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COLLEGE OF HEALTH SCIENCES,
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# THE TROPICAL JOURNAL OF HEALTH SCIENCES

Official Publication of the College of Health Sciences, University of Ilorin



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The Tropical Journal Of Health Sciences (TJHS) is an international journal which provides a forum for exchange of ideas among those who are engaged in the Health Science and related fields. The Journal intends to publish high quality papers on original research, case reports, short communications, commentary, review articles, editorials, correspondence and book reviews. TJHS is an official organ of the College of Health Science (A WHO Collaborating Center for Research and Manpower Development), University of Ilorin, Ilorin, Nigeria and will also serve as a medium for disseminating information on the activities of the College.

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THE TROPICAL JOURNAL OF HEALTH SCIENCES

Volume 23 Number 1 January, 2016

# CONTENTS

Editorial comments ____ v

**Research papers**

Prevalence and Correlates of Dementia and Depression in Geriatric Patients Admitted into Non-psychiatric wards of University of Ilorin Teaching Hospital, Ilorin.
O.A. Adegunloye, O.A. Abiodun, A.K. Oladosu, E.P. Fabiyi, A.B. Omotosho, S.A. Adepoju, T.A. Mohammed ____ 1

Electrolyte Profile of Epileptic Patients on Carbamazepine Monotherapy
R.O. Ayanniyi, S.A Biliaminu, K.W. Wahab, E.O. Sanya, M. Ighodalo, S.A. Oyeleke, M.O. Ologe ____ 08

Relationship Between Glycaemic Control And Hypertension In Nigerian Type II Diabetic Patients Attending The Medical Outpatient Clinics, U.I.T.H. Ilorin.
I.M AbdulAzeez, A.B Okesina, S.A. Adebisi, A.A Akande, 1S.A Biliaminu, A. Nyamngee Y.B Tijani ____ 12

Prevalence Of Human Immunodeficiency Virus & Hepatitis B Virus Co-Infection In A Population Of Apparently Healthy Pregnant Women In University Of Ilorin Teaching Hospital, Ilorin
A.O. Ogunlaja, A.A. Fawole, M.O. Bojuwoye, A. Idowu, I.P. Ogunlaja ____ 17

Effect Of Unfermented *Pakia biglobosa* Seeds On Calcium And Lipid Levels And Pain Perception In Adult Male Wistar Rats
A.L. Oyewole, V. O. Adeyinka, S. B. Kayode, and B. V Owoyele ____ 20

Cross- Sectional Survey Of School Teachers Knowledge Of Ebola Virus Diseases In Ilorin
M.B. Abdulkadir, Z.A. Abdulkadir, R.M. Ibraheem, J.K. Afolabi ____ 27

**Case Report**

Image-Guided Cervical Epidural Steroid Injections For Cervical Radicular Pain: Reports of Two Cases.
Z.A. Suleiman, I.K. Kolawole, O. Abe, O.A. Soyannwo ____ 31

# EDITORIAL COMMENTS

This issue of Tropical Journal of Health Sciences for January 2016 contains articles and case report of clinical information and basic research studies. It will therefore satisfy various interests in the College and others from far and wide.

The first article was a report of a study on the prevalence of dementia and depression among geriatric in-patients in non-psychiatric wards of a Teaching Hospital. Seventy-two elderly ill in-patients were recruited into the study. The prevalence of dementia and depression were 8.3% and 16.7% respectively. The study recommends the use of simple screening instruments to detect psychiatric co- morbidities in non-psychiatric units as well as the need for collaboration between specialists to provide holistic care for patients.

Another article investigated the effects of long term use of carbamazepine on serum concentrations of calcium, magnesium, inorganic phosphate and alkaline phosphatase in complex partial and generalized tonic-clonic seizure patients. They observed in the control group, that serum concentration of calcium was strongly correlated with concentration of magnesium, alkaline phoshatase and inorganic phosphate. This linearity was lost completely in epileptic patients on carbamazepine. An increase in serum calcium, alkaline phosphatase, magnesium and a decrease in inorganic phosphate were found in epileptic patients on carbamazepine monotherapy. Further studies preferably multicentre, with more patients is required to justify routine measurements of these electrolytes during long term use of Carbamazepine.

High prevalence of hypertension among diabetic patients is a well established phenomenon. An attempt to explain this using level of glycaemic control failed when this was investigated among patients attending the outpatients department of our Teaching Hospital. Correlation study showed no statistical significant relationship between blood pressure and levels of glycaemic control.

Using animal model, effects of *Parkia biglobosa* seed (commonly used as seasoning for traditional soups in the west coast of Africa), on serum calcium, lipid profile, pain and anxiety related behaviour were studied. Lipid profile showed a significant ($p<0.05$) reduction of LDL cholesterol, total cholesterol, triglycerides and significant ($p<0.05$) elevation in HDL cholesterol in all the treated groups compared with the control. Serum $Ca^{2+}$ level was also significantly ($p<0.05$) increased in the treated group compared to the control and there was significant ($p<0.05$) decrease in reaction time to pain, in the pain related behavioural study.

Infections of both of Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) are very important in clinical practice. When both are present in a patient, their synergistic effects create greater challenge to health care providers and should be detected early. The prevalence of such co-infection was reported in this issue. They found 12.7% of healthy pregnant women studied to be seropositive for HBV, 8.9% were positive for HIV, while only 1.7% of pregnant women had HBV/HIV co-infection.

The article on Ebola Virus Disese (EVD) , examines the knowledge of school teachers in some parts of Nigeria about the disease. Majority (87.6%) of the teachers recognized close contact with an infected person as a method of transmission. Most (68.5%) of the teachers were able to correctly identify six or more common symptoms of EVD. Over 70% of the teachers recognized the need to isolate suspected/ confirmed cases, frequent hand washing with use of hand sanitizers as effective strategies for the prevention of EVD. They conclude that, school teachers in the current study have a good knowledge of EVD and strategies for its prevention.

Prof A.B. Okesina
Editor in Chief

# Prevalence and Correlates of Dementia and Depression in Geriatric Patients Admitted into Non-psychiatric wards of University of Ilorin Teaching Hospital, Ilorin.

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**Abstract**

With aging comes the risk of multiple health problems. Psychiatric morbidities among the physically ill elderly patients have been largely undetected and under - reported with a consequence of increased hospitalization and poorer outcomes.

The aim of this study was to study the prevalence of dementia and depression among geriatric in-patients in non-psychiatric wards of a Teaching Hospital. A cross-sectional hospital based design was adopted, in which all consenting elderly in-patients in all the various non-psychiatric wards of the University of Ilorin Teaching Hospital (U.I.T.H) within a six-month period were assessed using a proforma for sociodemographic variables; depression was assessed by the 15-item Geriatric Depression Scale (GDS), (depression was regarded as present with a GDS score of $\geq$6). Cognitive impairment was assessed with the modified Mini Mental State Examination (MMSE) schedule, with a score of $\leq$13 indication presence of dementia syndrome.

Seventy-two elderly ill in-patients were recruited into the study. The prevalence of dementia and depression were 8.3% and 16.7% respectively. Having a dead spouse was the only sociodemographic variable found to be significantly associated with dementia. Neither chronic pain nor sensory deficit, psychoactive drug use, duration of illness, living alone and feeling lonely, were significantly associated with presence of depression or dementia.

This study has shown the need for holistic care of elderly physically ill patients, and recommends the use of simple screening instruments to detect psychiatric co- morbidities in non-psychiatric units as well as the need for collaboration between attending physicians and psychiatrists in order to achieve holistic care for geriatric patients.

**Key words:** Dementia, Depression, Elderly In-patients, Non-psychiatric Wards

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## Introduction

The phenomenon of aging is now of global importance, particularly in the health sector, as the advances in medical sciences have improved life expectancy.[1-3] Studies have reported that aging is an important determinant of psychiatric illness.[4,5] With aging, there are peculiar problems and the elderly are more at risk of developing both physical and psychological health problems due to age-related factors and changes in their social circumstances and expectations.[6-8]

The link between physical health and mental health has been well established, as people having serious and/or chronic physical health conditions are at a higher risk of developing psychological disorders than the general population[9] while those with chronic or serious mental disorders are also more likely to have chronic physical illnesses like hypertension and diabetes mellitus. They are also more likely to complain of chronic pain.[9-13]

Some studies have found that the prevalence rate of psychiatric co-morbidities range from 10%-52.5%.[2,4,6,14-19] These variations may be due to the study definition and methodology used.

Psychiatric morbidity may go unrecognized or untreated in the elderly physically ill patients, which may leave them more functionally disabled and increase their hospital utilization as well as leaving them with a poorer prognosis.[1,6,12,19,20]

In spite of the fact that most of the psychopathology in the physically ill elderly patients are amenable to pharmacological and psycho-therapeutic interventions, a large proportion of them with psychiatric co-morbidities, most especially in the developing countries (including Nigeria) remain undetected. Only about 2.8%-6% of these patients are recognized by their attending physicians as having psychiatric co-morbidities and their mental health needs thus remain largely unmet.[6,18]

Recognizing psychiatric morbidity such as Depression and Dementia among physically ill elderly patients may be challenging in that the symptoms may present in an unusual manner or it may be masked or at some other times, it may mimic the symptoms of a physical disorder. Thus, it may go undetected by the attending physician and if detected, it may not be adequately treated.[1,6,12,19,20] Factors that may hinder the diagnoses of psychiatric morbidity in the physically ill elderly patient include the pressure of time for the

attending physician, ignorance about psychiatric illness in old age, poor knowledge and clinical skill, as well as the issue of stigma.[21,22]

Depression has been reported to be the most frequent cause of emotional suffering in the elderly physically ill patients and it has been linked with comorbidity in physical illnesses such as, stroke, myocardial infarction, and diabetes mellitus.[19,21,23,24]

Depression is known to impact negatively on social and cognitive functions of the elderly. Furthermore, the reduction of energy level which occurs in depression may also negatively impact on their motivation in adopting a healthy lifestyle and medication adherence which may worsen their health outcome.[1,9,19,26] Psychiatric morbidity in the physically ill elderly patient reduces the quality of life and has a serious health cost implication.[9,19,25]

The current paucity of data in most developing countries, including Nigeria, makes planning and allocation of scarce resources difficult to adequately meet the health needs of the elderly within the population. The purpose of the present study was to assess the prevalence and pattern of depression and dementia in geriatric in-patients on non-psychiatric wards of a University Teaching Hospital, in order to improve the clinical care of the elderly inpatients in the hospital.

**Materials and Methods:**

The study population consisted of all consenting physically ill elderly inpatients in all the non-psychiatric wards (medical, surgical and gynecological wards) of University of Ilorin Teaching Hospital (U.I.T.H), Ilorin seen over a six-month period. Ilorin is the capital of Kwara state, one of the 36 states in Nigeria and located in the north central zone. The state has a population of about 2.3 million.[29] U.I.T.H is a major specialist centre for the state as well as five other adjoining states. All the various departments have a complement of attending consultants and trainee physicians (resident doctors) at various levels of postgraduate medical training, who daily see to the clinical care of the patients.

Ethical approval of the study was obtained from the ethical committee of the hospital. The inclusion criteria for the study included being aged $\geq$60 years, having good verbal communication skills and the presence of reliable informant(s), while the exclusion criteria included failure to give consent, being too physically ill to be interviewed as well as patients on drugs (e.g. Diazepam), which could alter their cognitive functions.

Psychiatric assessment on the patients was conducted at least 3 days after their admission into the hospital (this was to allow them to adjust to the prevailing ward conditions)[1]. A trained research assistant (resident doctor) explained the purpose of the study to them and obtained informed written consent. This was followed by the administration of (1) the proforma (covering sociodemographic and clinical variables such as, age, sex duration of illness, presence of sensory deficits, etc.). (2) The Mini Mental State Examination (MMSE) schedule using the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) adapted interpretation of a cutoff point of $\leq$ 13 which indicates the prescence of dementia in our environment,[30] and (3) The Geriatric Depression Scale (GDS – short form) was used to assess for depression. It has been used in previous studies in Nigeria, and it is a modification of the Original 30-item questionnaire. The 15 item GDS – short form has been found to have the same psychometric properties as the full 30 item version. A cutoff score of 6 or more on the GDS (short form) has been recommended for our environment[27]. At this cutoff scores, the performance of GDS (short form) has been found to be similar to those of Montgomery and Asberg depression rating scales[27]. (4) The case notes of the patients were later retrieved and relevant clinical details extracted.

**Data Analysis**

Data analysis was done using SPSS Version 20.[31]Simple frequency tables and cross tabulations were generated and compared.

**Results**

The study included a total of 72 in-patients who met the set criteria. There were 40 (55.6%) males and 32 (44.4%) females. Most of the participants were in the age group 60 – 75 years (n=58, 80.6%). Majority had their spouses alive (n=48, 66.7%) and also had some formal education, (n=47, 62.5%). Only a few of the participants were retired (n=29, 40.3%), lived alone (n=10, 13.9%), while some felt lonely (n=8, 11.1%); most of the participants had the duration of their illness spanning 1 to 26 weeks (n=66, 91.7%). Psychoactive drugs (e.g. cigarettes, alcohol, etc.) were used by 12 in-patients (16.7%) (Table 1).

**The Prevalence of Dementia and Depression**

Dementia was shown to be present in 6 of the patients (8.3%) while 12 patients (16.7%) had depression using the modified MMSE and GDS (short form) respectively ( Table 2).

This study did not find any significant association between the modified MMSE Scores and the clinical and sociodemographic variables studied except for physically ill elders who had lost their spouses (OR=0.081, CI=0.009-0.739) (Table 3). Although not statistically significant, there was a trend for those aged $\geq$76 years to be more likely to be cognitively impaired; so also were females, those

**Table 1: Sociodemographic characteristics of the physically ill elderly patients.**

| | | |
|---|---|---|
| **Age** | | |
| – 75 | 58 | 80.6% |
| ≥76 | 14 | 19.4% |
| **Gender** | | |
| Female | 32 | 44.4% |
| Male | 40 | 55.6% |
| **Spouse Status** | | |
| Alive | 48 | 66.7% |
| Dead | 24 | 33.3% |
| **Level of Formal Education** | | |
| Non-Educated | 45 | 48.9% |
| Educated | 47 | 51.1% |
| **Occupational Status** | | |
| Retired | 29 | 40.3% |
| Still Working | 43 | 59.7% |
| **Live Alone** | | |
| Yes | 10 | 13.9% |
| No | 62 | 86.1% |
| **Feel Lonely** | | |
| Yes | 8 | 11.1% |
| No | 64 | 88.9% |
| **Chronic Pain** | | |
| Present | 19 | 26.4% |
| Absent | 53 | 73.6% |
| **Sensory Deficit** | | |
| Yes | 5 | 6.9% |
| No | 67 | 93.1% |
| **Psychoactive Drug Used** | | |
| Yes | 12 | 16.7% |
| No | 60 | 83.3% |
| **Duration of Illness in weeks** | | |
| 1 – 26 | 66 | 91.7% |
| ≥27 | 6 | 8.3% |

without formal education, those still in active service, those who lived alone, those who felt lonely and those with sensory deficit.

There were no statistically significant associations found between the GDS-SF scores and the clinical and sociodemographic variables investigated, (Table 4). However, there was a trend for slightly more males than females to be depressed, so also were those without a living spouse, those with formal education, those still actively working, those who lived alone and those who felt lonely. Furthermore, there was a trend for those with chronic pain, sensory deficit, those who used psychoactive drugs and those who scored ≤13 on the modified MMSE to screen positive for depression, although, these were not statistically significant

## Discussion

This was a hospital based, descriptive study which sought to determine the prevalence of dementia and depression and their sociodemographic correlates among the physically ill elderly in-patients on non-psychiatric wards of a tertiary hospital. The prevalence

**Table 2: Dementia and Depression are indicated by the Geriatric Depression Scale (Short form) and the modified Mini Mental State Examination schedule.**

| MMSE | Number | Percentage |
|---|---|---|
| ≤13 (Dementia) | 6 | 8.3% |
| > 13 (Normal) | 66 | 91.7% |
| **GDS** | | |
| < 6 (Normal) | 60 | 83.3% |
| ≥6 (Depression) | 12 | 16.7% |

of dementia and depression were 8.3% and 16.7% respectively.

The finding of a prevalence rate of 8.3% for dementia in this study is higher than the rates obtained from previous studies in Nigeria. Two previous studies from western Nigeria reported prevalent rate of 1.35% to 2.29% for dementia.[32,33] While a study from eastern Nigeria reported a prevalence rate of 3%[6]. Another study from northern Nigeria reported a prevalence rate of 2.79% for dementia.[34] Furthermore, the finding of a prevalence rate of 16.7% for depression in this study is lower than the prevalence rate of 24% found in a study from eastern parts of Nigeria[24], although higher than the 7.4% rate found among the Yorubas in western Nigeria.[28]

These differences may be explained by the variations in measures taken and instruments used as well as patients studied (i.e. psychiatric and non-psychiatric patients, in-patients and out-patients, etc.)[32,33]and the prevailing cultural context[35,36]. The findings from this study supports the report of a high prevalence of psychiatric morbidity being unattended to in the physically ill elderly patients in non-psychiatric units[6]. The study also supports earlier findings of no significant association with most sociodemographic variables.[27,28] The only sociodemographic variable that showed a significant association in this study was loss of spouse among physically ill elderly patients with dementia. This finding, though interesting, calls for further studies.

The male gender was slightly over represented with a male to female ratio of about 1.2:1. This is similar to what had been reported in a previous study in the country[28] with the possible explanation being that Nigerians may have the tendency to take their male patients to the hospital so that they may recover quickly and resume their role of socio-economic importance to the family[6]. It has also been indicated that it may not be culturally prudent to expose women unduly to situations outside the home.[6,27] Though not statistically significant, the age group above 75 years were more likely to screen positive for dementia. This is not surprising as the prevalence rate for dementia is known to rise with age.[37,38] Although not statistically significant, elderly patients whose spouses were dead

**Table 3: Relationship between Mini Mental State Examination (MMSE) schedule and sociodemographic /clinical variables.**

| Variable | ≤13 (Cognitive Impairment) | > 13 (Normal) | Odd-ratio | C.I | P-Value |
|---|---|---|---|---|---|
| **Age** | | | | | |
| 60 – 75 | 4 (6.9%) | 54 (93.1%) | 0.444 | 0.073 – 2.713 | 0.719 |
| ≥76 | 2 (14.3%) | 12 (85.7%) | | | |
| **Gender** | | | | | |
| Female | 5 (15.6%) | 27 (84.4%) | 7.222 | 0.798 – | 0.116 |
| Male | 1 (12.5%) | 39 (97.5%) | | 65.337 | |
| **Spouse Status** | | | | | |
| Alive | 1 (2.1%) | 47 (97.9%) | 0.081 | 0.009 – 0.739 | 0.024 |
| Dead | 5 (20.8%) | 14 (79.2%) | | | |
| **Level of Formal Education** | | | | | |
| Non-Educated | 5 (11.1%) | 40 (88.9%) | 3.250 | 0.359 – | 0.509 |
| Educated | 1 (3.7%) | 26 (96.3%) | | 29.422 | |
| **Occupational Status** | | | | | |
| Retired | 1 (3.4%) | 28 (96.6%) | 0.271 | 0.030 – 2.454 | 0.425 |
| Still Working | 5 (11.6%) | 38 (88.4%) | | | |
| **Live Alone** | | | | | |
| Yes | 1 (10%) | 9 (90%) | 1.267 | 0.132 – | 1.000 |
| No | 5 (8.1%) | 57 (91.9%) | | 12.129 | |
| **Feel Lonely** | | | | | |
| Yes | 1 (12.5%) | 7 (87.5%) | 1.686 | 0.171 – | 1.000 |
| No | 5 (7.8%) | 59 (92.2%) | | 16.572 | |
| **Chronic Pain** | | | | | |
| Present | 0 (0%) | 19 (100%) | 0.000 | 0.000 – 2.610 | 0.295 |
| Absent | 6 (11.3%) | 47 (88.7%) | | | |
| **Sensory Deficit** | | | | | |
| Yes | 1 (20%) | 4 (80%) | 3.100 | 0.289 – | 0.889 |
| No | 5 (7.5%) | 62 (92.5%) | | 33.268 | |
| **Psychoactive Drug Used** | | | | | |
| Yes | 0 (0%) | 12 (100%) | 0.000 | 0.000 – 4.960 | 0.567 |
| No | 6 (10%) | 54 (90%) | | | |
| **Duration of Illness in weeks** | | | | | |
| 1 – 26 | 6 (9.1%) | 60 (90.9%) | | | 1.000 |
| ≥27 | 0 (0%) | 6 (100%) | | | |

showed a trend towards being positive for depression. The reason for this may be due to lack of committed and confiding relationship as their children might have left home, as well as, reduced social network and inability to work, as well as the increased risk of facing death[39]. This may also be the explanation for the increased likelihood of those living alone to screen positive for depression although this finding was also not statistically significant.

Interestingly in this study, elderly patients who were still employed tended towards being more likely to screen positive for depression though this was not statistically significant. This is in contrast to previous studies where unemployment was more linked with psychiatric morbidity.[5,25] The current finding may be due to the economic hardship in the country, with only about 6.4% of older adults receiving regular pension while 75% live under poverty line.[28] This might have made it necessary for the elderly to keep working in spite of the attendant stresses of work.

There was a trend in this study of more physically ill elderly patients with dementia to be more likely to screen positive for depression (although not statistically significant). This finding is similar to previous reports[28]. In order to improve the quality of care of physically ill elderly patients, there is therefore the need to establish consultation-liaison services for holistic management of geriatric patients in the non-psychiatric units of our Teaching Hospital[1]. This will require adequate collaboration between the psychiatric and non-psychiatric physicians. The use of short validated screening instruments (e.g. GDS-SF, MMSE) by attending physicians is recommended[17] as this will help in picking out undetected psychiatric co-morbidities in the elderly. In addition, the training of non-psychiatric doctors at both undergraduate and

**Table 4: Relationship between Geriatric Depression Scale (GDS-SF) and sociodemographic /clinical variables.**

| Variables | Non-Depressed | Depressed | Odd-Ratio | CI | P-Value |
|---|---|---|---|---|---|
| **Age** | | | | | |
| 60 – 75 | 47 (81%) | 11 (19%) | 0.329 | 0.329 – 2.786 | 0.506 |
| ≥76 | 13 (92.9%) | 1 (7.1%) | | | |
| **Gender** | | | | | |
| Female | 27 (84.4%) | 5 (15.6%) | 1.145 | 0.326 – 4.019 | 1.000 |
| Male | 33 (82.5%) | 7 (17.5%) | | | |
| **Spouse Status** | | | | | |
| Alive | 41 (85.4%) | 7 (14.6%) | 1.541 | 0.433 – 5.489 | 0.737 |
| Dead | 19 (79.2%) | 5 (20.8%) | | | |
| **Level of Formal Education** | | | | | |
| Non-Educated | 36 (80%) | 9 (20%) | 0.550 | 0.123 – 2.023 | 0.514 |
| Educated | 24 (88.9%) | 3 (11.1%) | | | |
| **Occupational Status** | | | | | |
| Retired | 25 (86.2%) | 4 (13.8%) | 1.429 | 0.387 – 5.270 | 0.832 |
| Still Working | 35 (81.4%) | 8 (18.6%) | | | |
| **Live Alone** | | | | | |
| Yes | 8 (80%) | 2 (20%) | 0.769 | 0.142 – 4.172 | 1.000 |
| No | 52 (83.9%) | 10 (16.1%) | | | |
| **Feel Lonely** | | | | | |
| Yes | 5 (62.5%) | 3 (37.5%) | 0.273 | 0.055 – 1.345 | 0.240 |
| No | 55 (85.9%) | 9 (14.1%) | | | |
| **Chronic Pain** | | | | | |
| Present | 14 (73.7%) | 5 (26.3%) | 0.426 | 0.117 – 1.554 | 0.188 |
| Absent | 46 (86.8%) | 7 (13.2%) | | | |
| **Sensory Deficit** | | | | | |
| Yes | 4 (80%) | 1 (20%) | 0.786 | 0.080 – 7.718 | 1.000 |
| No | 56 (83.6%) | 11 (16.4%) | | | |
| **Drug Used** | | | | | |
| Yes | 10 (83.3%) | 2 (16.7%) | 1.000 | 0.190 – 5.276 | 1.000 |
| No | 50 (83.3%) | 10 (16.7%) | | | |
| **Duration of Illness** | | | | | |
| 1 – 26 | 54 (81.8%) | 12 (18.2%) | | | 0.567 |
| ≥27 | 6 (100%) | 0 (0%) | | | |
| **MMSE** | | | | | |
| ≤13 (Cognitive Impairment) | 4 (66.7%) | 2 (33.3%) | 0.357 | 0.058 – 2.217 | 0.567 |
| > 13 (Normal) | 56 (84.8%) | 10 (15.2%) | | | |

postgraduate levels should be further enhanced with longer postings in psychiatry[1,6,40]. In addition, there is need to integrate psychiatry of later life (psychogeriatrics) into the national health care programmes of the country.

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# Electrolyte Profile of Epileptic Patients on Carbamazepine Monotherapy

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**Abstract**

Epileptic seizures result from disruption in electrical activity among neurons. Adequate amount of electrolytes is essential for a healthy nervous system. The existing knowledge on the impact of antiepileptic drugs on serum electrolyte is still controversial.

This study was designed to determine the effects of long term use of carbamazepine on serum concentrations of calcium, magnesium, inorganic phosphate and alkaline phosphatase in complex partial and generalized tonic-clonic seizure patients at University of Ilorin Teaching Hospital, Ilorin, Nigeria. It was a cross-sectional study involving 23 seizure disorder adult patients on carbamazepine monotherapy. Serum was analyzed for calcium, magnesium, inorganic phosphate, alkaline phosphatase and albumin using complexometric and colorimetric methods.

Serum concentration of calcium (albumin adjusted calcium 3.47±0.09) and alkaline phoshatase (261.87±14.53) were significantly ($P<0.05$) higher in subjects on carbamazepine compared to the control group (2.64±0.04 and 146.67±4.11) respectively. In addition serum concentration of magnesium (1.35±0.04) was significantly higher in the subjects compared to the control group (1.04±0.02) but within the normal range. Inorganic phosphate though significantly lower in the subjects was also within the normal range. In the control group, serum concentration of calcium was strongly correlated with concentration of magnesium, alkaline phoshatase and inorganic phosphate. This linearity was lost completely in epileptic patients on carbamazepine.

In this study, an increase in serum calcium, alkaline phosphatase, magnesium and a decrease in inorganic phosphate were found in epileptic patients on carbamazepine monotherapy. Monitoring serum concentration of these electrolytes may be of benefit to the patients' management.

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**Keywords:** Epilepsy, serum calcium, magnesium, alkaline phosphatase, inorganic phosphate

## Introduction

Epilepsy is a neurological disorder that affects people in every country throughout the world. It is characterized by a tendency to recurrent seizures and defined by two or more unprovoked seizures. Epilepsy affects at least 50 million people in the world[1] and about 3 percent of the general population will experience an epileptic seizure by age seventy-five 75 [2]. Studies in developing countries reveal a prevalence of more than 10 per 1,000 [3]. In both developed and developing countries up to 70 % of newly diagnosed children and adults with epilepsy are successfully treated with anti-epileptic drugs [1]. The use of these drugs is often limited by side-effects, but therapy of epilepsy needs to be maintained to avoid recurrent seizures with all its potential personal and social problems [4]. The existing knowledge on the impact of epilepsy and antiepileptic drugs (AEDs) on serum electrolyte is still controversial. Serum levels of magnesium and calcium have been found to play a vital role for seizure condition to develop [5]. Hypomagnesaemia and hypocalcaemia cause hyper-excitability of neurons and have been associated strongly with seizures in adults and children [6]. The calcium/magnesium ratio has also been found to be closely associated with initiation and continuation of seizures[7]. The most common laboratory findings reported with respect to AED use are hypocalcaemia, hypophosphatemia and elevated levels of alkaline phosphatase [8]. This study aims to determine the effect of long term use of carbamazepine (CBZ) on electrolyte profile in epileptic patients attending neurology clinic at the University of Ilorin Teaching Hospital, Ilorin Nigeria.

## Materials and Methods

The study was prospective, case-controlled involving 23 adult patients with complex partial or generalized tonic-clonic seizure disorder on CBZ monotherapy for more than one year. The control group consisted of 23 non-epileptic patients matched for age and sex.

This study was carried out in the Departments of Neurology and Chemical pathology of the University of Ilorin Teaching Hospital, Ilorin, Nigeria.

Patients on antiepileptic drugs other than carbamazepine, protein energy malnutrition and history of hepatic or renal failure were excluded from the study. None of the patients were on folate, vitamin D or calcium supplements. This protocol was approved by the Ethical Review Committee of the University of Ilorin Teaching Hospital, Ilorin and informed consent was obtained from all participants.

**Blood collection**

A total of 5 mls of venous blood was collected from each subject at the neurology clinic of the hospital. Immediately after collection, the sample was centrifuged at 3000 rpm for five minutes. The serum was stored at 4 $^{0}$C, until analysis was done. The serum was analyzed in the Department of Chemical Pathology, University of Ilorin, for calcium and magnesium using complexometric method [9], inorganic phosphate and alkaline phosphatase (colorimetric method) [10,11] and albumin (bromocresol green method) [12].

**Statistical Analysis**

Data are expressed as mean ± standard deviation. Comparison between the test and control groups was performed using the Student's t-test. Pearson's correlation was determined for the different electrolytes. Statistical significance was taken at P<0.05.

**Results**

A total of twenty-three epileptic patients on CBZ therapy participated in the study. They were comprised of 12 (52%) males and 11 (48%) females of which 15 (65.21 %) were between the age of 20-29 (Table 1). Serum calcium (albumin adjusted calcium) and alkaline phoshatase were significantly (P<0.05) higher in subjects on carbamazepine compared to the control group. These values were found to be higher than the normal range. Serum magnesium and albumin were also significantly (P<0.05) higher in the subjects but within the normal range. Inorganic phosphate though

**Table 1: Age and Sex distribution in subjects on carbamazepine therapy**

| Age (years) | Frequency (%) |
|---|---|
| 20 – 29 | 15 (65.21) |
| 30 – 39 | 3 (13.04) |
| 40 – 49 | 3 (13.04) |
| 50 – 59 | 2 (8.69) |
| **Sex** | |
| Male | 12 (52%) |
| Female | 11(48%) |

**List of Abbreviations**

| | |
|---|---|
| Calcium | Ca |
| Magnesium | Mg |
| Alkaline phosphatase | ALP |
| Inorganic phosphate | IP |
| Albumin | Alb |

**Table 2: Electrolyte profile in subjects on carbamazepine therapy**

| Electrolyte | Concentration | | | |
|---|---|---|---|---|
| | Normal value | Control | Subjects | P-value |
| **Calcium (mmol/l)** | 2.25-2.65 | 2.64±0.04 | 3.47±0.09 | P < 0.05* |
| **Magnesium(mmol/l)** | 0.65-1.7 | 1.04±0.02 | 1.35±0.04 | P < 0.05* |
| **Phosphate (mmol/l)** | 0.87-1.45 | 1.59±0.03 | 1.14±0.06 | P < 0.05* |
| **Alkaline phosphatase(iu/l)** | 20 - 140 | 146.67±4.11 | 261.87±14.53 | P < 0.05* |
| **Albumin (g/l)** | 35 - 50 | 35.07±0.68 | 39.57±0.75 | P < 0.05* |

*P < 0.05, Students t-test, n=23

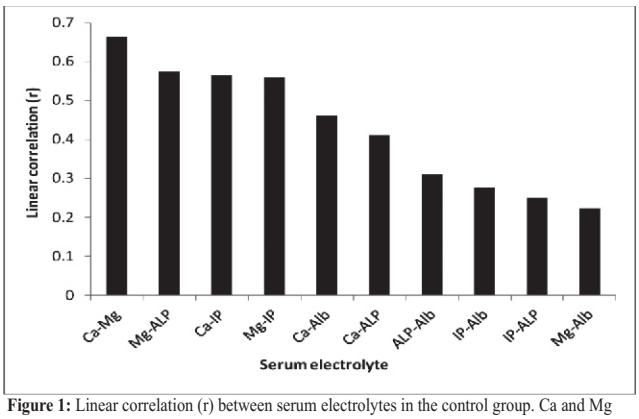


**Figure 1:** Linear correlation (r) between serum electrolytes in the control group. Ca and Mg concentrations strongly correlated with an absolute value greater than 0.6.

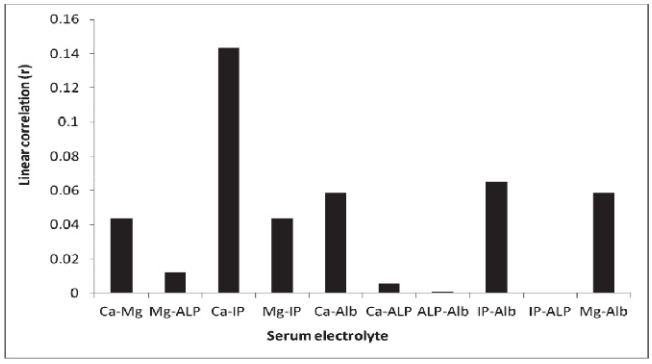


**Figure 2:** Linear correlation (r) between serum electrolytes in subjects on carbamazepine. Ca and Mg concentrations not correlated with a value of 0.04.

significantly (P<0.05) lower in the subjects was within the normal range (Table 2).

In the control group, the serum concentration of calcium was strongly correlated to that of magnesium, organic phosphate and alkaline phosphatase. The correlation between calcium and magnesium was stronger than that between organic phosphate and alkaline phosphatase with an absolute value greater than 0.6 (Figure 1).

The correlation between calcium and magnesium and that between calcium and alkaline phosphatase was lost completely in subjects on CBZ therapy with a value of 0.04 and 0.005 respectively. (Figure 2).

**Discussion**

In the present study, epileptic patients on long term CBZ therapy had increased serum calcium, magnesium, alkaline phophatase, albumin with decreased serum phosphate concentration. Increased serum calcium and magnesium concentration have been reported to be beneficial to seizure control and used as a marker for seizure control [6]. Our findings is similar to that of Hamed et al., [13] who found an increase in serum calcium concentration in CBZ- treated groups of patients [13]. The neurochemical basis of the abnormal discharge in epilepsy is not well understood and maybe associated with enhanced excitatory amino acid transmission, impaired inhibitory transmission, or abnormal electrical properties of the affected cells [14]. CBZ is one of the most widely used antiepileptic drug and affects membrane excitability by inhibiting voltage-dependent sodium channels[14]. This study further revealed that serum concentration of calcium was strongly correlated with that of magnesium and phosphate in the control group, but this correlation was lost in subjects on carbamazepine therapy. This shows that serum concentration of electrolytes is altered in epileptic patients on cabamazepine therapy, with calcium and alkaline phosphatase above normal range while magnesium was within the normal range. Magnesium modulates seizure activity by antagonizing the excitatory calcium influx through the N-methyl-D-aspartate (NMDA) receptor [15]. Increased mean alkaline phosphatase with decreased organic phosphorus seen in this study has also been reported in both children and adults receiving AEDs [16]. In a study, isoenzymes of alkaline phosphatase in epileptic patients receiving carbamazepine monotherapy was determined and increase in total alkaline phosphatase was reported to be due to the bone fraction [17]. Elevated plasma alkaline phosphatase concentration is often associated with drugs that induce hepatic microsomal enzyme including; CBZ, phenobarbitone, primidone and phenytoin [18]. Induction of hepatic microsomal enzymes by CBZ accelerates the metabolism of antiepileptic drugs and other drugs resulting in decreased plasma concentration [14]. For this reason, combination of CBZ with other antiepileptic drugs is inadvisable except in situations where the therapeutic benefit outweighs the risk of a potential drug interaction.

**Conclusion**

This study revealed an increase in serum calcium, alkaline phosphatase, magnesium, albumin concentrations and a decrease in inorganic phosphate in epileptic patients on long term carbamazepine monotherapy. More research with lager sample size will be required before we can conclude on the use of these findings in the management of epileptic patients.

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# Relationship Between Glycaemic Control And Hypertension In Nigerian Type II Diabetic Patients Attending The Medical Outpatient Clinics, U.I.T.H. Ilorin.

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**Abstract**

Diabetes is associated with hypertension partly through the effect of hyperglycaemia (and insulin resistance). There is therefore possibility that improvement in glycaemic control might be associated with favourable changes of blood pressure. This study is therefore aimed at determining relationship between glycaemic control and hypertension.

One hundred and sixty consenting type II diabetic patients were recruited for the study, consisting of 49 (30.6%) males and 111 (69.4%) females, while 70 non-diabetic subjects matched for age and sex with the patients were recruited as control consisting of 25 (35.7%) male and 45 (64.3%) female. Blood pressures were taken with a suitable mercury sphygmomanometer.

5mls of blood sample was collected from each patient and 2mls was put into a fluoride oxalate bottle (for fasting plasma glucose) while the remaining 3mls was put into ethylene diamine tetra acetic acid (EDTA) (for estimation of glycated haemoglobin).

One hundred and seventeen (73.1%) of diabetes subjects studied were hypertensive which was made up of 31(26.5%) males and 86 (73.5%) females. Only 43 (26.9%) of the subjects had diabetes alone of which 18 (41.9%) males and 25 (58.1%) were females. The mean duration of hypertension was 10.9±5.8years (range=1-35years). The mean systolic blood pressure was 133.0±20.0mmHg (range- 100-190mmHg) while the mean diastolic blood pressure was 81.3±9.3mmHg,(range =60-110). This was statistically significant ($p<0.05$) when systolic and diastolic blood pressure of subjects were compared to that of controls. There was also a weak positive correlation between systolic as well diastolic blood pressure and (FPG) and ($HbA_{IC)}$ at calculated correlation coefficient "r" of (0.281, 0.071) and (0.063, 0.049) and p-values of (0.086, 0.373) and (0.429, 536) respectively.

This study highlighted higher prevalence of type II diabetes among female subjects and reemphasized the high prevalence of hypertension among diabetics, as more than half (73.1%) of our subjects were hypertensive.

There was statistical significance different in systolic and diastolic blood pressure of subjects when compared to that of controls, but we were unable to establish a tangible relationship between level of glycaemic control and hypertension.

**Keywords**: Relationship, Glycaemic Control, Hypertension and Type II Diabetic Patients.

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## Introduction

Type II Diabetes mellitus and hypertension are commonly associated conditions, both of which carry an increased risk of cardiovascular and renal complications.[1–4] Hypertension occurs more in type II diabetics than in the general population, especially in younger patients.[5] Hypertension tends to further increase risk of cardiovascular disease associated with type 2 diabetes mellitus [2, 3, 6,] as well as being a risk factor for the development of microalbuminuria[7, 8] and retinopathy.

The present global pandemic of type II diabetes is accounted for by westernization of lifestyle, population growth, ageing with consequent dietary change, sedentary lifestyle, and obesity.[9] As high as this prevalence figure is (2.2 -9.2% ), it is thought to significantly underestimate the extent of the problem, since up to 50% of the population with diabetes are thought to remain undiagnosed and therefore untreated.[10] It is also a known fact that at the time of diagnosis, 50% of these patients already had micro and macrovascular complications which were known to adversely affect their quality of life and impose a heavy burden on healthcare system.[11,12] The burden of complications and premature mortality resulting from diabetes constitutes a major public health problem for most countries.

High blood pressure and impaired metabolic controls are among the main determinants of the progression of diabetes vascular complications.[13] The prevalence of hypertension is high in African ancestry, and it is frequently inappropriately controlled. [14]
Although genetic predisposition may not be ruled out, blood pressure and plasma glucose control are major confounders; therefore the increased prevalence in

microvascular complication is difficult to interpret.

Hypertension in type II diabetes mellitus is a common finding at time of diagnosis.[13] Furthermore, about 50% of patients having both type II diabetes mellitus and hypertension had hypertension before it was diagnosed.[15] This probably account largely for observation that microalbuminuria is already present at the time of diagnosis of type II diabetes in many cases. Hypertension substantially increases the risk of both macro and microvascular complications of diabetes including stroke, coronary artery disease, peripheral vascular disease, retinopathy, nephropathy and possibly neuropathy.[16] Each 10mmHg decrease in mean systolic blood pressure was associated with reduction in risk of 12% for any complication related to diabetes, 15% for deaths related to diabetes, 11% for myocardial infarction and 13% for microvascular complications.[11]

Since diabetic state is thought to be associated with hypertension, in part through the effect of hyperglycaemia (and insulin resistance) one therefore reasoned that improvement in glycaemic control might be associated with favourable changes of blood pressure. On the other hand, lack of any such association might to some extent explain the inconsistent effects of improvement of glycaemic control on hypertension. This study is therefore aimed at determining the relationship between glycaemic control and hypertension with a view to assist and encourage patients and clinicians on how good glycaemic control can lead to improved health, augment longevity, and enhance quality of life in diabetic patients with hypertension.

**Materials And Methods:-**

This was a cross sectional study of consenting type II diabetic patients attending Medical Outpatient Department (MOPD) of the University of Ilorin Teaching Hospital (UITH) Ilorin, Kwara state Nigeria. The study was undertaken with approval from the ethical committee of the University of Ilorin Teaching Hospital Ilorin.

A total of 160 consenting type II diabetic patients were recruited for the study consisting of 49(30.6%) male and 111(69.4%) female, while 70 non-diabetic subjects matched for age and sex with the patients were recruited as control consisting of 25 (35.7%) males and 45 (64.3%) females. The exclusion criteria include patients on drugs that could affect glucose metabolism e.g. steroids, beta blockers and thiazide diuretics. Pregnant women were excluded by finding out about their last menstrual period. Patients with renal failure and liver diseases were also excluded.

Blood pressure was taken with a suitable mercury sphygmomanometer after 10 minutes rest with patient in the sitting position and Korotkov´ sound phase I and V was used to determine the systolic and the diastolic blood pressures respectively.

A total of 5mls of blood sample was collected from each patient in sitting position after an overnight fast from the antecubital vein at the dorsum of the hand. 2mls of collected blood sample was put into a fluoride oxalate bottle while the remaining 3mls was put into ethylene diamine tetra acetic acid (EDTA) bottle for estimation of glycated haemoglobin.

Glucose analysis as well as glycated haemoglobin were carried out within 6 hours of sample collection. Analytical accuracy and precision was ensured by simultaneous analysis of commercially prepared control sera in each batch that was analyzed. Plasma glucose was determined using glucose oxidase method with 4 aminoantipyrine as the oxygen acceptor as described by Trinder[18] using commercial kit produced by AGAPPE DIAGNOSTICS KERALA INDIA. Glycated Haemoglobin was estimated by column method[19] using commercially prepared kit by AGGAPPE DIAGNOSTICS LTD. Statistical analysis was done using Statistical Package for Social Science (SPSS version 15.0) and results were expressed as means±SD. Paired sample t-test was used to compare means of results where appropriate, Pearson`s correlation analysis was used to examine the relationships between variables. A p-value less than 0.05 was considered significant.

**Results**

A total of 160 type II diabetic subjects were recruited for the study consisting of 49 (30.6%) males and 111(68.4%) females, while 70 non-diabetics were recruited as control consisting of 25 (35.7%) males and 45 (64.3%) females.

The mean age of the subjects was 60.7±8.7 (range =42-80years) while the mean age of control was 54.8±13.0 years, (range =30-79).

The mean duration of diabetes among subjects was 10.1±5.7years (range =1-35years). One hundred and seventeen (73.1%) of diabetic subjects studied were hypertensive which was made up of 31 (26.5%) males and 86 (73.5%) females. Only 43 (26.9%) of the subjects had diabetes alone of which 18 (41.9%) males and 25 (58.1%) were females. The mean duration of

**Table 1: Mean values of blood pressure in subjects and the control**

| Variables | Subjects MEAN±SD | Control MEAN± SD | P-value |
|---|---|---|---|
| Mean Systolic BP (mmHg) | 133±20.0 | 118.5±9.1 | 0.000* |
| Mean Diastolic BP (mmHg) | 81.3±9.3 | 74.9± 6.4 | 0.001* |

**Table II: Correlation of level Of Glycaemic control (FPG) with Hypertension**

| Level of Glycaemic Control using FPG (mmol/L.) | Mean SBP (mmHg) ±S.D | Mean DBP (mmHg) ±S.D |
|---|---|---|
| **Good Glycaemic Control (<6.0)** | 130.1±17.7 | 80.1± 8.8 |
| **Acceptable glycaemic Control (6.1 -6.9)** | 130.8±16.1 | 81.4±8.0 |
| **Poor glycaemic Control (>7.0)** | 136.1± 22.5 | 82.4±10.0 |
| **r =** | 0.281 | 0.071 |
| **P-value** | 0.086 0.373 | |

**Table iii: Correlation of level of glycaemic control using $HbA_{IC}$ With hypertension**

| Level of Glycaemic Control using $HbA_{IC}$ (%) | Mean SBP (mmHg) ±S.D | Mean DBP (mmHg) ±S.D |
|---|---|---|
| **Good Glycaemic Control (<6.5)** | 131.1±18.1 | 81.1± 9.0 |
| **Acceptable glycaemic Control (6.5 -7.5)** | 130.6±19.1 | 79.8±7.9 |
| **Poor glycaemic Control (>7.5)** | 134.1± 22.0 | 82.1±10.1 |
| **r =** | 0.063 | 0.049 |
| **P-value** | 0.429 0.536 | |

hypertension was 10.9±5.8years (range=1-35years). The mean systolic blood pressure was 133.0± 20.0mmHg (range- 100-190mmHg) while the mean diastolic blood pressure was 81.3±9.3mmHg, (range =60-110). Table 1 showed that there was statistical significant difference in systolic and diastolic blood pressure of subjects when compared to that of controls. Tables II and III showed a weak positive correlation between systolic as well as diastolic blood pressure and (FPG) and ($HbA_{IC}$) at calculated correlation coefficient "r" of (0.281,0.071) and (0.063,0.049) with p-values of (0.086, 0.373) and (0.429 and 0.536) respectively.

## Discussion

The high number of female diabetic patients than the male diabetics observed in this work has been reported in a previous study[20] and elsewhere in Nigeria.[21] They may be due to the facts that in African settings males are considered to be the bread winner and probably with less time to visit the clinic.

The close association between diabetes and hypertension is a well known phenomenon and more than half (73.1%) of our subjects were hypertensive, [22] which is much higher than figures quoted by previous work.[23] The mechanism by which diabetes causes elevated blood pressure is possibly the effect of hyperinsulinaemia on the homeostasis of hormones that regulate blood pressure by increasing the concentration of circulating rennin-angiotensin and noradrenalin.[24] Another possible reason is that hyperinsulinaemia predisposes to hypertension due to its Antidiuretic effect with increase in sodium absorption at the proximal renal tubules.[25] Insulin's effect on sodium-potassium ATPase and sodium-hydrogen exchange in tubules is another possible cause of hypertension in type II diabetes.[23]

An association between hypertension, impaired glucose tolerance, hypertriglyceridaemia, obesity, hyperinsulinaemia, and insulin resistance has been appreciated since the early 1960s.[24] Various aspects of this syndrome have been called syndrome X and the insulin resistance syndrome.[25] Both insulin resistance and possibly, hyperinsulinaemia have been suggested as risk factors for the development of cardiovascular complications in diabetics[26] and approximately 75% will eventually die from complications of coronary heart disease.[27] Hypertension itself is a risk factor for coronary heart disease in diabetics as well as non-diabetics.[28] Recent evidence suggests that cardiovascular complication rates associated with DM can be considerably reduced through intensified treatment of hypertension.[29]

Inadequate blood pressure control in the majority of a group of patients with DM was reported in a recent study carried out in Nigeria in which only 11% of diabetic patients with hypertension had their BP controlled to levels below 140/90mmHg.[26] In our present study, approximate 50.9% of the patients achieved BP control below the currently recommended target level of 130/80mmHg. In the United Kingdom Prospective Diabetes Study Group (UKPDS) blood pressure trail, [30] intensive blood pressure treatments i.e. diastolic of 80mmHg had led to a 32% decrease in diabetes-related deaths, and a 37% decrease in microvascular complications. Similar observations had been noted by the Hypertension Optimal Treatment (HOT) trial[30] where a target of 80mmHg diastolic pressure had been found to have cardioprotective effect in diabetics. Early treatment of hypertension therefore will be of particular importance in diabetic patients to prevent cardiovascular complications, to minimize the progression of microvascular complications and to decrease mortality.

## Conclusion:-

This study highlighted higher prevalence of type II diabetes among female subjects than male subjects.

Hypertension among our subjects was high as was found in previous studies. There was close association between diabetes and hypertension as more than half (71.3%) of our subjects were hypertensive.
There was statistical significant difference in systolic

and diastolic blood pressure of subjects when compared to that of controls. Tables II and III (correlation study) showed no statistical significant relationship between blood pressure and levels of glycaemic control.

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# Prevalence Of Human Immunodeficiency Virus & Hepatitis B Virus Co-Infection In A Population Of Apparently Healthy Pregnant Women In University Of Ilorin Teaching Hospital, Ilorin

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**Abstract**

A study on Humman Immunodeficiency Virus (HIV) & Hepatitis B Virus (HBV) co-infection in apparently healthy pregnant women is important due to the synergistic effect these viruses exert on the clinical course and severity of the disease they produce in humans.

This was a prospective cross sectional study carried out at the Department of Obstetrics and Gynaecology, University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria. A total of 237 pregnant women participated in this study between September 1 and December 31, 2012. Seropositive mothers for either or both HBV and HIV were indentified following screening of both booked and unbooked pregnant women who consented to participate in the study. The exclusion criteria included pregnant women with any form of ill health either acute or chronic or those who refused to participate in the study.

Thirty (30) of the 237 women were found to be seropositive for HBV giving a prevalence rate of 12.7%. Twenty one (21) pregnant women were HIV seropositve accounting for 8.9%. Four (1.7%) patients had HBV/HIV co-infection.

Co-infection with HIV and HBV is of global importance and has significant health implication on its cohorts. It has been noted over the years that this causes a synergistic destructive effect. Hence, there is a need to take swift action which includes early detection, counselling and treatment when one or both of the viruses infect an individual.

**Key words:** Human Immunodeficiency Virus, Hepatitis B Virus, Pregnant women, Co-infection

## Introduction

Human immunodeficiency virus (HIV) and hepatitis B virus (HBV) constitute major public health problems particularly in sub-Saharan Africa. These viruses have similar biology and modes of transmission (contact with infected blood, blood products or body fluid and sexual contact), thus co-infection may occur. When co-infection occurs it has far reaching implications on the health status of the pregnant woman as it may worsen the foetal or maternal prognosis or both.[1,2]

The burden of HBV infection is greatest in the low income countries of sub-Saharan Africa and South East Asia where 8-10% of individuals are chronic carriers and these same regions habour over two-thirds of the global HIV burden.[3-5]Studies across Nigeria have shown varying prevalence rates of HBV/HIV co-infection ranging from 9.2% to as high as 70.5 %.[6-9] HIV infection worsens the liver disease in HBV infected persons and is also associated with rapid progression to cirrhosis and a higher mortality. Whether or not HBV directly impacts HIV disease progression remains a subject of debate.[10,11]

A study on HIV/HBV co-infection in apparently healthy pregnant women is important because of its potential for causing severe disease in infected individuals resulting in significant morbidity and mortality.

This study was conducted to determine the burden of HIV/HBV co-infection in a population of apparently healthy pregnant women in the University of Ilorin Teaching Hospital, Ilorin, Nigeria.

## Materials And Methods

**Study Design:** A prospective cross sectional study.

**Study Setting:** The Department of Obstetrics and Gynaecology, University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria.

**Subjects/Participants:** A total of 237 pregnant women participated in this study between September 1 and December 31, 2012. Seropositive mothers for either or both HBV and HIV were indentified following screening of both booked and unbooked pregnant women who consented to participate in the study. The exclusion criteria included pregnant women with any form of ill health either acute or chronic or those who refused to participate in the study.

**Procedure for data collection:**

After the routine antenatal health education given to all pregnant women, voluntary counseling and testing for HIV was done using the antibody screening test strip (determine). Patients who refused screening were

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allowed to opt out and were not considered for the random selection for HBV testing by screening for the presence of hepatitis B surface antigen (HBsAg) in the serum.

The screening for HBsAg was done using the Clinotech Diagnostic HBsAg detection Kit.[11]This is a rapid generation chromatographic immunoassay for the qualitative detection of HBsAg in serum.

## Results

Two hundred and thirty seven (237) women consented and completed this study. These were pregnant women recruited from the antenatal clinic and unbooked pregnant women who delivered at the University of Ilorin Teaching Hospital, Ilorin. The 237 women were made up of 148(62.4%) booked and 89(37.6%) unbooked women. Two hundred and thirty (97%) pregnant women were married with 189 (80.4%) in a monogamous family setting. One hundred and ninety two (81.0%) of the subjects were of the Yoruba ethnic group. Table 1

Thirty (30) of the 237 women were found to be seropositive for HBV giving a prevalence rate of 12.7%. Twenty one (21) pregnant women were HIV seropositve accounting for 8.9%. Four (1.7%) patients had HBV/HIV co-infection.

Majority (40%) of the clients were in the age range of 30-34years. The mean birth weight of babies of seropositive mothers either for HBV or HIV or both was 2.96±0.22kg. In the seronegative mothers' group, the mean birth weight of their babies was 3.04±0.63kg. The difference in the mean birth weight of the two groups was not statistically significant (p=0.07).

**Table 1: Sociodemographic characteristics of subjects**

| Variables | Frequency | Percentage |
|---|---|---|
| **Age Group** | | |
| < 20 | 1 | 0.4 |
| 20 – 24 | 22 | 9.3 |
| 25 – 29 | 64 | 27.0 |
| 30 – 34 | 117 | 49.4 |
| 35 – 39 | 26 | 11.0 |
| ≥40 | 7 | 3.0 |
| **Marital Status** | | |
| Married | 230 | 97.0 |
| Widowed/Widower | 4 | 1.7 |
| Separated/Divorced | 2 | 0.8 |
| Single | 1 | 0.4 |
| **Type of Marriage** | | |
| Monogamous | 189 | 80.4 |
| Polygamous | 46 | 19.6 |
| **Educational Level** | | |
| Primary | 25 | 10.5 |
| Secondary | 85 | 35.9 |
| Tertiary | 119 | 50.2 |
| No formal Education | 8 | 3.4 |
| **Occupation** | | |
| Civil Servant | 85 | 35.9 |
| Self Employed | 134 | 56.5 |
| Unemployed | 7 | 3.0 |
| Students | 3 | 1.3 |
| Works for Private Firm | 3 | 1.3 |
| Others | 3 | 1.3 |
| **Religion** | | |
| Christianity | 92 | 38.8 |
| Islam | 145 | 61.2 |
| **Tribe** | | |
| Yoruba | 192 | 81.0 |
| Igbo | 28 | 11.8 |
| Hausa | 4 | 1.7 |

## Discussion

Over the years there has been a remarkable public health approach towards reducing the burden of HIV and HBV globally. This approach has been aimed at reducing the burden of each of these viral infections independently. However, studies conducted to ascertain HIV/HBV co-infection rates have been of increasing importance in view of the synergistic effect observed when infections occur together in individuals hence increasing the associated risks of morbidity and mortality. Majority of these studies focus on the prevalence of HBV amongst HIV infected patients, while others focus on HIV and HBV co-infection.[6-9]This may be the reason for the wide variations in the prevalence rates obtained for HIV/HBV co-infection. A critical look at this picture in an apparently healthy population is of immense benefit in determining the burden of this problem in our society. Taking into consideration the peculiarity of our society specifically the poor health seeking behavior, the pregnancy period offers a good opportunity to screen apparently healthy women visiting the hospital for care.

The seroprevalence of HBV infection can be classified according to its prevalence as low (<2%), moderate (2-7%) and high (>7%).[12]The value of 12.7% for HBV observed in our study reveals that the prevalence of HBV is high; hence the risk of transmission and associated burden of HBV is high in our society. The already identified chronic sequelae of this infection includes chronic hepatitis, liver cirrhosis and hepatocellular carcinoma.[13,14]On the other hand, the prevalence obtained for HIV infection was 8.9% and this is higher than the 3.4% obtained by the new National survey conducted by the Federal Government of Nigeria for the 2012 National HIV/AIDS and Reproductive Health Survey-Plus (NARHS Plus).

Studies across Africa have shown wide variations in the prevalence of HIV/HBV co-infection in pregnancy. In our study, the prevalence rate of

HBV/HIV co-infection in pregnant women of 1.7% obtained was similar to the rate of 1.5% observed in a similar study in Texas USA (an area reported to have a lower prevalence of HBV infection).[15] Reports from other studies conducted within and outside Nigeria revealed a higher prevalence of 4.1%-9.0%.[16-20]The observed variations may be due to the differences in the sociocultural practices and the prevailing prevalence rates of HIV and HBV from one region to another. Futhermore, some of these studies were conducted to determine HIV positive cohorts having co-infection with HBV. This raises a need for the conduct of a study in the future to determine the prevalence of HIV co-infection in patients treated for HBV infection and its sequelae in our centre.

Co-infection with HIV and HBV is a global health problem and has significant health implication on affected individuals. It has been noted over the years that it is associated with increased morbidity and mortality. Hence, there is a need to intensify efforts aimed at early identification, counselling and treatment of infected individuals.

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# Effect Of Unfermented *Pakia biglobosa* Seeds On Calcium And Lipid Levels And Pain Perception In Adult Male Wistar Rats

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**Abstract**

*Parkia biglobosa* seed is commonly used as seasoning for traditional soups in the west coast of Africa. However, its effects on serum calcium, lipid profile, pain and anxiety related behaviour have not been clearly elucidated. The present study therefore aim to investigate its effects on these serum parameters and behaviours.

Fifteen male Wistar rats with an average weight of 180-240g were divided into three groups of five rats and used for the study. The groups were treated as follow: Group 1, the control, took 10ml/kg of distilled water, Group 2 was treated with 250mg/kg of *P. biglobosa* and Group 3 was given 500mg/kg of *P. biglobosa*. All treatments were administered orally and once daily for 21 days. Weights of the animals were measured once a week. Tail immersion pain study and behavioural study on open field maze were carried out three hours post treatment on the 21st day and finally, blood was collected from each animal via cardiac puncture for lipids and $Ca^{2+}$ assay.

The results showed a significant ($p<0.05$) increase in mean value of weight in Group 2 which had no association with the lipid profile that showed a significant ($p<0.05$) reduction of LDL cholesterol, total cholesterol, triglycerides and significant ($p<0.05$) elevation in HDL cholesterol in all the treated groups compared with the control. Serum $Ca^{2+}$ level was also significantly ($p<0.05$) increased in the treated group compared to the control and there was significant ($p<0.05$) decrease in reaction time to pain, in our pain related behavioural study. However, there was no significant ($p<0.05$) difference between the control and the treated group in the anxiety related behavioural study. In conclusion, this findings point to possibility that consumption of *P. biglobosa* seed, a popular food seasoning among local folks in various African countries may be of benefit to the people with regards to regulation of their lipids.

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**Keywords:** Lipids; *Parkia biglobosa;* rats; serum; weight

## Introduction

*Parkia biglobosa,* commonly known as African locust bean tree is a perennial tree legume of sub-family *Mimosoideae* and family *Leguminosae*[1]. The tree preference habitants spread widely in the savannah region of West Africa up to the southern edge of the Sahel zone[2]. Though not usually cultivated, couple of *Parkia* trees can be seen scattered around in the savannah region of Nigeria[3]. The locust bean tree or African locust bean tree as it is commonly called, normally bears yellow pulp that contains the seeds sealed in zip-like pods on a yearly basis. The yellow pulp is naturally sweet and the trapped seeds are processed into a valuable traditional food and soup seasoning paste known as *iru* and *daddawa* among the Yoruba and Hausa people of Nigeria, respectively[4,5]. The seeds of locust bean was reported to contain vitamin B2, protein, carbohydrate, lipids and lysine in its fermented form[6]. Past studies indicated that various parts of the locust bean tree are used for medicinal purposes[7]. The plant is documented for its wound-healing properties in South-Western Nigeria and its antimalarial properties in Guinea[8,9]. In rats, the stem bark decoction of *Parkia biglobosa* was implicated for its anxiolytic[10], analgesic and anti-inflammatory activities[11]. Ethnopharmacological studies also reported the seeds and stem bark to have cardio-inhibitory[12] and antidiabetic[13] activities, and it also prevented myocardial infarction[5]. The effect of unfermented *P. biglobosa* seeds on body weight in relation to lipid profile in male Wistar rats has not been properly elucidated in the literature.

The body lipid profile had many a time been correlated with the body weight in various studies in the literature. The effect of weight loss on body lipids for instance differs from one person to another[14]. Loss of about 10% of body weight in an overweight person leads to reduced low density lipoprotein cholesterol (LDL) and triglycerides (TGs), and increased high density lipoprotein cholesterol (HDL)[15]. This observation is backed by data from WHO where intentional weight loss of 10 kg in overweight persons was claimed to result in a 15% reduction in LDL cholesterol, 30% reduction in triglycerides, 10% reduction in total cholesterol, and 8% increase in HDL cholesterol[16]. Thus on the other way round, intentional

weight gain might lead to increase lipids in the body. Also, low concentrations of HDL, and high concentrations of circulating TC, TG and LDL are established biomarkers of risk for cardiovascular disease[17]. A good example of such risk is atherosclerosis where inflammation causes oxidative modification of LDL, a process believed to be crucial in its genesis[18]. Hence, weight and the level of circulating lipids have a stake in an individual's health status which in turn influences one's behavioural activities. In alloxan-induced diabetic rats, fermented *Parkia biglobosa* seeds was associated with weight gain and improvement in body lipid profile[11]. In normal rats however, the effect of the unfermented seeds is relatively unexplored.

Calcium ($Ca^{2+}$), a naturally occurring chemical element is the fifth-most-abundant element by mass in the earth's crust and in the seawater[19]. Because of its high reactivity, freely occurring $Ca^{2+}$ metal hardly exit in nature. In cell physiology, calcium acts as a second messenger that regulates almost all known cellular processes that define life and death of every cell[20-22]. These varieties of functions executed by $Ca^{2+}$ depends on the speed, amplitude, and spatiotemporal pattern of $Ca^{2+}$ signals and by interactions between $Ca^{2+}$ and other signaling pathways[21]. In growing neurons, intracellular $Ca^{2+}$ is an important part of the response to attractive guidance cues in neurite outgrowth[23], and as a messenger in axon growth cone mobility and on bidirectional axon growth cone turning[24,25]. In skeletal muscle contraction, $Ca^{2+}$ triggers contraction by reacting with regulatory proteins that would have prevented interaction of actin and myosin if $Ca^{2+}$ is absent[26]. Contraction of skeletal muscles is vital in animals' locomotion and other physical displays. Movements generated from this muscular contraction can be interpreted into behavioural activities when conducted in the appropriate maze.

Generalized anxiety disorders are the most common psychiatric disorders in human[27]. The development of tool to assess anxiety in animal studies is of great importance to detect potential anxiolytic drug. Open field maze is such tool that assess the anxiety level in rodents by systematically assessing novel environment exploration, general locomotor activity, and provide an initial screen for anxiety-related behaviour[28]. Also, the presence of pain in human and animals has been linked to attitudinal and behavioural changes in the various past studies. The experience of pain depends on the balance between pro-nociceptive and anti-nociceptive inputs, this under normal physiological conditions allow us to recognise and react to pain. The nociceptive balance can however be altered in a state of injury or disease[29]. Such alteration can be quantified with cold and hot tail immersion model of pain evaluation.

As a result of convincing evidences on central effects of stem bark decoction of *Parkia biglobosa*[10,11] the present studies were targeted to find out possible central effects of unfermented *Parkia biglobosa* seeds in male Wistar rats. Thus, we focused on the effects of unfermented *Parkia biglobosa* seeds on anxiolytic related behavioural changes, pain related behavioural changes, body weight as it relates with the serum lipid profile, as well as the effects of unfermented *Parkia* seeds on calcium level.

## Materials and Methods

*Animal Preparation*

Fifteen (15) male adult Wistar rats weighing between 180-240g were used for this experiment. The rats were obtained from the Department of Biochemistry, University of Ilorin, Ilorin, Kwara State, Nigeria. Animals were randomly divided into three groups of five rats and were labeled Group 1, 2 and 3. The animals were housed in the College of Health Sciences' Animal House, University of Ilorin where the research was carried out. The animals had free access to water and food throughout the experimental period. Principles of laboratory animal care that guides animals' experiment was strictly followed as prescribed in the University of Ilorin's Guide for the Care and Use of Laboratory Animals.

*Seeds Collection, Drug Preparation and Treatment*

Unfermented locust bean was bought from a local dealer around Elekoyangan area, Ilorin, Nigeria sometime in the month of December. The identification and authentication were done by Mr. Stephen Adebayo of Botany Department, University of Ilorin and voucher number UITH/001 was deposited at the herbarium of the university for future reference. Unfermented locust bean (15g) was weighed and milled with mortar and pestle without adding water. The smoothened paste of the beans was finally dissolved in 30ml of distilled water. The dosage was calculated base on this stock solution and fresh stock solution was prepared each day throughout the treatment period to avoid any slight chance of seeds fermentation. The method of Odetola *et al.*[30] was modified and used for these studies. While Group 1 (Control) was given 10ml/kg of distilled water, Group 2 and 3 were treated with 250mg/kg and 500mg/kg respectively. All treatments were done through oral route using oral canula and administration was done once daily for 21days. Three (3) hours after the last administration, the rats were sacrificed under an anaesthetic agent (chloroform). Blood was collected from each animal into a plain bottle via cardiac puncture. Serum lipid profile and calcium level were investigated in the samples collected.

*Toxicity Test*

The method described by Parasuraman (2011) for acute

toxicity test was modified and used for this study[31]. In this test, a group of five animals was treated with high dose (1000mg/kg) of unfermented *Parkia biglobosa* seeds orally for 14 days and was kept under close watch at day 1, day 3, day 7 and day 14.

*Biochemical assays of Serum Lipid and Calcium*

Blood was collected via cardiac puncture in a plain bottle for the determination of triglyceride (TG), high-density lipoprotein-cholesterol (HDL-C), low-density lipoprotein-cholesterol (LDL-C) and total cholesterol (TC). The blood was centrifuged at 3000 × g for 15 min and the serum was extracted. TG, TC, HDL-C and LDL-C concentrations were measured by standard enzymatic-colorimetric method using enzymatic kits supplied by Randox laboratory Ltd (Co. Antrim, UK). The detection limit was 3.88mmol/L (150mg/dL). Also, serum calcium level was measured using standard enzymatic-colorimetric method with the kit produced by Abcam Plc, Kuwait.

*Tail Immersion*

The method described by Pizziketti *et al.*[32], *and* Sewell and Spencer[33] was used to study pain in this study. Three hours after the oral administration of the extracts and the normal saline, the tail of the animals were immersed in 0°C and 55°C water baths. The average time spent by each group before the animals flicked or removed their tails from the water bath was documented as reaction time to pain stimulus.

*Anxiety Evaluation*

Anxiety was evaluated using File's method[34]. Briefly, the open field apparatus used in the present study consisted of a square area (72x72 cm) with walls 36 cm high. The four walls were made with transparent Plexiglas. The wooden floor was painted white; it was divided by lines into 16 equal squares by parallel and intersecting blue lines. A central square was drawn in the middle of the open field. Animals were put at this middle individually with each facing away from the handler. Animals were allowed to explore the maze for 15 minutes during which anxiety related parameters were recorded.

*Statistical Analysis*

Results were presented as mean ± standard error of mean (SEM). Statistical difference between the control and the treated groups was carried out using one-way ANOVA on SPSS Statistical 16.0 for Windows (SPSS Inc, Chicago, IL, USA). Statistically significant differences were accepted at *p less than* 0.05.

**Results**

*Toxicity effects of unfermented Parkia biglobosa seeds*

Within 24 hours of treatment with 1000mg/kg dose of unfermented *Parkia biglobosa* seeds, there was no noticeable change in the food and water consumption in the animals used. Also, all the animals appeared to be as active as they were before the commencement of the study. At day 3, the animals were still active as day 1.

At day 7, the weight of the animals decreased significantly while food and water consumption remained the same. The faeces also became soft and

**Table 1.** Effect of unfermented *Parkia biglobosa* seeds on serum lipids level.

| GROUP | TG (mmol/L) | CHOL (mmol/L) | HDL (mmol/L) | LDL (mmol/L) |
|---|---|---|---|---|
| **Group 1** | 1.180 ± 0.091 | 2.200 ± 0.089 | 0.288 ± 0.023 | 0.552 ± 0.099 |
| **Group 2** | 1.300 ± 0.070 | 1.540 ± 0.040* | 0.482 ± 0.023* | 0.184 ± 0.016* |
| **Group 3** | 1.920 ± 0.080* | 2.860 ± 0.120* | 0.488 ± 0.021* | 0.216 ± 0.018* |

Each value is the mean ± S.E.M. of 5 Wistar rats; * = $p < 0.05$ compared with control, ANOVA. Group 1 - Distilled water (5ml/kg b.w.); Group 2 - 250mg/kg of unfermented *Parkia biglobosa* seeds; Group 3 - 500mk/kg of unfermented *Parkia biglobosa* seeds.

**Table 2.** Effect of unfermented *Parkia biglobosa* seeds on Calcium ions

| GROUP | Calcium (mmol/L) |
|---|---|
| **Group 1** (5ml/kg of distilled water) | 2.99 ± 0.09 |
| **Group 2 (**250mg/kg of *Parkia biglobosa* seeds**)** | 3.36 ± 0.14* |
| **Group 3 (**500mg/kg of *Parkia biglobosa* seeds**)** | 3.33 ± 0.20* |

Each value is the mean ± S.E.M. of 5 Wistar rats; * = $p < 0.05$ compared with control, ANOVA.
Group 1 - Distilled water (5ml/kg b.w. ); Group 2 - 250mg/kg of unfermented *Parkia biglobosa* seeds;
Group 3 - 500mk/kg of unfermented *Parkia biglobosa* seeds.

**Table 3.** Effect of unfermented *Parkia biglobosa* seeds on pain induced by tail immersion

| Group | Reaction Time in Cold Immersion (s) | Reaction Time in Hot Immersion (s) |
|---|---|---|
| **Group 1** | 40.20 ± 12.13 | 5.20 ± 0.58 |
| **Group 2** | 10.60 ± 0.51* | 4.40 ± 0.67 |
| **Group 3** | 13.00 ± 2.98* | 2.80 ± 0.58* |

Each value is the mean ± S.E.M. of 5 Wistar rats; * = $p < 0.05$ compared with control, ANOVA. Group 1 - Distilled water (5ml/kg b.w.); Group 2 - 250mg/kg of unfermented *Parkia Biglobosa* seeds; Group 3 - 500mk/kg of unfermented *Parkia Biglobosa* seeds.

**Table 4.** Effect of unfermented *Parkia biglobosa* seeds on anxiety indices using open field maze

| Group | Ambulatory | Rearing Frequency | Rearing Latency (s) | Grooming Latency (s) |
|---|---|---|---|---|
| Group 1 | 26.8±8.6 1 | 7.00±1.7 8 | 16.00±2.3 0 | 92.80 ±22.6 5 |
| Group 2 | 17.60±6.5 0 | 5.20±2.1 5 | 13.00±3.6 0 | 83 . 00 ± 30 . 56 |
| Group 3 | 28.20±9.2 4 | 8.60±1.7 4 | 22.60±4.4 0 | 1.65±17.8 0* |

Each value is the mean ± S.E.M. of 5 Wistar rats; * = $p < 0.05$ compared with control, ANOVA. Group 1 - Distilled water (5ml/kg b.w.); Group 2 - 250mg/kg of unfermented *Parkia Biglobosa* seeds; Group 3 - 500mk/kg of unfermented *Parkia Biglobosa* seeds.

wet but activities in animals appeared to remain the same as in day 1.

At day 14, weight loss became more obvious across all the animals. Food and water consumption became drastically decreased and animals showed low activity. Also, the faece still remained soft and wet. In summary, at dose 1000mg/kg of *P. biglobosa* seeds, there was no dose related lethality though behavioural signs of discomfort was noticed in the animals.

*Effect of unfermented Parkia biglobosa seeds on serum lipids level.*

While a significant ($p<0.05$) decrease in LDL was recorded in both treated groups, a significant increase in HDL was observed also in all the treated groups compared to the control group (Table 1). This study also showed significant increase in TC in the high dose and decrease in the low dose compared to the control. Significant ($p<0.05$) increase in TG was also observed in the high dose compared to the control group.

*Effect of unfermented Parkia biglobosa seeds on Calcium ions*

Serum calcium ions was significantly ($p<0.05$) increased in all the treated groups (3.36 ± 0.14; 3.33 ± 0.20) compared to the control group (2.99 ± 0.09) (Table 2).

*Effect of unfermented Parkia biglobosa seeds on weight*

Changes in weight were monitored each week for duration of the study. A significant ($p<0.05$) increase in weight was recorded at the third week in the Group 1 and Group 2 compared with the initial weights (Fig. 1).

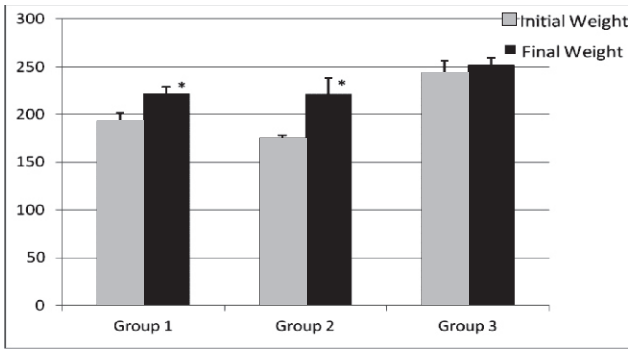


**Fig. 1.** Effect of unfermented *Parkia biglobosa* seeds on weight
Each value is the mean ± S.E.M. of 5 Wistar rats; * = $p < 0.05$ compared with control, ANOVA.
Group 1 - Distilled water (5ml/kg b.w.); Group 2 - 250mg/kg of unfermented *Parkia Biglobosa* seeds;
Group 3 - 500mk/kg of unfermented *Parkia Biglobosa* seeds.

*Effect of unfermented Parkia biglobosa seeds on pain*

The seeds extract lowered the pain threshold in the treated animals. There was a significant ($p<0.05$) decrease in reaction time for the animals in treated groups (10.60 ± 0.51; 13.00 ± 2.98) when subjected to cold tail immersion compared to the animals in the control (40.20 ± 12.13). However following hot tail immersion test, only the high dose treated group (2.80 ± 0.58) showed a significant ($p<0.05$) decrease in reaction time compared with the control (5.20 ± 0.58) (Table 3).

*Effect of unfermented Parkia biglobosa seeds on anxiety indices*

Behavioural observations of the treated animals on the

open field maze gave no significant ($p<0.05$) difference when compared with the control group (Table 4).

**Discussion**

Apart from the rigorous physical efforts required, millions of dollars is spent annually by the overweight and obese people to shed their weight. This is not unconnected to the amount of information available to the people from the scientific community that over weight can lead to obesity which in turn can lead to chronic diseases like type 2 diabetes, coronary heart disease, hypertension, and some forms of cancer[16]. Despite several previous studies targeted to solving over weight, obesity and behavioural disorders, there is paucity of effective drugs in view of its purpose in the literature thus ethno-pharmacology study on this purpose is always welcome.

In this present study, animals administered 1000 mg/kg of *P. biglobosa* seed extract in the toxicity test lost weight. This observed decrease in weight was not observed in the real study as the final weight of the Group 2 animals significantly ($p<0.05$) increased compared with the initial weight of the same group prior to treatment. The same cannot be said for Group 3. The increased weight in Group 2 may not be due to the treatment with 250 mg/kg of *P. boglobosa* seed extract. This is because the control group that was treated with 10ml/kg of distilled water recorded similar significant ($p<0.05$) increase in weight. The weight gain can thus be viewed as part of normal growth process. Also, this study revealed the ability of the extract to significantly ($p<0.05$) decrease LDL, TG, CHOL and significantly ($p<0.05$) increased HDL. The data provided by WHO on overweight individuals shows that intentional weight loss of 10 kg led to reduction of LDL cholesterol (15%), cholesterol (10%), triglycerides (30%)and elevated HDL cholesterol (8%)[17]. Our study recorded the same pattern of reductions and elevation of various lipids despite the fact that the animals (180-240g) were neither overweight nor loss weight. In fact, the animals rather gained weight though this might not be associated with the treatment as stated earlier.

In relation to weight, this study established that *P. biglobosa* seed extract has no associating significant effect on weight. Also, reduction of LDL cholesterol, cholesterol, triglycerides and elevation HDL cholesterol in rats does not lead to loss of weight as documented in humans but might rather be an index of "good growth". "Good growth" in the sense that the recorded reductions and elevation of lipids are positive health adjustments. The results also showed that unfermented *P. biglobosa* seeds at the doses used in this study has positive effects on healthy lipids balance which may be helpful in treatment of diseases with underlying imbalance in "bad" and "good" lipids.

We observed in this study that treatment with *P. biglobosa* seed extract led to significant ($p<0.05$) increase in serum $Ca^{2+}$ level compared to the control group. This might be due to parts of the seeds constituents that was absorbed via the GIT or maybe the seeds has ability to free $Ca^{2+}$ from its storage organ such bone. While drugs like phenobarbital and oral glucocorticoid were documented with ability to release $Ca^{2+}$ from its storage, grape products[35-37] and combined extract of *Morus alba* and *Polygonum odoratum* leaves were shown to increase serum $Ca^{2+}$ level.

To the best of our knowledge, no previous study has linked increased serum $Ca^{2+}$ level with increased muscular contraction activities. We postulated a correlation between the two since $Ca^{2+}$ is necessary for muscular contraction[38], though $Ca^{2+}$ needed for muscular contraction reside in the sacorlemma/endoplasmic reticulum of such muscle[26]. At the end, it was not possible to establish any reasonable association either between the observed increased serum $Ca^{2+}$ and behavioural changes on open field maze or that of pain-related behavioural response. All behavioural indices for anxiety or depression on our open field maze test were not significant ($p<0.05$) in the treated groups compared with the control. However, in both the hot and cold tail-immersion pain models, the reaction time to pain which is usually identified by pain related behavioural response (tail flicking) significantly ($p<0.05$) decreased in the treated groups compared with the control. Though, this is with the exception of the low dose group in the hot water tail immersion model. Why unfermented *P. biglobosa* seeds decreased pain threshold is not yet clear and it needs to be investigated. It is not surprising however as mustard oil that is also consumed as food was documented with the same effects[39].

Our new findings based on the doses used herein suggest that *P. biglobosa* seed has no effect on the studied behaviours. Furthermore, *P. biglobosa* seed extract was capable of elevating serum $Ca^{2+}$ level via a mechanism we are still investigating in our laboratory. Also, *P. biglobosa* seeds is potent in the reduction of pain threshold as well as the reaction time to pain stimulus.

In conclusion, unfermented *P. biglobosa* seed, a popular food seasoning among local folks in various African countries stands as a promising solution to the future accomplishments in the adjustment and stability of lipids profile and $Ca^{2+}$ level in the body towards positive health attainment, as this is needed for nervous system development, memory formation and adipocytes-cross talk in the brain.

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# Cross- Sectional Survey Of School Teachers Knowledge Of Ebola Virus Diseases In Ilorin

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**Abstract:**

The current outbreak of Ebola virus disease (EVD) is the largest ever. It had led to major disruptions in academic calendars due to closing of schools. However, recent successes in curtailing the epidemic had led to the reopening of schools. School teachers who are in close contact with children should have the necessary knowledge regarding the disease and the capacity to carry out appropriate actions for ill children. We sought to determine the knowledge of primary and secondary school teachers in privately owned schools regarding EVD. The study is a descriptive questionnaire based survey on knowledge of teachers regarding EVD. Study participants were primary and secondary school teachers working in privately owned schools. A purposive sampling technique was used in selecting participants. One hundred questionnaires were distributed with an 89% response rate. The mean age of the teachers was 34.18 years ± 8.49. Majority (87.6%) of the teachers recognized close contact with an infected person as a method of transmission. Most (68.5%) of the teachers were able to correctly identify six or more common symptoms of EVD. Over 70% of the teachers recognized the need to isolate suspected/ confirmed cases, frequent hand washing the use of hand sanitizers as effective strategies for the prevention of EVD.

School teachers in the current study have a good knowledge of EVD and strategies for its prevention.

**Keywords**: Ebola virus disease; Teachers; Knowledge; Nigeria; Prevention

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**Introduction:**

The current outbreak of Ebola virus disease (EVD) has been the largest ever recorded. World Health Organization estimates that by 23rd March 2015 there had been 24,842 suspected/confirmed cases in West Africa with 10,299 deaths (case fatality 41.5%). Children infected during Ebola outbreaks are generally few because of outbreak dynamics and societal structures. During the current outbreak, only 13.8% of cases were aged 15 years and below. Similarly, the Ebola outbreak in Zaire in 1995 resulted in 315 cases of which 9% were in children less than 18 years of age. Nevertheless, the 2014 outbreak resulted in closure of most schools in affected areas on account of fears of transmission within the school population. However, the waning epidemic led to increasing calls for schools to be reopened with governments ensuring the schools had put in place certain minimum requirements. United Nations Children's Fund, Centers for Disease Control and prevention and World Health Organization, amongst other bodies developed guidelines for reopening of schools containing key information and principles for reopening schools.

The School Health Program (SHP) provides a framework upon which staff of schools are expected to provide school health services, such as health problem identification, treatment of common ailments and injuries, monitoring for outbreaks and ensuring vaccinations as necessary, among others.[6] Unfortunately, studies in Nigeria have documented the poor implementation of the SHP and as such, schools are largely unprepared to deal with disease outbreaks.[7,8] A survey by Oyinlade et al[9] demonstrated that most schools in Sagamu did not have qualified health personnel or staff trained in basic health care and none of the schools had areas for isolation of children with potentially transmissible infections. Sick children were taken home in the school bus or parents called to pick the child.[9] Areas of congregation of people, such as schools have been recognized as fertile grounds for ready transmission of EVD.[4] When coupled with the deplorable state of the SHP, there is potentially a significant increase in the risk of the disease spreading rapidly in school populations, if introduced. With the resumption of schools, it became critical to evaluate preparedness of school teachers, as frontline staff of schools, for EVD among staff and students. To the best of the authors' knowledge, no study has been conducted in Nigeria to examine this critical issue, made more important as the nation deploys multipronged

strategies to address the current Ebola epidemic. Thus, we sought to determine the knowledge of school teachers regarding Ebola virus disease and its prevention in preparation for the reopening of schools following the outbreak in Nigeria.

**Materials and methods:**

The study was a descriptive cross-sectional survey of school teachers of privately owned primary and secondary schools in Ilorin (comprising of Ilorin West, Ilorin East and Ilorin South Local Government Areas). It was carried out in August 2014 as part of training for staff of private schools and the interviews were conducted before the training. The study population consisted of all teachers of privately owned primary and secondary schools from Ilorin city present at the training. There were 310 registered teachers from the study coverage area and using a 10% confidence interval and 95% confidence level the calculated minimum sample size was 74. Allowing for a 10% non-response rate, the calculated sample size was 81. A convenience sampling of the teachers was used to determine study participants and questionnaires were given to them as they walked into the hall. Approval for the study was obtained from the state ministry of education. Written informed consent was obtained from the teachers and those who agreed to participate were given the study instrument. A self-administered questionnaire was administered to the school teachers that contained basic demographic data, questions on knowledge of EVD, preparedness for school resumption considering the Ebola outbreak and practices regarding disease prevention in their institutions. The questionnaire was designed by the investigators and based on items as listed in the key messages for safe school operations in countries with outbreaks of Ebola. All questionnaires were retrieved before commencement of the training. Responses were coded and entered into a spread sheet. Each response regarding knowledge was categorized as correct or incorrect based on predetermined answers as determined by the study investigators.

**Results:**

One hundred questionnaires were distributed to the teachers. Eighty nine questionnaires were returned completed giving a response rate of 89%. Sociodemographic characteristics of the non-responders could not be obtained. Demographic characteristics of the respondents are summarized in Table 1. The mean (SD) age of the teachers was 34.18(8.49) with a range of 20-58 years. There were 55(63.2%) females and 32 males (gender not stated for two subjects). Majority (95.5%) of the teachers were of the Yoruba ethnic group. The highest educational qualification of the teachers was National College of Education certificate (41 teachers (46.1%)) and

Table 1: Demographic characteristics of teachers

| Characteristics | Frequency (%) n=89 |
|---|---|
| Mean (SD) age, years | 34.18(8.49) |
| Age groups (years) | |
| - 20-29 | 33(37.1) |
| - 30-39 | 32(36.0) |
| - 40-49 | 17(19.1) |
| - >50 | 7 (7.9) |
| Sex* | |
| - Male | 32 (36.0) |
| - Female | 55 (61.8) |
| Location of school | |
| - Urban | 70 (78.7) |
| - Rural | 19 (21.3) |
| Highest educational qualification | |
| - NCE | 41(46.1) |
| - OND | 6 (6.7) |
| - HND | 11(13.6) |
| - B.Sc/ B.Ed/ B.A | 28(31.7) |
| - Others | 3 (3.4) |
| Ethnic group | |
| - Yoruba | 85(95.5) |
| - Igbo | 2 (2.2) |
| - Nupe | 1 (1.1) |
| - Tiv | 1 (1.1) |

* Two respondents did not indicate their sex

Table 2: Teacher responses on Ebola virus disease

| Response | Frequency (%) n=89 |
|---|---|
| What causes EVD | |
| - Virus | 73 (82.0) |
| - Other responses(Bacteria, protozoa) | 16 (18.0) |
| Where did first ever case occur | |
| - Congo | 12(13.5) |
| - Guinea | 7 (7.9) |
| - Liberia | 23(25.8) |
| - Sierra Leone | 4 (4.5) |
| - Sudan | 35(39.3) |
| - No idea | 8 (9.0) |
| Methods of transmission* | |
| - Close contact with secretions | 78(87.6) |
| - Airborne | 35(39.3) |
| - Water borne | 21(23.6) |
| - Food borne | 9 (10.1) |
| - Mosquito bites | 13(14.6) |
| - Others | 9 (10.1) |
| Number of features correctly identified | |
| - <3 | 11(12.4) |
| - 3-5 | 21(23.6) |
| - 6-8 | 53(59.6) |
| - >8 | 4 (4.5) |

* Respondents were allowed to give more than one response

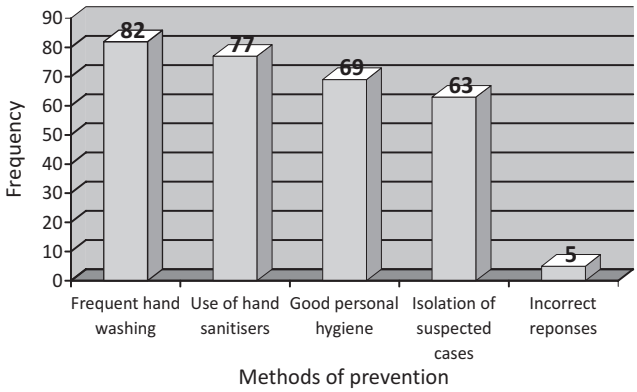


Figure 1: Responses regarding methods of prevention of EVD

Bachelor degree for 21 teachers (31.7%). Others are as shown in Table 1. Seventy of the teachers taught in urban communities.

Regarding the etiology of EVD, 82% of the teachers knew it was caused by a virus (Table 2). Only 35(39.3%) teachers knew the first reported outbreak of EVD was in Sudan. Other responses are as shown in Table 2. Regarding methods of transmission, 78 teachers (87.6%) identified close contact with an infected person as a method of transmission. Incorrect responses given regarding methods of transmission included breathing air in a room with an infected person (39.3%), water borne (23.6%), food borne (10.1%) and mosquito bites (14.6%) (Table 2). Of the 12 listed symptoms and signs of EVD, only 4 (4.5%) teachers were able to correctly identify greater than 8 features and 53(59.6%) identified between six and eight features. Others are listed in Table 2. Regarding effective ways of preventing EVD, 82(92.1%) teachers indicated frequent hand washing, 77(86.5%) teachers recommended use of hand sanitizers, 63(70.8%) teachers indicated isolating suspected/confirmed cases and 69(77.5%) teachers recommended good personal hygiene (Figure 1). Incorrect responses given included chewing kolanut (2 teachers), bathing with salt water (1 teacher) and avoiding public transportation (2 teachers). Teachers were asked about actions they routinely carry out whenever a child is ill or injured at school. The commonest response was to administer first aid (65 teachers (73.0%)). Forty one teachers (46.1%) would take the child to a clinic, 40 (44.9%) would call the parents, 24 (27.0%) would do nothing and watch for improvement, 16 (18.0%) will isolate the child from other children and 10 teachers (11.2%) would send the child home.

**Discussion**

The concept of the "safe schools" during outbreaks of EVD is relatively new to most parts of West Africa. The current outbreak has disrupted educational institutions with its attendant effects on development in Africa. The pressure for schools to reopen as the outbreaks wanes in various countries means necessary strategies have to be put in place.

The School Health Program is pivotal and provides a readymade framework upon which disease prevention models can be built.[6] Unfortunately, the SHP has been poorly implemented in most communities and as such, "adhoc" measures have to be put in place urgently as an immediate strategy to deal with the current epidemic while the nation grapples with strengthening and ensuring functionality of the SHP. This forms the basis for the "safe school" training to handle the EVD epidemic.[5] Teachers, by virtue of being in close contact with children in schools, have a key role to play in reducing the risk of transmission of EVD in schools. This is especially important as a lot of wrong messages driven by fear and panic are often spread during such outbreaks. Majority of the teachers in the study had correctly identified the cause of EVD, methods of transmission, common symptoms, signs and preventive strategies. Despite this, quite a number of these teachers also harbored wrong information such as air, water and food borne transmission, and transmission via mosquito bites. The concept of droplet transmission is often misunderstood by individuals to mean it can be transmitted by breathing the same air as someone with the disease. Training sessions and information booklets must underscore the distinction between the two. Hand washing and the use of hand sanitizers are effective strategies for preventing EVD. Their use is limited in most settings by the availability of running water, soap and the hand rubs. When children fall ill at school, teachers are expected to take necessary action to provide immediate care for the child and limit the spread of infections to other children. In the current study, only 18% of teachers would isolate an ill child from other children. This has enormous implications for the spread of several communicable diseases ranging from diarrheal disease, respiratory tract infections, viral exanthems and most definitely EVD.

The current EVD epidemic has further demonstrated the weakness of the SHP in Nigeria, and indeed most parts of Africa. The SHP has as one of its key components school health services which encapsulate the provision of preventive and curative services delivered within the school.[6] Under the SHP, schools should have designated health staff (or teachers with training in delivering basic care), methods for screening for common diseases, facilities for temporary isolation and protocols for dealing with potentially infectious cases.[6] Basic personal hygiene should also be taught to students and practiced by all.[6] These measures, if well implemented, obviously will enable early identification of most disease conditions and limit spread within school facilities. Thus, there exists a dire need for resuscitation of the school health program in Nigeria so teachers are empowered with the knowledge and facilities to manage such situations

adequately. Governments in the region have a key role to play in ensuring schools meet with the required minimum standards routinely.

In conclusion, majority of the teachers in the study had good knowledge regarding EVD and common strategies for its prevention in the school environment and community.

**Acknowledgement**

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**Conflict of interest**

There are no conflicts of interest.

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# Image-Guided Cervical Epidural Steroid Injections For Cervical Radicular Pain: Reports of Two Cases.

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**Abstract**

Cervical radicular pain is a common cause of chronic neck pain especially among adult population; and it impairs functions and reduces qualities of life of patients. Of the available conservative non-operative treatment options such as analgesic medications, exercises, heat therapy, stabilizing the cervical spine with neck collar among others, epidural steroid injections are the only conservative treatment with proven efficacy. This treatment option is not readily available in Nigeria due to the dearth of expertise and equipment. We present two successful cases of cervical epidural steroid injections with good relief of pain and without complications. The procedures were done under fluoroscopy after correlating clinical symptoms and signs with MRI findings and exclusion of reduced posterior epidural space from large inter-vertebral disc herniation.

**Keywords:** Epidural steroid injections, cervical radicular pain, pain relief

## Introduction

Cervical radicular pain is defined as pain in the upper limb, shooting or electric in quality, caused by irritation and injury of a cervical spinal nerve.[1,2] The pain radiates from the neck over the posterior shoulder into the arm and sometimes into the hand, depending on the affected nerve root. Knowledge of the segment-specific pattern enables the physicians to determine the pain-generating cervical nerve(s). Pain caused by C4 is confined to the neck and the suprascapular region. Pain originating from C5 radiates up to the upper arm, and pain arising from C6 and C7 radiates from the neck to the shoulder, the forearm and the hand.[2,3] However, there is no confinement of radicular pain to a particular dermatome and it can be perceived in all the structures that are supplied by the affected nerve roots such as muscles, joints, ligament and skin.[2]

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Cervical spondylosis, a degenerative disorder of cervical vertebrae, is a common cause of cervical radicular pain among the elderly population. The disorder tends to affect the quality of life of patients through impaired functionality, reduced productivity and conferment of dependence status on the patients. Routinely, cervical radicular pain is managed conservatively with analgesic medications, wearing of neck collar; application of heat therapy, scheduled graded physical exercises and cervical epidural injections before surgical intervention is considered. Of the available conservative treatments, only the cervical epidural steroid injections have been shown to be efficacious in relieving cervical radicular pain.[4,5]

In Nigeria, cervical epidural steroid injections are not part of the readily available conservative treatment options being offered to patients with cervical radicular pain due to the dearth of expertise. This is majorly responsible for the paucity of literature in Nigeria on the evaluation of clinical effectiveness and complications of cervical epidural steroid injections. The procedure is highly technical and associated with risks that can lead to serious morbidities and or fatality.[6,7]

We present a report of two successful cases of fluoroscopic-guided cervical epidural steroid injections in patients with cervical radicular pain which failed to respond to analgesic medications and scheduled physical exercised. The patients were referred to our pain and palliative care unit from orthopaedic unit with history of chronic neck pain radiating to the upper limb, associated with reduced abduction and range of motion (ROM) at the shoulder joints. Diagnosed was established by correlating the clinical features with the MRI findings. Fortunately, the ethical review committee of our hospital had approved a proposal for the commencement of interventional pain management techniques in our unit. The patients were duly informed about the benefits of the interventions and the potential serious complications that might occur after which written informed consents were obtained.

## CASE PRESENTATIONS

### Case history 1

A 66 year old retired civil servant presented to our unit with 8 months history of neck pain that was radiating to the right upper limb of seven months duration. He was placed on cervical neck collar, paracetamol and NSAIDs, complemented by scheduled

exercise sessions but there was no significant improvement in her symptoms. On assessment, the pain was rated as 8 on a visual analogue scale (VAS) and neck disability index (NDI) was 31 (connoting severe disability). Although no weakness or loss of sensation was noticed on the limb, Spurling test reproduced the characteristic pain on the right upper extremity and relieved of the pain was achieved by shoulder abduction test.

Patient was counseled, prepared and offered a transforaminal cervical epidural steroid injection in the theatre on the day of presentation due to the pain severity.

**Descriptions of Transforaminal epidural steroid injections**

The patient was in supine position, with secured intravenous access and connected to multi-parameter patient's monitor to obtain baseline vital signs. The C-arm fluoroscope, a low-dose X-ray machine, was positioned postero-anteriorly (PA) to visualize the cervical vertebrae, and then rotated laterally to the oblique position until the intervertebral foramina was brought into view. A 22G, $3^{1/2}$ inch spinal needle with extension line (prefilled with saline) was directed towards the C5 intervertebral foramina. After determining the depth of the needle on the lateral view, the needle was advanced forward to a safe depth until its tip touched superior articular process on the cervical facet joint below. The iohexol contrast was injected under continuous imaging, and the 2mls mixture of 0.125% plain bupivacaine and 40mg of triamcinolone acetonide was injected into the right C6 foramen after good spread of the contrast and negative aspiration test, Fig. 1.

Figure 1: Fluoroscopic image of cervical transforaminal approach showing needle tip at the right C5 neuroforamen.

The patient experienced immediate pain relief after the injection, he spent an hour in the recovery room and was discharged without complications. He was followed up and assessed at 3, 6 and 12 months post procedure. The VAS and NDI scores were 2, 2 and 1 respectively and 5, 6 and 3 respectively. He rated his PSGR as excellent a year after the intervention.

**Case history 2**

A 74 year old cocoa farmer referred to our unit with three month history of neck pain which was radiating to both upper limbs. It was associated with persistent paraesthesia on both hands. The patient was placed on amitriptylline, NSAID, paracetamol and physiotherapy by the referring orthopaedic surgeon. On evaluation, the right upper limb pain was shooting in

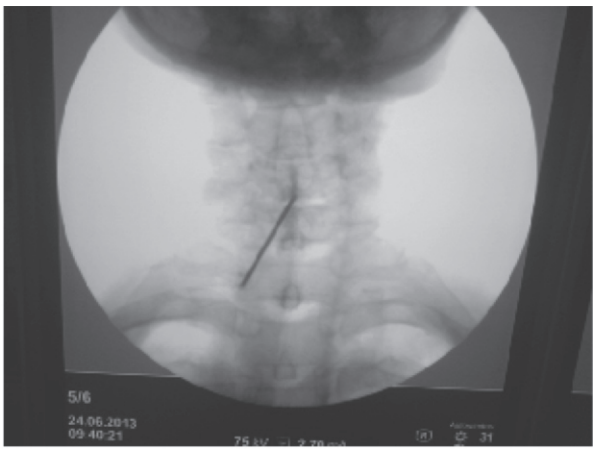


Figure 2: Fluoroscopic image of cervical interlaminar approach showing Tuohy needle at C5 – C6 intervertebral space.

Figure 3: Fluoroscopic image of a typical rail track appearance of contrast spread in the epidural space.

nature; and there was parasthesia in both hands up to the wrist. No weakness in all the muscle groups; but Spurling and shoulder abduction tests were positive. The pain intensity on the neck and the extremities was 6 and 7 respectively on VAS, NDI score was 37, indicating complete disability.

After a month period of non-response to pregabalin, the patient was offered interlaminar epidural steroid injection without any complication, Figs. 2 and 3.

**Descriptions of Interlaminar epidural steroid injections**

With patient in prone position, venous access secured and cardio-respiratory system monitoring instituted, the C-arm was positioned in PA view to identify the intervertebral space at the C7 – T1 level. The skin was prepared and anaesthetized by lignocaine infiltration over C5 – C6 interspace. A size 18G Tuohy needle was advanced until there was a contact with the lamina of C6 vertebra. Under fluoroscopy, the needle was gently directed upward and advanced through the supraspinous and interspinous ligaments. The fluoroscope was then rotated laterally to check the depth of the needle, in relation to the base of the spinous process ("virtual line") of C6. After checking the depth of the needle, a loss of resistance (LOR) syringe was attached to the needle and it was advanced under fluoroscopic guidance until the needle passed through the ligamentum flavum as reflected by forward movement of the plunger without resistance. A syringe containing 5mls mixture of 40mg triamcinolone acetonide and 0.125% plain bupivacaine was injected after negative blood and CSF aspiration. He was followed up and re-evaluated at 3, 6, 12 and 22 months after the procedure. Post intervention, the VAS and NDI scores at 12 months were 4 and 16 respectively; and at 18 months they were 2 and 8 respectively, implying improved status from moderate to mild disability. The PSGR was said to be good response.

**Outcome evaluation**

After the intervention, patients' subjective global responses (PSGR), neck disability index (NDI) and VAS pain scores were assessed. The PSGR was graded as follows: (1) Excellent-greater than 70% improvement, (2) Good-50% to 70% improvements, (3) Fair-30% to 49%, and (4) Poor-less than 30%.

**Discussion**

This case reports demonstrates the clinical effectiveness of cervical epidural steroid injections in providing significant pain relief and functional improvement of upper limbs in patients with cervical radicular pain. The first patient had cervical transforaminal epidural steroid injection (CTFESI) because his neck pain was radiating to one upper extremity; and interlaminar approach (CIESI) of injecting steroid-local anaesthetic agent mixture into the cervical epidural space was employed in the second patient whose neck pain was radiating to the two upper limbs.

The CIESI provided the patient with pain relief and improved upper limb function which was sustained 12 months after interventions. These findings are supported by previous studies that have evaluated the role of CIESI for managing chronic neck pain.[8,9,10] A systematic review[11] on the effectiveness of cervical epidurals has concluded that CIESI provided a significant effect on cervical radicular pain and findings from our study lend credence to this assertion. However, the strength of generalizing the results of case report is weak as responses of more patients with cervical radicular pain to the intervention need to be evaluated in a controlled research ambience.

The pain relief and functional restoration in the right upper extremity recorded in the two patients are as supported by the findings of previous studies [12,13,14] on the benefits of CTFESI in patients with chronic neck pain due to cervical spondylosis.

In a study by Slipman et al,[12] 20 patients with non-traumatic cervical radiculopathy were treated with transforaminal steroid injections. Sixty percent of the patients had good to excellent pain relief and improved functions. Similar favourable results were achieved, by the same authors in another study, in which 3 of the 15 patients treated with the injections following traumatic cervical spondylotic radiculopathy experienced good/excellent pain relief.[13] Bush and Hillier observed that 76% of 68 patients with cervical radiculopathy treated with steroids and local anaesthestic were free from 39 months after the intervention.[14] Similarly, our intervention provided good pain relief to the patients and this lend credence to cervical epidural steroid injections as appropriate conservative treatment option for patients with cervical spondylosis. The intervention may be perceived as "high tech" in our environment because of the rarity of the expertise and restricted availability of the necessary equipment for its delivery to few hospitals; and this constitute a hindrance to the provision of this therapy to the needing patients. The therapy needs to be evaluated in a large number of patients with cervical spondylosis in order to ascertain its clinical usefulness rather than conclude on its effectiveness from the responses obtained only in two patients.

Severe morbidity and deaths have been reported following cervical epidural steroid injections from spinal cord injury or adverse effects from the injected medications.[6,7] To avoid post procedural serious complications, it has been strongly suggested that cervical MRI should be diligently reviewed before cervical epidural infiltrations, the intervention must be

done under fluoroscopy and the fluoroscopic images must be correlated with the MRI to detect large disc protrusions that may be mechanically obliterating the posterior epidural space.[15] All these recommendations were followed while delivery the therapy to our patients to ensure safe and beneficial outcomes.

**Conclusion**

Cervical epidural steroid injections are effective in relieving cervical radicular pain and improving the functions of the upper limbs. When proficiently done, the clinical usefulness of the interventions will be appreciated by the patients. Expertise in this technique and other conservative non-operative treatment options such as cervical facet or cervical medial branch blocks for managing different aetiological causes of neck pain and upper extremity pain should be encouraged in environment to strengthen the capability of physicians attending to patients with cervical radicular pain beyond the routine prescription of analgesic medications.

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