pharynx</td>
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<td></td>
<td>- Pneumonia ( Infective)</td>
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<td></td>
<td>- Tuberculosis</td>
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<td></td>
<td>- Desquamative Interstitial Pneumonia (DIP)</td>
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<td></td>
<td>- Respiratory bronchiolitis-associated interstitial lung disease (RB-ILD)</td>
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<tr>
<td></td>
<td>- Pulmonary Langerhans Cell histiocytosis (PLCH) or eosinophilic granuloma or pulmonary histiocytosis.</td>
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<tr>
<td>Cardiovascular System</td>
<td>- Hypertension</td>
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<td></td>
<td>- Atherosclerosis</td>
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<tr>
<td></td>
<td>- Ischaemic heart disease (angina pectoris and myocardial infarction)</td>
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<td></td>
<td>- Peripheral vascular disease</td>
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<td></td>
<td>- Aneurysms</td>
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<tr>
<td>Gastro-intestinal System</td>
<td>- Peptic ulcer disease</td>
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<td></td>
<td>- Cancer of lip, oral cavity, oesophagus, pancreas</td>
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<td></td>
<td>- Gall stones</td>
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<td></td>
<td>- Cholecystitis</td>
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<tr>
<td>Central Nervous System</td>
<td>- Stroke</td>
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<td>Renal System</td>
<td>- Renal cell carcinoma</td>
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<td></td>
<td>- Bladder Cancer</td>
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<tr>
<td>Reproductive System</td>
<td>- Premature labour</td>
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<tr>
<td>(Female)</td>
<td>- Small for age babies</td>
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<tr>
<td></td>
<td>- Premature rupture of membranes</td>
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<td></td>
<td>- Abruptio Placentae</td>
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<td></td>
<td>- Spontaneous abortion</td>
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<td></td>
<td>- Cervical cancer</td>
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<tr>
<td>Reproductive System</td>
<td>- Impotence</td>
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<tr>
<td>(Male)</td>
<td>- Senile Cataracts</td>
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<td></td>
<td>- Macular degeneration</td>
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<tr>
<td>Eyes</td>
<td>- Osteoporosis</td>
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<tr>
<td>Bones</td>
<td>- Wrinkling</td>
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<tr>
<td>Skin</td>
<td>- Platelet aggregation</td>
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Tanimowo: Tobacco related diseases in Africa
The relationship between blood pressure and risk of cardiovascular disease (CVD) events is continuous and consistent. The higher the blood pressure, the greater the chance of myocardial infarction, heart failure, stroke and kidney disease\(^2\).

A multiplicative interaction exists between cigarette smoking and other CVD risk factors such that the increment in risk produced by smoking among patients with hypertension or elevated serum lipids is substantially greater than the increment in risk produced by smoking for individuals without these risk factors\(^2\).

**Stroke and ischaemic heart disease:** Cigarette smoking predisposes people to atherosclerosis, and platelet aggregation with vascular occlusion, which in turn are common risk factors for stroke and ischaemic heart disease\(^2\). The incidence of stroke and ischaemic heart disease will rise with increased smoking rate. Other vascular diseases related to smoking are peripheral vascular disease\(^2\) and aneurysms\(^2\).

**Others**

Smoking is associated with many other diseases including: renal cell carcinoma, bladder cancer, peptic ulcer disease, cancers of lip, oral cavity, pharynx, oesophagus, pancreas, liver and stomach, gallstones and cholecystitis in women. Others are: reproductive abnormalities (e.g premature labour with attendant high perinatal mortality, small for age babies, premature rupture of membranes, abruptio placentae, placenta praevia, spontaneous abortion, cervical cancer, and male impotence), senile cataracts, macular degeneration, osteoporosis and wrinkling of skin\(^2\).

Cigarette smoking also worsens the poverty of individual smoker in an already impoverished African setting. The little money available (very low per capita income) which should be used to improve nutrition, education and general wellbeing is burnt out in cigarettes, thereby enhancing the vicious circle of ignorance, poverty, and disease\(^2\). Smoking is generally commoner among the low socio-economic class\(^2\).

Most developing countries are already under the yoke of malnutrition, poverty, ignorance, and infectious diseases, especially malaria, tuberculosis and more recently the HIV/AIDS pandemic. Tobacco-related diseases are eminently preventable, and this can be achieved by discouraging smoking i.e. not starting the habit at all or smoking cessation.

**Recommendations**

The numerous tobacco-related diseases affecting Africans is a clarion call for a serious and urgent action to avert possible epidemic of such diseases. The following steps are hereby recommended:

I. Government political will is very important in African countries where a huge tax is realized from cigarette-manufacturing companies. It must be realized that the huge tax will eventually be mopped up by labour loss and huge health costs which will accompany an epidemic of tobacco-related disease.

II. The tax on tobacco products can be increased thereby automatically increasing the retail price.

III. Advertising of tobacco products should be discouraged on both print and electronic media. If it must be done on the electronic media, let it be after children have gone to bed at night, and it should carry a warning that tobacco is injurious to health.

IV. Legislation should be made and enforced against smoking in public offices to prevent passive smoking and also against child smoking and selling cigarettes to children.

V. Tobacco cessation clinics should be set up in African countries, so that people who are already indulging in the habit can stop.

VI. Health education of the community through the use of the print and electronic media, bill boards, posters, lectures and cinemas in schools, churches, mosques and market places on the harmful effects of smoking should be embarked upon.
VII. Since about 90% of individuals who will become cigarette smokers usually start the habit during adolescence (<18 years of age), and the habit is also commoner among manual workers and the low socio-economic class,76 preventative strategies should have them in focus.

VIII. Health-care providers, parents and guardians should set the example by not smoking.

IX. A multidisciplinary specialist approach towards the prevention and control of cigarette smoking is likely to yield highly satisfactory results. Teachers, sociologists, physicians, obstetricians, paediatricians, community health physicians, psychologists, psychiatrists and general practitioners should be involved.

References

10. American College of Chest Physicians. COPD symposium: Into the New Millenium. Chest. May 2002; 121 (S suppl.)
Primary angiosarcoma of the breast: A case report and review of the literature

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Introduction
Angiosarcomas are uncommon malignant neoplasms characterized by extensively infiltrating anaplastic cells derived from blood vessels and lining irregular blood filled spaces (sinusoids). Primary angiosarcoma of the breast is a rare aggressive tumour of unknown etiology and may be difficult to diagnose. We present a case to illustrate the difficulty in diagnosis and the effect of this on the prognosis of the disease.

Case report
A 22 year old student presented at the surgical outpatient unit of LAUTECH Teaching Hospital, Osogbo, Nigeria with a right breast mass of 8 months duration. The swelling slowly but progressively increased in size with no nipple discharge. An excision biopsy of the mass done 9 months earlier in another centre suggested capillary haemangioma. Examination revealed a young lady apparently looking healthy. The left breast was normal but the right showed a circum-areola scar with a purplish lesion in the inferior and lateral aspects of the breast. There was a satellite nodule on the edge of the previous scar (Fig.1). An impression of recurrent haemangioma was made.

Breast ultrasonography revealed multiple hypoechoic solid masses of various sizes in the subcutaneous region of the areola and the outer quadrant. Colour flow Doppler study showed multiple vessels within and surrounding the masses but with no detectable increase of blood flow when compared to the normal left breast.

Fine needle aspiration for cytology report suggested recurrent haemangioma. Excision biopsy with nipple preservation was repeated; histology report still came as haemangioma.

She reported back with recurrence and profuse bleeding 6 months after this and had an emergency excision with parascapular fasciocutaneous flap and skin grafting of the defect. Histology then showed grade 1 angiosarcoma.

She developed left hemiparesis ten days post operatively and had a brain computerized tomography scan which revealed multiple brain metastases to the cerebrum (Fig. 2). She was commenced on tablet of Dexamethasone 8mg three times daily while being worked up for palliative chemotherapy. She died three days later following a generalized tonic clonic seizure.
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Discussion
Angiosarcoma are rare breast tumours. They represent a heterogeneous group of malignant vascular tumors occurring in different anatomic sites. In the female breast, they account for less than 1% of all malignant tumors and mainly develop as secondary angiosarcomas after prior irradiation. Primary angiosarcoma of the breast is very rare though many cases of angiosarcomas following mastectomy and irradiation have been reported. This should be differentiated from Stewart-Treves syndrome which is a lymphoedema-associated angiosarcomas and usually developing in female patients after mastectomy and axillary lymph node dissection. Studies have shown that angiosarcoma of the female breast represents a genetically heterogeneous tumour entity without a readily identifiable pattern of common chromosomal alterations. A frequent clinical presentation is a painful palpable smooth mass or diffuse enlargement of the breast without a palpable mass but with purple discoloration of the overlying skin. They are aggressive and tend to recur locally, spread widely, with lymph node and systemic metastases associated with a high rate of tumour related deaths. These features are consistent with the clinical history of the patient in the present report.

Difficulty in making a diagnosis in angiosarcomas of the breast have been reported and the need for an extreme caution in the interpretation of histological characteristics of all palpable vascular tumours of the breast is emphasised. Difficulty in making a definitive diagnosis based on cytological examination alone has been stressed; and that histology, supported by immunohisto-chemical studies, helps in arriving at the diagnosis.

All angiosarcomas tend to be aggressive and are often multicentric. Treatment is therefore difficult. Complete surgical excision is mandatory. Even then, prognosis is poor as exemplified by this case. Treatment is now standardized with radical mastectomy associated with adjuvant chemotherapy especially paclitaxel and docetaxel and radiotherapy for grade 2 or poorly differentiated tumours. Angiosarcomas often recur after surgery; chemotherapy, radiotherapy, and targeted therapy against tumour biological properties may be a new approach to treatment. Among sarcomas, angiosarcoma was the only histologic type significantly associated with a poorer outcome in a multivariate analysis with a ten year overall survival rate of 80% in low grade tumours and 20% for high grade tumours.

The need for extreme caution in the interpretation of the histological characteristics of all palpable vascular tumours of the breast is emphasised. Vascular lesions of the breast must be thoroughly investigated before they can be described as benign. This will help in early diagnosis and reduce the mortality that accompanies angiosarcoma of the breast.

References


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