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Niger Delta Journal of Medical Sciences
December 2019 Vol. 2 Issue 2

# Niger Delta Journal of Medical Sciences

Official Publication of
The Faculty of Clinical Sciences
Niger Delta University
Wilberforce Island, Bayelsa State, Nigeria

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Niger Delta Journal Of Medical Sciences
*Reaching out with Scholarly Research*

# Editorial Board



## Philosophy

To reach out with scholarly research positively impacting on the clinical services in Nigeria and the rest of Africa

## Scope

Niger Delta Journal of Medical Sciences (NDJMS) is a peer-reviewed, quarterly, international, general medical Journal that accepts scholarly manuscripts from within and outside Nigeria in areas of basic and clinical medical sciences and related fields

## Editorial Advisers

# Editorial Information

Niger Delta Journal of Medical Sciences (NDJMS) is a quarterly peer-reviewed official publication of Faculty of Clinical Sciences (FCS), College of Health Sciences (CHS), Niger Delta University (NDU) , Amassoma, Wilberforce Island Bayelsa State, Nigeria.

This general medical Journal accepts manuscripts from within and outside Nigeria in areas of basic and clinical medical sciences and related fields. All manuscripts submitted to this journal are expected to conform to the Uniform Requirements for Manuscripts Submitted to Biomedical Journals issued by the International Committee for Medical Journal Editors (ICMJE).

## Types of Manuscripts and Limits

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Papers on original scientific articles with up to 3,000 words, five illustrations / tables / figures and twenty five references.

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A comprehensive review of a timely, important clinical subject along with the analysis of the topic leading to conclusions. This should not exceed 4,000 words and 120 references.

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# Contents

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# Physician Migration at its roots: Emigration Intentions and Preferences among Medical Students of a Nigerian University in the Niger Delta Region

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Abstract

*Background*

*Emigration of physicians from developing countries like Nigeria to industrialized countries has deprived the former of vital human health workforce. With the flight of doctors and the associated brain drain, poor economies and subsequent poor financing of the health sector, the health sector becomes overburdened with myriads of health issues. The study aimed to determine the emigration intentions and preferences of medical students, who are the future physicians.*

*Method: This cross-sectional study was carried out among fourth - year medical students between August and October 2019. One hundred and thirty nine eligible students were enrolled. A semi-structured questionnaire was used to collect the necessary data. Data was analyzed with SPSS software.*

*Results: One hundred and three students completed the survey. Seventy respondents (68.0%) reported that they had intention to emigrate outside Nigeria. Only seventy one (68.9%) respondents believed that there were ample career opportunities in Nigeria. The preferred top destination countries were Canada and the United States of America. Lack of professional prospect (61.1% of responses) was the most common 'push factor' while opportunity to gain more experience (69.9%) and better working condition (49.5%) were the major 'pull factors. Emigration intention was negatively predicted by age and 'belief in career opportunities in home country'*

*Conclusion: Most of the medical students in this study had intentions to emigrate aside their home country after graduation. There is a need for concerted efforts by the government, key stakeholders and individuals to stem the ugly tide of the medical brain drain.*

Keywords: Brain drain, Emigration, Medical students, Physicians, Nigeria

## Introduction

Physician migration from developing countries, including Nigeria and other countries in sub-Saharan Africa to more developed countries, seems to be on the increase in recent years and has become a major cause for concern.[1] Exodus of skilled workers may be fuelled by 'push factors' such as poor remuneration and motivation, unemployment, poverty, insecurity and unstable politics while on the other hand, massive recruitment and favourable immigration policies, better employment opportunities and working conditions, higher wages and economic stability in destination countries have been identified as possible 'pull factors.'[2-4]

Although migration of skilled workers usually has positive consequences for destination countries, the resulting 'brain drain' is deleterious to emerging economies.[5,6]

The Organization for Economic Cooperation and Development (OECD) data set shows high emigration rates across the African continent and emphasizes the reality of the medical brain drain.[7] *A* 50% increase in migration trend of Nigerian doctors to the United States of America was reported over the period 2002 – 2011.[8] The latest World Health Organization report on the density of physician ratio is 4 per 10,000 population in Nigeria,[9] compared, for instance, with the United States, with a density of 25 per 10,000 population.[10] Nigeria has continuously failed to meet the United Nations' recommended minimum level of health workforce density of 2.5 health workers per 1,000 population. [11] This gap is particularly worrisome for a country having some of the worst health outcome indices in the world [12] The medical brain drain worsens the already depleted healthcare resources jn developing countries and widens the gap in health inequities worldwide. [13]

Despite the importance of the medical brain drain to the health care delivery system in Nigeria, not much attention appears to have been paid to it. In order to have a clear understanding of the migration trend among physicians, a survey among medical students will be important. Since medical students are the future medical practitioners, their emigration intention may give a projection of the medical brain drain trend and may give an indication of the medical work force in a country in the near future. A study done in Serbia showed that over 80% of medical undergraduates had considered emigration and practice abroad [14] while in another survey in Ghana, over half of medical students reported an intention of emigration. [15] To the best of the author's knowledge, there appears to be a dearth of report on emigration- related attitude among medical undergraduates in Nigeria. This study was therefore undertaken to examine the intentions of medical undergraduates towards emigration and to determine their migration preferences and associated factors. The information derived from the study may be helpful while developing specific strategies aimed at curbing the brain drain epidemic in the country.

## Materials and Methods

This cross-sectional survey was conducted among fourth - year medical students of the Niger Delta University (NDU) which is located in Amassoma, a community in the Southern Ijaw local government area of Bayelsa State. Although the state has a number of universities, NDU is currently the only one with full accreditation to train medical students.

The study took place between August and October 2019. It was carried out in the clinical students' classrooms at the Niger Delta University Teaching Hospital (NDUTH) at Okolobiri, another community in the state. The hospital serves as a referral centre for many hospitals within and outside Bayelsa state. Clinical students from NDU also receive most of their lectures at this site. The University, like most Nigerian Universities runs a 6-year medical programme comprising an initial 3-year basic medical studies and a subsequent 3-year- clinical programme. The students that were recruited in this study had just started the second phase of their clinical studies.

The inclusion criteria were fourth year medical students of NDU who had just commenced their clinical programme. Students who were absent from class during the study were excluded from the study All students that met the inclusion criteria were invited to

voluntarily participate in an emigration survey taken in-between mandatory group lecture sessions. Ethical clearance for the study was obtained from the Ethics and Research Committee of NDUTH. The purpose and procedure of the survey was explained to the respondents and appropriate instructions given. Anonymity and confidentiality were maintained. The students were also informed that partaking in the survey was completely voluntary and failure to participate bore no ill consequences. Informed consent was obtained from all those that agreed to participate.

A 29-item self-administered semi-structured questionnaire was used to collect data from the respondents. The items of the questionnaire were adapted from similar studies earlier carried out[16] with slight modification. The information collected included socio-demographic data, age, gender, highest educational degree, marital status, religion, tribe, family setting of parents (monogamous or polygamous), highest educational level of parents, academic performance (whether a respondent had failed a medical course or not) and questions on emigration such as desire to emigrate, the form of emigration, emigration push and pull factors, having relative(s) abroad, preferred destination country, steps already taken in pursuit of emigration, as well as perceived effect of future health care reforms on emigration intention.

Data was collated, stored and analyzed with IBM SPSS version 20.0 (SPSS Inc, Chicago, IL, USA). Data was presented in form of tables and bar charts. Descriptive analysis was computed for quantitative variables. Discrete variables were represented with frequencies and percentages while mean and standard deviation were computed for continuous variables. The association of various socio-demographic and academic-related factors with intention to emigrate was tested using univariate and multivariate binary logistic regression. The dependent variable was derived from the question “Do you intend migrating outside of the country after graduation?” Those who responded “Yes” were coded '1' while those that responded otherwise were coded '2.' The independent variables were a combination of socio-demographic data and academic-related data. The socio-demographic data included age, gender, marital status (never married *vs.* ever married), ethnicity (Ijaws *vs.* non-Ijaws), religion (christianity *vs*, other religions) natal family setting (whether monogamous or polygamous), having relative(s) abroad (yes or no), The academic-related variables were 'highest certificate or degree' (senior school certificate or higher degrees), level of education of father and mother (tertiary or not), whether or not respondent had failed a medical course in the past and belief in ample career opportunities in Nigeria (yes *vs* no). The level of significance was set at the 95% confidence interval.

## Results

Out of an eligible population (total class population) of 139, thirty three students were not available, while three students, who started the survey, did not complete it. The total population used for data analysis was therefore a hundred and three. The mean age of the respondents was 22.7 $\pm$4.2 yrs. There were 56(56.4%) males. Ninety seven (94.2%) were 'never married' while only six were 'ever married': Five (4.85%) respondents were still married while one (0.97%) was divorced. Ninety eight (95.1%) respondents were Christians while the remaining 5(4.9%) belonged to 'other Religions.' Eighty one (78.6%) and 22(21.4%) respondents were brought up in a monogamous and polygamous family setting respectively. Forty nine (47.6%) respondents had at least a relative abroad.

The senior school certificate degree was the highest qualification obtained in 76(73.8%) respondents while others had higher certificates: twenty one (20.4%) had advanced level, three (2.9%) had a master degree while another three (2.9%) had a bachelor's degree. Respondents' fathers had up to a tertiary level of education in 72(69.9%) cases while mothers had up to a tertiary level of education in 64(62.1%) respondents. Thirty two (38.1%) respondents had failed a medical course in the past. The socio-demographic data of respondents is shown in table 1;

*Table 1: Socio-demographic data of respondents*

| Variable | Frequency (%) |
|---|---|
| Age | |
| <25 | 94(91.3% |
| >25 | 9 (8.7%) |
| Gender | |
| Male | 56(54.4%) |
| Female | 47(45.6%) |
| Ethnicity | |
| Ijaws | 60(58.3) |
| Non-Ijaws | 43(41.7) |
| Religion | |
| Christianity | 98(95.1) |
| Others | 5(4.9%) |
| Marital status | |
| Single | 96 (93.2) |
| Others | 7(6.8) |
| Certificate or degree attained | |
| Senior School Certificate | 76(73.8) |
| Higher certificates | 27(26.2) |
| Family setting | |
| Monogamous | 81(78.6) |
| Polygamous | 22(21.4) |
| Father tertiary education | |
| Yes | 72(69.9) |
| No | 31(30.1) |
| Mother tertiary education | |
| Yes | 64(62.1) |
| No | 39(37.9) |
| Relative(s) abroad | |
| Yes | 49(47.6) |
| No | 54(52.4) |
| Ever failed a medical course | |
| Yes | 32(38.1) |
| No | 71(68.9) |

Ninety five (92.2%) respondents had intention of practising as a doctor somewhere after graduation, two (2.0%) did not wish to practise while 6 (5.8%) were undecided as to whether they would practise as a doctor or not. Seventy two (69.9%) participants wished to own a private clinical practice in the future.

Seventy respondents (68.0%) reported that they had an intention to emigrate outside their home country while 23(22.3%) respondents were not sure if they would emigrate in the future. Only 10(9.7%) respondents had no intention of migration. The likelihood of emigrating outside Nigeria was rated as 'greater than 50%' in 63 (61.2%) respondents. Eleven (10.7%) of them were 100% certain that they would emigrate after school while the emigration intention of the others was to lesser degrees. Twenty seven (26.2%) respondents reported a preference for permanent emigration, 48(46.6%) were interested in staying away for some years only, while 22(21.4%) would opt for a very short stay. Twenty three (21.4%) respondents indicated that they would emigrate within one year after graduation, thirty seven (35.9%) of them between one and five years after graduation while twenty four (23.3%) would emigrate after five years post-graduation. Seventeen (16.5%) respondents who reported uncertainty about the chance of emigration however stated that they could consider a very short stay abroad in the future, while retaining position in Nigeria. Sixty nine (67.0%) of the respondents wanted to seek for employment abroad after graduation though seventy one (68.9%) respondents believed that there were ample career opportunities in Nigeria.

The most common emigration 'push factor' reported was perception of poor professional development in Nigeria (in 63; 61.1% responses) while opportunity to gain more experience (72; 69.9% responses) and better working condition (51; 49.5% responses) were the major 'pull factors' for emigration among the respondents. (fig 1).

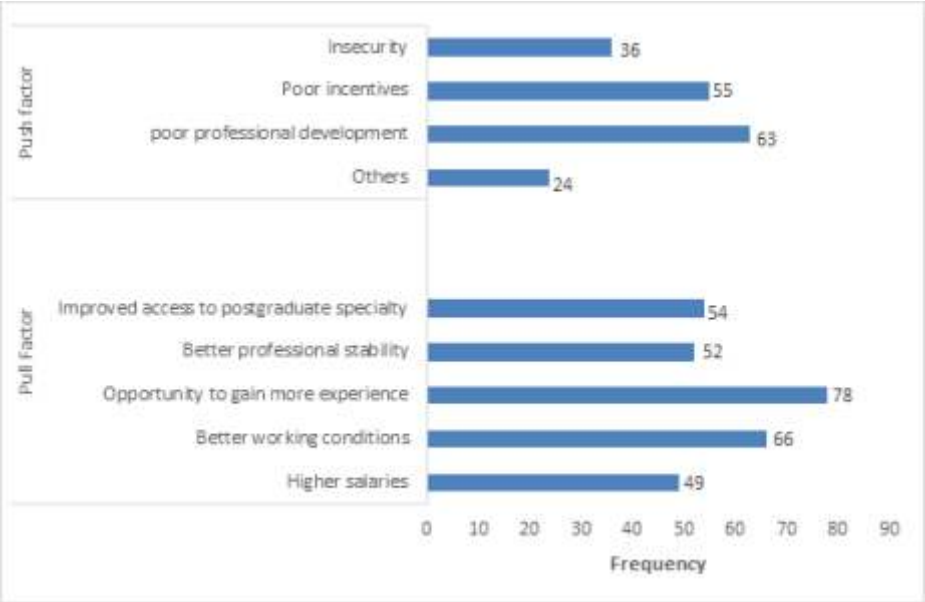


*Fig 1: Push and Pull factors influencing emigration among the medical undergraduates.*

The preferred top destination countries were Canada in 34(33.0%) respondents and the United States of America in 24(23.3%) respondents (fig 2)

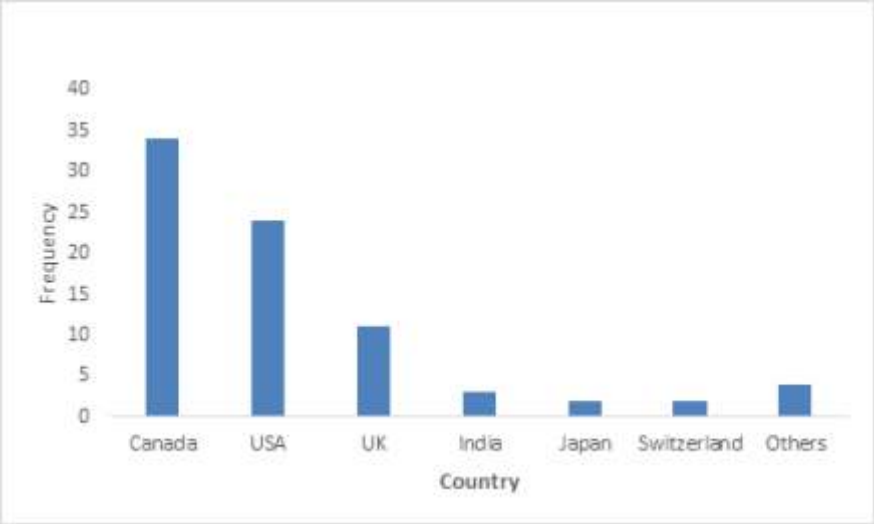


*Fig 2: Preferred destination countries among the medical undergraduates*

Out of the socio-demographic and academic - related factors tested in the logistic regression model, only 'age' and 'belief in career opportunities in home country' had association with 'intention to emigrate' (table 2) and remained significant in multivariate analysis (table 3). Respondents who were less than 25 years old had a ten times increased odd of emigration compared with those that were older. Similarly, respondents who did not believe that there were ample career opportunities in Nigeria had sixteen times increased odd of emigration compared with their counterparts who believed in the existence of such opportunities (table 3). The other factors did not show any significant association with 'intention to emigrate' (table 3)

*Table 2: A univariate logistic regression analysis of factors associated with willingness to emigrate*

| Variable | B | *P* | OR(CI) |
|---|---|---|---|
| Age | 1.602 | 0.031* | |
| >25 | | | 4.963(1.159 – 21.2888)* |
| <25 | | | 1 |
| Sex | -0.010 | 0.980 | |
| Female | | | 0.990(O.431 – 2.272) |
| Male | | | 1 |
| Marital status | 0.501 | 0.529 | |
| Never married | | | 1.650(0.347 – 7.836) |
| Ever married | | | 1 |
| Ethnicity | -0.330 | 0.448 | |
| Non-Ijaw | | | 0.719(0.307 – 1.685) |
| Ijaw | | | 1 |
| Religion | -0.662 | 0.561 | |
| Christianity | | | 0.516(0.055 – 4.803) |
| Other religion | | | 1 |
| Certificate | -0.080 | 0.867 | |
| Senior school | | | 0.923(0.362 – 2.351) |

| Variable | B | *P* | OR(CI) |
|---|---|---|---|
| certificate | | | |
| Higher degrees | | | 1 |
| Ever failed at least a medical course | -0.053 | 0.908 | |
| Yes | | | 0.949(0.387 –2.328) |
| No | | | 1 |
| Family setting | -0.013 | 0.980 | |
| Polygamous | | | 0.987(0.359 – 2.714) |
| Monogamous | | | 1 |
| Father education | -0.201 | 0.668 | |
| Below tertiary | | | 0.816(0.327 – 2.048) |
| Tertiary | | | 1 |
| Mother education | 0.468 | 0.277 | |
| Below tertiary | | | 1.597(0.686 – 3.716) |
| Tertiary | | | 1 |
| Relative(s)abroad | -0.674 | 0.120 | |
| Yes | | | 0.510(0.218 – 1.193) |
| No | | | 1 |
| Belief in ample career opportunities in Nigeria | -2.453 | 0.001* | |
| No | | | 11.625(2.578 -52.425) |
| Yes | | | 1 |

*B= standardized coefficient, OR – odds ratio, p = level of significance, CI – confidence interval,*
** statistically significant*

Sixty three (61.1%) respondents had taken at least a step in pursuit of their emigration goals. The steps taken included browsing the internet in 44(42.7) and establishing contacts with other emigrants in 40 (38.8%) cases. Forty eight (46.6%) respondents reported that health care reforms in Nigeria could influence their emigration decision in the future while 18(17.5%) did not think so. However, 30 (29.1%) respondents were not sure whether their decision could be affected by such reforms. Seven (0.07%) respondents left the question unanswered.

## Discussion

This study has revealed a high desire of medical students to emigrate after graduation. Almost 70% of them had an intention to emigrate from Nigeria. Although, only about a quarter were considering permanent emigration, this does not bring much relief as favourable factors encountered abroad may encourage migrants to stay for longer than earlier anticipated.[17] For instance, a study done among some UK-trained physicians in New Zealand showed that even though only 30% of participants had planned to emigrate 69% of them extended their stay on getting there.[18] Over one-fifth of participants were unsure about their wish to emigrate. Attention must also be paid to this subset of the population as the undecided today may become emigrants tomorrow depending on the conditions they encounter in the future.

Considering these findings, it is likely that the present trend in brain drain among medical doctors may yet continue or even intensify in the near future especially if their colleagues in other institutions in the country share a similar disposition.

The study found a higher percentage of medical students with intention to migrate compared with a study in Ghana (49%).[15]

This rate is also much higher than the average reported rate of 21% found in another study comprising students trained in six African countries, namely South Africa, Democratic Republic of Congo, Kenya, Tanzania, Uguanda as well as Nigeria.[19] However, these studies including the latter one, were done several years ago. Considering the dynamic nature of migration issues, it is possible that there may have been an actual increase in emigration interest over this period.

Majority of the students who had migration intentions had already taken some steps such as internet browsing for opportunities and contacting friends abroad for enquiries. This implies some level of seriousness about their intentions. A similar emigration survey done in Pakistan and Romania showed that a considerable number of medical students had taken concrete steps including studying for licensing examinations, enrolment in a language course, searching for jobs on the internet and planning to gain clinical experience in their desired country of interest while still in their home country.[20,21]

While the decision to migrate may be a personal one, the overall context should be considered as well. The most common push factors for migration in this population were perception of poor professional development and poor incentives in home country. Similarly, factors related to professional development were observed to play a leading role among a group of Egyptian Physicians migrating to Germany.[22] Financial incentives have been shown to be an important motivating factor for health workers, especially in countries where government salaries and wages are insufficient to meet the basic needs of health workers and their families.[23] These incentives include salary supplements, benefits and allowances. Improved salaries and benefits are major financial incentives for workers to remain in the health sector and in their home communities.[24]

A major pull factor in this study was the opportunity provided by migration to gain more professional experience. It has been reported that an important factor attracting health professionals to countries overseas is the opportunity to gain international experience. This is especially important in a country like Nigeria with low budgetary allocation to health[25] and decaying health infrastructure. It is therefore not surprising that most of these students desired to move out for professional exposure and experience.

The preferred destination countries in this study were Canada, SA and UK. Canada is presently a popular destination for several developing countries. This may be due to favourable immigration policies and massive recruitment of skilled workers in recent times. In a study done in Saudi Arabia among physicians, Canada, followed by USA were also the preferred countries for immigration.[26]

The determinants of 'intention to emigrate outside Nigeria' in this study were age and 'belief in ample career opportunities in Nigeria' Among Physicians in Canada and Iceland, younger age was similarly associated with willingness to emigrate [27, 28] while in a German study, older doctors were more likely to emigrate compared with younger ones.[29]

However, in these studies, most of those who wished to emigrate were in the mid- or late thirties. Our population however, was a younger one as the study was carried out among medical students and not already working doctors. Working conditions, including career opportunities have severally been recognized as having major effects on a country's emigration rate. Preventive measures of emigration should therefore address modifiable determinants associated with an increased chance for wishing to emigrate, including availability of career and job opportunities.

Sex showed no association with willingness to emigrate. In the German study, 'female sex', 'being in a relationship' and 'having children' were associated with a lower chance of wishing to emigrate. [29] This may be presumably due to the added responsibility or demand conferred by such position or status. In our study, almost all participants were single. 'Having a relative living abroad' did not show any significant association with willingness to emigrate in this study. This is contrary to the findings of a study done among Lebanese medical students which reported that having a relative or friend abroad conferred a significantly increased odd for intention to train abroad.[30] However, our study was not necessarily about training abroad. Similarly, 'having failed a medical course' showed no relationship with willingness to emigrate. Those that had failed at least a medical course were not more or less likely to emigrate compared with their counterparts who have had no such academic problems. Our finding is similar to the report of Kolčić et al who found no significant difference in willingness to emigrate between Croatian final year medical students that have 'ever failed a year' and 'those that never failed a year.[31] Similarly, there were no significant differences in academic grades between those contemplating migration and those planning to remain in Poland.[16] It does appear that the desire of medical students to emigrate outside their home country may have no relationship with their academic performance. Similarly, parental education had no significant relationship with emigration intentions. Furthermore, family structure, whether monogamous or polygamous, had no impact on desire to emigrate. There are however not many studies on these associations to allow for adequate comparisons.

It is therefore obvious from this study that the medical brain drain may continue except some proactive steps are taken to curtail it. The government and health care stakeholders should tackle this issue as a dire emergency. Active steps should be made to create more jobs and improve the career prospect of doctors. There should be more room for professional training and re-training of doctors to improve professional perspectives. Medical students and resident doctors should have short exchange programmes and elective periods overseas where they can have additional clinical exposures and experience without necessarily a need for long term emigration. Deliberate attempts should be made to improve incentives and working conditions of doctors and to breach the current wage gap among countries. Generally, there should be an urgent and upward review of the budgetary allocation to health. It is worrisome to note that only 3.6% of the annual budget of N8.8 trillion was allocated to health services in 2019 despite the fact that Nigeria currently has one of the poorest health records in the world.[25]

In conclusion, most of the medical students in this study had a desire to emigrate outside Nigeria. Significant push factors were lack of professional perspectives and poor incentives in the country while pull factors in this population were 'opportunity to get more experience and better working conditions.

'Intention to emigrate was negatively predicted by age and perception of career opportunities in Nigeria. There is a need for concerted efforts by the government, key stakeholders and individuals to stem this ugly tide by addressing these factors.

The study had some limitations. The sample size was rather small and study was limited to only one class of students in a particular institution. Secondly, its cross-sectional design does not allow for cause- and -effect analysis. Also, students who were absent from class did not partake in the study. One cannot exclude some elements of response bias in this study. There may be need for follow up studies to observe for possible changes in attitude with subsequent progress in medical school. More studies are needed on a larger scale among medical students and physicians to explore the current trend and other determinants of the medical brain drain as well as uncover unfavorable policies likely to perpetuate this epidemic.

Acknowledgement: Nil

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# Comparison of Lymphocyte Transformation in Normotensive and Preeclamptic Women

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Abstract

*Background: Preeclampsia is a severe form of hypertensive disorders in pregnancy with multisystemic effects. Although the exact aetiology is not known, lymphocyte response during preeclampsia may be a cause or effect.*

*Objectives: To determine if or not lymphocyte transformation occurs in normal pregnancy and in preeclampsia and compare results between the two.*

*Method: This was a cross-sectional comparative study. Two millilitres of venous blood was obtained from 37 preeclamptic women and 38 normal pregnant women. Phytohaemagglutinin was used to induce lymphocyte transformation after determining the baseline count. Data analysis was with Graphpad prism 7.1. Level of significance was set at $p<0.05$.*

*Results: Forty women were recruited in each group of normotensive and preeclamptic patients from which 38 and 37 samples respectively were eligible for analysis. The mean baseline lymphocyte count was not statistically different between the two groups ($p = 0.5731$). There was no significant increase in lymphocyte transformation with phytohaemagglutinin in and between the groups ($p = 0.335$).*

*Conclusion and Recommendation: During normal pregnancy and in preeclampsia, there was no increase in lymphocyte activity noted. Further research on lymphocyte subpopulation and uterine natural killer cells activity in pregnancy is recommended using modern technology.*

*Key words: Lymphocytes, transformation, phytohaemagglutinin, preeclampsia*

## Introduction

Preeclampsia is a syndrome which affects virtually all maternal organ systems. Despite extensive researches, the aetiopathogenesis of pre-eclampsia is not yet fully understood. Preeclampsia is comprehended as an abnormality of the maternal immune system that prevents it from recognizing the fetoplacental unit[1]. Excessive production of immune cells like lymphocytes causes secretion of tumor necrosis factor alpha which induces apoptosis of the extravillous cytotrophoblasts[1, 2]. The major pathological changes are in the placental bed[3]. Altered immune cells are believed to play a role in the pathogenesis of preeclampsia[4]. During pregnancy there is gradual increase in lymphocytes due to increased spontaneous Deoxyribonucleic acid (DNA) synthesis[5, 6]. The proinflammatory $CD4^+$ and cytokines increase during preeclampsia while the regulatory T cells and anti-inflammatory cytokines decrease[7,8]. All these are products of lymphocytes. It is not clear whether the altered immunity is a cause of preeclampsia or a consequence of the disease.

Lymphocyte transformation is applied in immune function testing, bacterial and viral testing, testing for metal poison and environmental pollutant. Lymphocyte transformation may play a significant role in finding the aetiopathogenesis of preeclampsia. This study, set to identify the role of immune system through lymphocytes transformation in preeclampsia using mitogens

## Materials and Methods

It was a cross sectional comparative study of preeclamptic women as cases and normal pregnant women as controls. The study was conducted from September, 2017 to April, 2018 in the department of Obstetrics and gynaecology of Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto. Inclusion criteria were women with preeclampsia and normal pregnancy beyond 20 weeks of gestational age, while exclusion criteria were medical disorders that were not preeclampsia, clinical evidence of infection and use of antiviral drugs. The sample size for the study was determined using the standard formula for calculation of minimum sample size for group comparison.

$$n = \frac{Z^2_{1-\alpha/2}(2\sigma^2)}{d^2}$$ [9]

Where: n = Minimum Sample size

$Z^2_{1-\alpha/2}$ = Standard error associated with confidence interval.

σ = estimated standard deviation (assumed to be equal for each group)

d= desired precision.

The calculated sample size was approximately 31 women and 20% attrition was added to get 37 women for each group. For convenience, 40 women for each group were enrolled into the study. The cases were recruited using the convenient sampling method while the women in both the cases and controls were matched for gestational age only.

All working reagents were obtained from Sigma–Aldrich (St. Louis, Missouri, USA). The lymphocytes transformation assay was done as described by Bayun[10]. Two millilitres of blood were aseptically collected from each study participant and dispensed into a $K_2$EDTA container. The blood sample and balanced salt solution were dispensed into a 10ml test tube and the contents of the tube were carefully mixed; using a Pasteur pipette. The diluted blood sample was layered onto 3ml of Ficoll-paque solution in a centrifuge tube and centrifuged at 400rpm for 30mins at room temperature. The upper layer of the segments formed was removed, while the lymphocyte layer at the interface was pipetted into another centrifuge tube. The isolated lymphocyte was washed in 6ml of the balanced salt solution and finally suspended in 0.5ml of the balanced salt solution. Lymphocyte viability test was done by the trypan blue exclusion test.

The lymphocytes were prepared into concentrations of $1.0 \times 10^6$ cells / ml of blood and cultured in the wells of microtitre culture plates, using TC 199 as culture medium which had been enriched with AB blood group serum. Exactly 0.1ml of phytohaemagglutinin was then added to each well of the microtitre plate. The culture mixtures were then incubated at 37°C for 72 hours. At the end of the incubation period, cultures were centrifuged at 1,500 rpm for 7 minutes and the isolated cells were fixed in 1:10 glacial acetic acid / alcohol mixture and re-centrifuged. The cell pellets were finally resuspended in 0.5ml of culture medium. Thin blood film was prepared from the isolated cells in microscope slides. The films were allowed to dry, stained with Leishmans stain. The percentage of transformed T cells was determined for each sample. The lymphoblasts (as the transformed cells), were counted in a light microscope using x100 objective and the count expressed in percentage. Stimulation index (SI) was calculated as the mean ratio of the stimulated cells divided by the unstimulated cells[11].

Ethical approval for this study was obtained from UDUTH Health Research and Ethics Committee. The data was recorded in Microsoft excel and analysed using GraphPad prism 7.1 software. A *p* - value of $< 0.05$ was considered statistically significant.

## Results

Five samples were found to be haemolysed and were excluded from analysis. Two of the samples were from the normotensive pregnant women (control) group and three samples were from the preeclamptic women (cases) group.

A Shapiro Wilk test ($p < 0.05$) and a visual inspection of the histograms, normal Q-Q plots and box plots of the lymphoblast and stimulation index showed that the data was not normally distributed as it was positively skewed.

*Table 1. Baseline characteristics of the study participants*

| Characteristics | Preeclampsia | Normal pregnancy | *p*-value |
|---|---|---|---|
| Mean age (years) | 28.9±6.8 | 24.0±4.9 | *0.001* |
| Parity | 1 | 0 | *0.006* |
| Mean gestational age(weeks) | 36.0±3.8 | 36.2±3.7 | *0.832* |

*The mean ages of the preeclamptic and normal pregnant women were 28.9 (SD 6.8) and 24.0 (SD 4.9) years respectively. The mean ages (p =0.003) and modal parity (p=0.006) were statistically different between the two groups while the gestational age shows no statistically significant difference (p = 0.832). Table 1*

*Table 2. Baseline lymphocyte count, lymphoblast and stimulation index*

| | Preeclampsia | Control | *p* – value |
|---|---|---|---|
| Baseline lymphocyte count ( x $10^9$) | 2.1 ± 1.2 | 1.96 ± 0.8 | *0.5731†* |
| Lymphoblast (%) | 46.5 | 57.9 | *0.335ū* |
| Stimulation index | 2.1 | 1.7 | *0.335ū* |

*† - t-test, ū - Mann Whitney U test*

*Though the mean unstimulated cell count was higher with the Preeclamptic group, this however did not attain statistical significance (p= 0.573). While the control group recorded a median increase in lymphoblast transformation (p = 0.335), the Preeclamptics had a higher stimulation index (p=0.335) as depicted in Table 2.*

## Discussion

Preeclampsia known as disease of theories has multi-systemic effects. The immune system is one system that has a very significant role either as a cause or effect[1,4]. From this study the preeclamptic women were found to be older than the normal pregnant women which was statistically different. This was similar to findings by Kumari *et al*[12]. The observed difference may be because the two groups of the participants were not matched for age.

The unstimulated lymphocytes count was slightly lower in the normal pregnancy group compared to the preeclamptic women. Though the difference was not statistically significant this may indicate an ongoing inflammatory process in preeclampsia. This is similar to findings by Yuvuscan *et al* and *Brien et al*, who demonstrated slightly higher lymphocyte count in preeclamptic women compared to the normal pregnant women[13,14].

Also Ceyhan *et al* and Mukayana *et al* found no significant difference in lymphocyte count between the preeclampsia and normotensive pregnant women[15, 16]. Clinically, total lymphocytes count may not be of any clinical significance in diagnosing or assessing the severity of pre-eclampsia in our environment. However assessing CD4+ CD8+ lymphocytes and T regulatory cells may help in assessing the severity of the disease[7, 8]. An imposing number of mechanisms have been proposed to explain the aetiopathogenesis of preeclampsia. One of these mechanisms is immunological maladaptive tolerance among maternal, placental and fetal tissues. This may explain the higher lymphocytes counts observed in this study.

Lymphoblast that results from the incubation of lymphocytes with phytohemagglutinin (PHA) stimulates the transformation of autologous lymphocytes but in preeclampsia the lymphocytes response is poor[17]. In this study lymphocytes transformation with PHA was slightly higher in the normal pregnant women compared to the preeclamptic women however not statistically significant. This may indicate that lymphocytes during normal pregnancy and preeclampsia are not significantly stimulated by phytohaemagglutinin or it may be the failure of the lymphocytes to initiate adequate inflammatory response during pregnancy and preeclampsia. However the lymphocytes in normal pregnancy and preeclampsia may not be responsive to phytohaemagglutinin but may be stimulated by other mitogens. This was similar to the work of Petrucco *et al* on phytohemagglutinin[18]. Curzen and co-workers demonstrated that there was no statistically significant difference in Mytomycin-induced lymphocytes transformation between normal pregnant and preeclamptic women[19]. Although Metthiesen *et al* found a higher lymphocytes transformation with phytohemagglutinin in preeclampsia patients compared to normotensive women, there was no statistically significance found[20]. Lymphocytes have been demonstrated to be responsible for their spontaneous DNA activity[18]. During pregnancy human placental lactogen, human chorionic gonadotrophic hormone, cortisol and progesterone may be responsible for the inhibition of lymphocyte DNA activity[18, 21]. It has also been demonstrated that mesenchymal stem cells can inhibit the proliferation of lymphocytes in respond to phytohaemagglutinin[22]. However only cortisol was shown *in vitro* to have a regular inhibition at physiological concentration[18]. These may explain the failure of significant lymphocytes activation during pregnancy and preeclampsia.

The stimulation index with PHA between the normal pregnant and preeclamptic women was not significantly different since the transformation was not statistically significant. There was no significant lymphocyte transformation in preeclampsia. This had been demonstrated by Petrucco *et al*,[18] Curzen *et al*[19] and Metthiesen *et al*[20]. Lymphocytes transformation neither occurred significantly in normotensive pregnancy nor in preeclampsia in this study as in another report by Comings[23]. It can be deduced from this research that the mitogen used did not induce the lymphocytes in both normal pregnant and preeclamptic women. The failure of the lymphocytes to be initiated by this mitogen may disprove the immune theory proposed for preeclampsia. This may not hold until other available mitogens are used for lymphocytes transformation in normal pregnancy and preeclampsia. It may also be that lymphocytes are not involved significantly in the aetiopathogenesis of preeclampsia.

If the immune theory holds to be true in the aetiopathogenesis of preeclampsia in humans, immune modulators may play a role in the prevention or treatment of the disease. This study could downplay the role of immune modulation in the prevention or treatment of pre-eclampsia. However the limitation of this study is the non-matching of the participants for age and parity.

## Conclusion

There was no involvement of lymphocytes transformation in preeclampsia from this study. This may be due to failure of the lymphocytes to respond to the mitogen used, counter effect of hormones of pregnancy or perhaps that the immune system plays little or no role in the pathogenesis of preeclampsia

## Recommendation

Further researches that will focus on the functions and subpopulations of lymphocytes including the uterine natural killer cells using modern techniques of assessing immune responses are recommended.

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# Pattern of Mortality amongst In-Patients in a Tertiary Hospital South-South Nigeria.

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## Abstract

*Background Measurement of the number of deaths each year and evaluation of the causes is an important means of assessing the effectiveness of a healthcare delivery system and will assist health policy makers to plan for effective and efficient healthcare delivery system. There is however dearth of information on causes and pattern of in-patients hospital mortality in most countries of Sub-Saharan Africa including Nigeria particularly in the South-South region.*
*Therefore this study is aimed at finding out the mortality pattern among in-patients in a tertiary hospital South-South Nigeria.*

*Methods A 3 years retrospective descriptive cross-sectional study of deaths that occurred in the Niger Delta University Teaching Hospital, South-South Nigeria from January 2016-December 2018 . The information for the study was collected from medical records of deaths that occurred in the hospital during the period.*

*Results During the period under review, a total of 4527 patients were admitted with a total mortality of 447 with an average crude mortality rate of 9.9%. The male sex had a higher mortality of 15.0 % compared to the female of 7.2% and the age group 45-64 years recorded the highest percentage mortality (33.3%). Infectious diseases constituted the highest cause of death (28.2%) followed by neurological diseases with deaths from hematological conditions being the lowest (1.6%).*
*Conclusion This study revealed that communicable diseases (infectious diseases) constituted the most common cause of death. Amongst the non-communicable diseases, neurological diseases were responsible for 15.6% of the deaths.*

Key words- Mortality Pattern, Cause of Death, South-South Nigeria.

## Introduction

Measurement of the number of deaths and evaluation of the possible causes is an important means of assessing the effectiveness of a healthcare delivery system. Health statistics reflecting the causes of death and the mortality pattern will assist health policy makers to plan for effective and efficient healthcare delivery system.

Hospital inpatients mortality pattern is important for monitoring the population health and useful in planning for curative and public health care, policymaking, and eventually the allocation of resources for health services, research, and training.[1-3] Developed countries have sophisticated systems that facilitate collection of data but such systems of data collection are lacking in developing and underdeveloped counties.[4]

More than half of all deaths in low-income countries in 2016 were caused by communicable diseases, maternal causes; conditions arising during pregnancy and childbirth, and nutritional deficiencies.

Non-communicable diseases caused 71% of deaths globally, ranging from 37% in low-income countries to 88% of high-income countries.[5] Majority of African studies report infectious diseases as the major cause of death.[6-12] By contrast, less than 7% of deaths in high-income countries were due to such causes. Lower respiratory infections were among the leading causes of death across all income groups.[5]

In Ife and Owo (western Nigeria),[6,8] infections, trauma, neonatal and pregnancy-related deaths were the leading causes of death while a study from Kano (northern Nigeria) reported infectious diseases other than HIV/AIDS, cerebrovascular disease and chronic renal failure as leading causes of hospital deaths.[7] Another study from Umuahia (South-East Nigeria) showed that the overall leading cause of death was infectious diseases. Other major causes were cardiovascular system-related, neonatal causes, trauma, diabetes mellitus complications and neoplasia.[12]

Knowing the current burden and trends of the main causes of in-hospital deaths is crucial for determining current healthcare needs assessment in both public health and hospital care[1-3]. The importance of the availability of such data for the planning and the distribution of scarce resources to improve the weak healthcare system of the Nigeria cannot be overemphasized.

There is however dearth of information on causes and pattern of in-patients hospital mortality in most countries of Sub-Saharan Africa including Nigeria particularly in the South-South region.

Therefore this study is aimed at finding out the mortality pattern among in-patients in a tertiary hospital in South-South Nigeria.

## Materials and Methods

This study was conducted in the Niger Delta University Teaching Hospital, Okolobiri in Bayelsa State. Bayelsa State is one of the oil producing states in South –South, Nigeria. The hospital is located in a community very close to a crude oil and gas facility with it attendant gas flaring which has continued unabated for 14 years. Apart from the host community, several other neighboring communities are exposed to the gas flaring. Oil and gas exploration activities with it associated gas flaring and environmental pollution have been ongoing in most communities in Bayelsa and its environs since the discovery of crude oil in Olobiri, Bayelsa State

The hospital also sub-serves the neighboring communities, other communities in Bayelsa and neighboring states with similar oil and gas exploration activities. Bayelsa State is geographically located within Latitude 04 to 15' North, 05 to 23' South and longitude 05 to 22' West and 06 to 45' East. It shares boundaries with Delta State on the North, Rivers State on the East and the Atlantic Ocean on the West and South. Bayelsa State is a picturesque tropical rain forest, with an area of about 21,110 square kilometers. More than three quarters of this area is covered by water, with a moderately low land.

A 3 year retrospective descriptive study of deaths that occurred in the Niger Delta University Teaching Hospital from 2016-2018. The hospital provides a high level of care to patients and has in place quality improvement measures. The Health

Information Department uses both manual and electronic methods of record keeping. While autopsy findings provide the gold standard for cause-of-death evaluations, this approach is prohibitively expensive, rarely applied and likely to be based on a biased sample of deaths assigned to coroners. It was not practical to carry out autopsies for most deaths that occurred in the hospital because of cultural practices and beliefs that prohibit autopsy[13]. The data obtained from the medical records included demography, duration of hospital admission, ward of admission, primary diagnosis, specific causes of death, categorization and Medical Consultant that reviewed the cases. The gold standard used for cause-of-death reporting was to have the cause certified by a medical practitioner using the rules and procedures of the *International classification of diseases and related health problems* (ICD).[14] Only cases certified death by medical practitioners were included. All 'Brought in Dead' cases were excluded from the study.

The information for the study was collected from medical records of deaths that occurred in the hospital from January 2016-December 2018. Data were analyzed with Statistical Programme for Social Sciences (SPSS) version 21.0 software. Frequency tables, ratio, proportions and rates were used to present and analyze data. The level of significance was set at $p<0.05$. Ethical approval was sought and obtained from the hospital Ethics and Research Committee before the commencement of the study.

## Results

*Table 1: Yearly Variation in Mortality Rate*

| Year | Admission | Mortality | Crude Mortality Rate (%) |
|---|---|---|---|
| 2016 | 1457 | 117 | 8.0 |
| 2017 | 1651 | 152 | 9.2 |
| 2018 | 1419 | 178 | 12.5 |
| Total | 4527 | 447 | 9.9% |

*A total of 4527 patients were admitted with a total mortality of 447. The average crude mortality rate was 9.9% with a progressive increase in the crude mortality rate within the study period (Table 1).*

*Table 2: Frequency of Admissions and Mortality in Relation to Sex*

| Sex | Admissions | Mortality | Crude Mortality Rate (%) |
|---|---|---|---|
| Male | 1571 | 235 | 15.0% |
| Female | 2956 | 212 | 7.2% |
| Total | 4527 | 447 | 9.9% |

*The male sex had a higher mortality (15.0 %) compared to the female (7.2%) (Table 2).Person's $x^2$ value=69.894, $p<0.0001$. Statistically significant.*

*Table 3: Mortality according to Age and Sex distribution*

| Age Group | Female | Male | Total (%) |
|---|---|---|---|
| <24 hours | 7 | 10 | 17(3.8) |
| 1 day-28 days | 13 | 15 | 28(6.3) |
| 1-11 months | 1 | 3 | 4(0.9) |
| 1-4 years | 9 | 10 | 19(4.3) |
| 5-18 years | 7 | 9 | 16(3.6) |
| 19-44 years | 79 | 45 | 124(27.7) |
| 45-64 years | 59 | 90 | 149(33.3) |
| 65 and above | 37 | 53 | 90(20.1) |
| Total | 212 | 235 | 447(100) |

Age group 45-64 years recorded the highest percentage mortality of 33.3% (Table 3).

Table 4: Causes of Death

| Causes of Death | Frequency | Percentage (%) |
|---|---|---|
| Infections | 126 | 28.2 |
| Endocrinology | 34 | 7.6 |
| Cardiovascular Diseases | 32 | 7.2 |
| Neurological Diseases | 71 | 15.9 |
| Gynecological / Obstetrics | 10 | 2.2 |
| Respiratory Diseases | 19 | 4.2 |
| Neonatology | 43 | 9.6 |
| Surgery / Trauma | 16 | 3.6 |
| Hematology | 7 | 1.6 |
| Oncology | 32 | 7.1 |
| Nephrology | 20 | 4.5 |
| Gastroenterology | 37 | 8.3 |
| Total | 447 | 100 |

*Infectious diseases constituted the highest cause of death (28.2%) followed by neurological diseases with deaths from hematological conditions being the lowest (1.6%) (Table 4).*

*Table 5: Major causes of mortality and age distribution*

| Causes of Death | Children (%) | | | | | Adults (%) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | <24hrs | 1-28 days | 1-11 months | 1-4yrs | 5-17yrs | 18-44yrs | 45-64yrs | ≥65yrs | Total |
| Infection | 5 (4.0) | 3(2.4) | 1 (0.8) | 10(7.9) | 9(7.1) | 52(41.3 | 34(27.0) | 12(9.5) | 126 (100) |
| Endocrinology | - | - | - | - | - | 4(11.8) | 19(55.9) | 11(32.4) | 34(100) |
| Cardiovascular Diseases | - | 1(3.0) | - | - | - | 8(27.3) | 13(39.4) | 10(30.3) | 32(100) |
| Neurological Diseases | - | 1(1.4) | 1(1.4) | 2(2.8) | 1(1.4) | 10(14.1) | 30(42.3) | 26(36.6) | 71(100) |
| Gynecological / Obstetrics | - | - | - | - | - | 10(100) | - | - | 10(100) |
| Respiratory Diseases | 1 (5.3) | 2 (10.5) | - | 1 (5.3) | 1 (5.3) | 6 (31.5) | 3 (15.8) | 5 (26.3) | 19 (100) |
| Neonatology | 7(16.3) | 36(83.7) | - | - | - | - | - | - | 43(100) |
| Surgery / Trauma | - | - | - | - | - | 9 (56.3) | 4 (25.0) | 3 (18.7) | 16 (100) |
| Hematology | - | - | - | 2 (28.6) | 1 (14.2) | 2 (28.6) | 2 (28.6) | - | 7 (100) |
| Oncology | - | - | - | - | 3 (9.4) | 7 (21.9) | 12(37.5) | 10(31.2 ) | 32 (100) |
| Nephrology | - | - | - | - | 1 (5.0) | 5 (25.0) | 7(35.0) | 7(35.0) | 20 (100) |
| Gastroenterology | - | 2 (5.4) | 2 (5.4) | - | - | 8 (21.6) | 20(54.1) | 5 (13.5) | 37 (100) |

As shown in Table 5, endocrine, cardiovascular, neurological diseases and malignancies are rare causes of death amongst children.

## Discussion

The present study described the pattern of mortality at the Niger Delta University Teaching Hospital, Okolobiri. Bayelsa State, South –South Nigeria from January 2016 - December, 2018. The observed crude mortality rate was 8.0%, 9.2 %, 12.5% in 2016, 2017 and 2018 respectively and the overall crude mortality rate of 9.9%. This mortality rate was much lower than the 28.3% mortality rate of similar study done in Kano, Nigeria.[15]This higher mortality figure could be explained by the design of the Kano study which only looked at mortality in medical wards in contrast to our study which evaluated overall mortality during the period under review.

In a study done in Umuahia, South-East, Nigeria an overall mortality rate of 12% was found which was slightly higher than our finding.[12]This difference could be partly explained by the fact that their study was done 10 years ago.

Our study revealed that male constituted 52.6% of the total mortality as against 47.4% of female This finding is similar to other studies done in Nigeria.[7,12] Females have generally been shown to have lower mortality and longer life expectancy than males.[16-17]The exact explanations for gender difference in life expectancy is not very clear because of the complex interplay of biological, social and behavioral factors.[16-17]

In our study, deaths from malignant conditions constituted 7.1% as against 3.5% of a similar study carried out in the South-Eastern Nigeria.[12] Breast cancers were responsible for most of the malignancy related mortality. A plausible explanation among other risk factors for this trend is increased exposure to toxins occasioned by increased gas flaring and water pollution from oil exploration activities in Bayelsa State. Evidence abounds that oil and gas flaring are deleterious and have grave consequences on public health. Crude oil contains polycyclic aromatic hydrocarbon, metals and other components.[23-24]

Gas flaring and venting associated with petroleum exploration and production in Nigeria have been shown to affect virtually all major organs and systems of the body and cause different acute and chronic diseases including cancers.[23-24] This study has some limitations. Autopsy findings provide the gold standard for cause-of-death evaluations. However, it was not possible to carry out autopsy in all the deaths because of the prohibitive cost, cultural beliefs and practices. In this study, cause-specific mortality fractions based on vital registration data which is the ideal standard was not obtained. Since this is a hospital based study and some deaths occur outside hospitals which are rarely medically certified, substantial number of deaths could have been missed.

## Conclusion

This study revealed that communicable diseases (infectious diseases) constituted the most common cause of death. Therefore infectious diseases control programs should further be strengthened to tackle the menace of the diseases.

Amongst the non-communicable diseases, neurological conditions mostly cerebrovascular disease accounted for a number of the deaths.

There is therefore need to sensitize the population on lifestyle modification and change in health seeking behavior to reduce the prevalence of non-communicable diseases.

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Original Article

# Utilization of Diagnostic Musculoskeletal Ultrasound Scan in Clinical Practice: The Irrua Specialist Teaching Hospital Experience.

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Abstract

*Background: Soft tissue lesions of the musculoskeletal system are commonly encountered in clinical practice, often manifesting as palpable masses. Ultrasound scan is increasingly being used for the evaluation of these masses and can serve as an excellent investigative modality for the clinical practitioner because certain clinical and imaging findings give accurate diagnosis in some cases. Although ultrasound scan is readily available, relatively inexpensive and provides high-contrast resolution images, clinical request for musculoskeletal ultrasound scan is quite low in our health institutions thus necessitating this study.*

*Aim: To illustrate the relevance of musculoskeletal ultrasound scan in clinical practice.*

*Methods: Retrospective data of patients that underwent soft tissue ultrasound scan in the Department of Radiology, Irrua Specialist Teaching Hospital, Irrua, Edo state, Nigeria from August 2016 to May 2017 was collected and analyzed to determine age, sex distribution, clinical indication for the procedure and the findings.*

*Results: A total of 3,698 patients were referred for ultrasound scan, 24 of these were request for musculoskeletal ultrasound scan. Of these patients, 58.3% were males, 41.7% were females, age ranging from 8 months to 60 years with a mean age of 27.7years. The commonest indication was suspected non-inflammatory conditions (75%). The most frequent abnormality seen on ultrasound scan was tumors of fatty origin accounting for 37.5%.*

*Conclusion: The use of musculoskeletal ultrasound scan in the evaluation of soft tissue lesions cannot be over emphasized. There is low referral rate from clinical practitioners.*
*We thus encourage the use of musculoskeletal ultrasound scan as the primary investigative tool for musculoskeletal lesions.*

Keywords: Musculoskeletal, masses, ultrasound scan, clinician, utilization.

## Introduction

The radiologic evaluation of soft tissue masses has changed dramatically within the last two decades[1]. Before the introduction of computer-assisted imaging, assessment of clinically suspicious soft tissue masses was usually limited to radiographs[1]. Although radiographs were sensitive in the identification of adipose tissue and soft

tissue mineralization, they provided little other diagnostic information.

The earliest report of application of ultrasound in the evaluation of musculoskeletal system disorders was published in 1972[2].To our knowledge, literature publication of the utilization of musculoskeletal ultrasound in our environment is rare. A recent study in the USA showed significant increase in musculoskeletal ultrasound utilization over the past decades with as high as 316% increase in the number performed between 2000 to2009[3].

Musculoskeletal ultrasound involves the use of high frequency sound waves to image soft tissues such as tender muscles, nerves, cartilages, joints, etc and bony structures for the purpose of diagnosing pathology or guiding real time interventional procedures[4]. Radiological evaluation of musculoskeletal masses has changed dramatically with the continued improvement of imaging technology[5], thus increasing clinical application and allowing acquisition of dynamic information[1]. Although the choices available for imaging evaluation of musculoskeletal masses have changed dramatically, the basic objectives have remained the same: diagnosis and management[5].

The application of ultrasound to musculoskeletal conditions continues to expand and it has become the primary modality of imaging[6]. The wide availability and improvement in technology coupled with portability, low cost, use of non-ionizing radiation and its safety makes ultrasound a preferable first choice imaging modality for the evaluation of musculoskeletal disease[7]. Ultrasound scan also has the benefit of quick scan time with real-time dynamic examination. It also allows contralateral examination and does not pose limitations due to metal artifacts which can be problematic in Magnetic Resource Imaging (MRI)[8]. Clinical presentation of the disease, ultrasound skills with its prerequisite anatomical knowledge makes the diagnosis more precise and reduces uncertainties in the choice of therapy[8].

There are several applications of real-time dynamic ultrasound examination in the musculoskeletal system. It can be used in imaging both inflammatory and non-inflammatory diseases, traumatic and degenerative soft tissue conditions [7,8] such as cellulitis, abscesses, pyomyositis, disease of the joints like Baker's cyst, infectious tenosynovitis, necrotizing fascilitis[8,9], septic arthritis, carpal tunnel syndrome, adhesive capsulitis, extensor carpi ulnaris, joint effusions, diagnosis of intra-articular bodies, rheumatoid tenosynovitis, tendon tear, soft tissue masses and infections of the extremities, differentiating cystic from solid masses and identifying their vascularities [7,8,9]. Other indications include identification of soft tissue foreign bodies, developmental dysplasias, ultrasound guided biopsy and aspiration and other indications where MRI is contraindicated such as in patients with metallic implants[2, 8, 9,10,11,12]. Musculoskeletal sonography is also invaluable in sports medicine, where it can be used to identify traumatic joint effusions, occult fractures and fissures, joint inflammation, muscle and tendon rupture [8,13].

Infection of the musculoskeletal system can be associated with high mortality and morbidity if not promptly and accurately diagnosed[14]. These infections are generally diagnosed and managed clinically, however, clinical and laboratory findings sometimes lack sensitivity and specificity

and a definite diagnosis may not be possible[14] . In certain situations, imaging is frequently performed to confirm the diagnosis, evaluate the extent of the disease and aid the treatment plan[14]. Although many imaging findings of infectious diseases can overlap with non-infectious processes, imaging can help establish the diagnosis when combined with the clinical history and laboratory findings[14].

Integrated ultrasound imaging (using B-mode and Color Doppler) plays a fundamental role in the study of periskeletal soft tissue tumor for both diagnosis and treatment planning[15]. It permits the integration of conventional morphostructural parameters with biofunctional data of lesion flow patterns and relative qualitative features thus differentiating benign from malignant soft tissue tumors[15].

Despite these advantages, the use of musculoskeletal ultrasound scan has some limitations. Ultrasound scan is operator-dependent with poor repeatability[7]. Even with advances in the resolution of the transducer, deeper structures like bone marrow may be difficult to visualize as the higher frequency transducers have lower tissue penetration[7]. Another limitation is the restricted access to certain joints such as the metacarpophalangeal joints which are difficult to image with an ultrasound probe[7]. In addition, examination of multiple joints in clinical setting may be time consuming[7].

These factors may necessitate the use of other imaging modalities especially cross sectional modalities either as first line radiologic investigation or complementary modality. Plain radiography is commonly the first line imaging modality of bone and soft tissue diseases in most of our health institutions because of its availability and low cost[16] and is the cornerstone of imaging evaluation of joints[16]. Radiography is sensitive to the identification of adipose tissue and soft tissue calcification[16]. But it is of little value in soft tissue imaging due to its intrinsically poor contrast of soft tissues[1].

Cross sectional imaging including Computed Tomography (CT) scan and MRI provide detailed anatomical information in the evaluation of soft tissues due to their inherent high spatial and contrast resolution[14]. Deeper structures and multiple areas can be imaged in one acquisition[14]. There are distinguishing CT characteristics that can suggest a specific diagnosis including the lesion`s mineralization pattern, density, pattern of adjacent bone involvement, degree and pattern of vascularity[17]. Magnetic Resonance Imaging has become a valuable technique in the evaluation of musculoskeletal system because of its excellent soft tissue differentiation and its ability to obtain images in multiple planes[1,18]. It not only is maximally sensitive to the presence of musculoskeletal soft tissue lesions, but also provides exquisite definition of their features[19]. Magnetic Resonance Angiography accurately reveals the arterial and venous supply of vascular tumors[18]. Contrast enhanced MRI is the most sensitive technique for the detection of synovitis, ligament tears, chondral lesions and it is the only modality that can detect bone marrow edema which is an indication of active inflammation[20], osteonecrosis, occult fractures; primary and secondary neoplasm and metastases[20,21].

Radionuclide bone scan is of value in evaluating the extent of osseous involvement or in detecting unsuspected skeletal metastasis[18]. Positron Emission Tomography (PET) using fluorine-18-fluro-2-deoxy-D-glucose is useful in metabolic imaging[10,22,23]. It is used as an adjunct in the

preoperative evaluation of suspected soft tissue masses, differentiating malignant from benign tumors depending on their differential uptake ration[10,18].

## Materials and Methods

This study is a retrospective analysis of patients that were referred to the Department of Radiology, Irrua Specialist Teaching Hospital, Irrua, Edo state who had soft tissue ultrasound scan performed on them by Consultant Radiologists from August 2016 to May 2017. Ethical approval was sought and granted by the hospital ethical committee. Irrua is situated in Esan land, some 87Km North of Benin-City. It is the headquarters of Esan Central Local Government area in Edo state. The locals are the Esan speaking people. Irrua Specialist Teaching Hospital is one of the tertiary health care centres in Edo state which carters for patients in Edo state as well as those referred from Delta, Ondo, Ekiti, Kogi and other neighbouring states.

B-mode ultrasound scan was done using a high frequency 7.5 MHz curvilinear transducer (Mindray DUS 2013 model manufactured by Shenzen Mindray Biomedical Electronic Company Limited, Shenzen China). Emphasis was placed on scanning the area of swelling and comparing with the contralateral normal area or limb. Longitudinal and transverse images were obtained. Color Doppler studies were occasionally done to ascertain the vascularity of the lesions. The data obtained were recorded using tables. Statistical analysis was done with Chi-square test using SPSS version 21.0 software. Results were presented in figures and tables using comparative percentage.

## Results

A total of 3,698 patients were sonographically examined from August 2016 - May 2017 of which, 24 patients were referred for musculoskeletal ultrasound scan.

*Table I: Socio-demographic characteristics of participants*

| Age (Years) | Frequency | Percentage |
|---|---|---|
| ?1 | 3 | 12.5% |
| 1-20 | 6 | 25% |
| 21-40 | 9 | 37.5% |
| 41-60 | 6 | 25% |
| Total | 24 | 100% |
| Mean ± SD=27.72 | | |
| Male | 14 | 58.3% |
| Female | 10 | 41.7% |
| Total | 24 | 100% |

*A higher proportion of these participants were of the age group 21-40years (37.5%). Majority of them were males (58.3%) while percentage of females was 41.7% (Table I).*

*Table 2: Clinical indication for scan.*

| Clinical Indication | Frequency | Percentage |
|---|---|---|
| Inflammatory | 6 | 25% |
| Non-inflammatory | 18 | 75% |
| Total | 24 | 100% |

*Based on the clinical information provided by the referring clinician, 6 (25%) had suspected inflammatory conditions like abscess, cellulitis, while 18 (75%) had suspected non-inflammatory conditions i.e. tumors of various soft tissue origin (Table II)*

*Table 3: Ultrasound scan findings.*

| Ultrasound Diagnosis | Frequency | Percentage |
|---|---|---|
| Fatty tumors | 9 | 37.5% |
| Abscess | 6 | 25% |
| Muscular tumors | 3 | 25% |
| Mixed Muscular and fatty tumors | 2 | 8.3% |
| Others | 4 | 16.7% |
| Total | 24 | 100% |

Ultrasound scan findings include; abscesses (25%), tumors of fatty origin (37.5%), muscular tumors (12.5%), mixed muscular and fatty tumors (8.3%) and others (16.7%) which include bone tumors and tumors of vascular origin including aneurysm (Table III).

Fifty percent (50%) of the participants that had tumors of fatty origin were within the age group of 41-60 years. Abscess (66.7%) was seen in those less than one year of age. More females (50%) had tumors of fatty origin as compared with males (28.6%). A higher proportion of males (57.1%) had other tumor types (tumors from bone, vascular tumors).

## Discussion

A total of 3,698 patients underwent a B-mode ultrasound scan in our department; out of which only 24 (0.0065%) were for musculoskeletal. This is a reflection of a very low referral rate for musculoskeletal ultrasound scan in our environment. This finding is similar to earlier reports from several authors. Iovane et al[15] reviewed B-mode and Color Doppler findings of 43 patients with palpable periskeletal soft tissue masses. Blankstein et al[24] also had a small sample size of 34 patients like ours. However, some authors had larger sample sizes. Hung et al[25] carried out a study in Shatin, Hong Kong and evaluated 714 (seven hundred and fourteen) patients with superficial soft tissue tumors. This is a reflection of increased referral and utilization of musculoskeletal ultrasonography by clinicians. All our 24 patients (100%) had abnormal findings on ultrasound scan. This seems to confirm the high sensitivity of musculoskeletal ultrasound. Hung et al[25] concluded in their study that the diagnostic accuracy of musculoskeletal ultrasound in the assessment of superficial musculoskeletal soft tissue tumors is high and determined an overall accuracy of 79%. Sensitivity and specificity for identifying malignant superficial soft tissue tumor was 94.1% and 99.7% respectively[25]. Increased observer awareness of specific tumor entities increases the sensitivity and specificity of ultrasound diagnosis[25].

Musculoskeletal tumors are histologically classified based on the tissue type they affect[26], ranging from benign subcutaneous lipoma to

malignant deep high grade sarcoma[27]. The commonest tumor types recorded in this study were tumors of fatty origin only. This made up 37.5% of our patients and found in the 41-60years age group (50%), affecting more females. Fat-containing tumors are the most commonly encountered soft tissue masses clinically[28] and vast majorities are benign[28]. They demonstrate a characteristic appearance on ultrasound scan which is identical to subcutaneous fat[12, 28]. Study by Murphy et al[12] reported that soft tissue lipoma accounts for almost 50% of all soft tissue tumors and radiologic evaluation is diagnostic in up to 71% of cases[12].

The usual onset of lipoma is within the age range of 40-60years, rare in children and the cause is unclear but could be hereditary. It has equal incidence in males and females[5,29] Sonographically, lipomas are relatively hyperechoic when compared with adjacent subcutaneous fat but could be hypoechoic or isoechoic[30, 31, 32]. Inampudi et al[31] showed a wide range of appearance of biopsy proven lipomas in their study. They recorded that 17% were hypoechoic, 59% isoechoic, 24% were hyperechoic compared to adjacent subcutaneous fat[30], no acoustic shadowing, no or minimal color Doppler flow[30]. Heterogeneous echotexture, presence of Color Doppler flow or large size is suspicious of liposarcoma[30].

Six (25%) of our patients had inflammatory disease diagnosed sonographically as abscess. Fifty percent (50%) of these cases that were diagnosed as abscess were found in the age group of less than one year. Abscesses can occur in any age group when there is a skin infection that is untreated, when the immune system is compromised due to systemic illness or medication[33]. Ultrasound scan is usually the first investigation to evaluate suspicious abscess. Abscesses are manifestations of cellulitis and necrotizing fascitis[33]. It lies within the dermal and subdermal cutaneous layers. Sonographically, abscesses appear as poorly defined anechoic or hypoechoic fluid collection with or without echogenic borders and with or without septae. Sediments or even gas may be seen within the central fluid collection. Compression with the transducer may induce movement or swirling of the abscess content. Also, Cobblestone appearance of surrounding subcutaneous tissues due to edema from associated cellulitis may be seen[33].

A limitation of this study was absence of confirmatory histopathologic diagnosis of tissue sample from our patients.

## Conclusion

The management of patients with soft tissue masses needs careful assessment and appropriate use of investigational tools to obtain a diagnosis. Ultrasonography is well suited to identify location, size and extent of musculoskeletal masses because of its high diagnostic accuracy which can be improved through increased Radiologist awareness of the characteristic appearances of these disease entities. A better interaction among Surgeons, Radiologists and Pathologists would enable adequate staging of musculoskeletal tumors and better planning of definitive treatment of patients.

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# Effects of Statins on the Serum Uric acid of Dyslipidemic Patients in the University of Port-Harcourt Teaching Hospital.

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Abstract

*Introduction: Uric acid, which is an end product of purine metabolism is associated with cardiovascular risk via its up regulation of inflammatory markers.*

*Objectives: To determine the effects of different statins on the serum uric acid level of dyslipidemic patients in the University of Port-Harcourt Teaching Hospital, as well as correlate the doses of the selected statins with these effects.*

*Method: This was a cohort study carried out over a period of 9 months from June 2017 to February 2018, in the University of Port-Harcourt Teaching Hospital. Dyslipidemic subjects who met the study criteria, had their baseline serum uric acid assayed and repeated at 3months.*

*Results: Three hundred and sixty six subjects were recruited, but forty-six were lost to follow-up. The subjects used for final analysis were 160 test subjects placed on statins and 160 control subjects who were statin- free. The mean age± SD of the test subjects was 57.02±12.45, while that of the control subjects was 51.86±13.27. Statins had a significant effect on the reduction of serum uric acid, although there was no significant correlation between the doses of statins used and the uric acid levels.*

*Conclusions: Statins were found to have hypouricemic effects, although there was no significant correlation between the dosages of statins and their effects on serum uric acid.*

Keywords: Uric acid, statins, Dyslipidemia, Port-Harcourt.

## Introduction

Hyperuricemia is a health problem in industrialized nations with increasing prevalence world-wide. It has been associated with dyslipidemia and cardiovascular mortality.[1] In the United States, Rodriguez *et al*[2] *reported that* about 53% of adult population have dyslipidemia, predominantly hypertriglyceridemia (30%). In developing countries, the majority of the cardiovascular death is among the young adults and middle age group[3] and in the future, it will impact negatively on the economic growth and development as they belong to the working class. Uric acid has been found to have pro-inflammatory activity, which it exerts by the induction of nicotinamide adenine diphosphate oxidase( NADP-oxidase) in cultured adipocytes, thereby up-regulating C-reactive protein, a marker of inflammation in endothelium of the vascular smooth muscles.[4] Statins which are analogues of 3-hydroxy-3-methylglutaryl CoA (HMG CoA) and inhibitors of the rate limiting step of cholesterol synthesis have been reported to have other effects unrelated to its

cholesterol lowering activity,[5,6] of which hypouricemic effect is often associated. It is therefore necessary to determine if statins have effects on the reduction of uric acid level of dyslipidemic patients to encourage its use in the reduction of cardiovascular risk.

The aim of the study is therefore to determine the effects of statins on the serum uric acid of dyslipidemic patients in the University of Port-Harcourt Teaching Hospital and to also correlate the doses of different statins with these effects.

## Materials and Methods

The study was carried out in the University of Port-Harcourt Teaching Hospital (UPTH), Port-Harcourt, a tertiary hospital in Port-Harcourt, Rivers State. The test subjects were diabetic, hypertensive and stroke patients who were about to be commenced on statins, presenting with dyslipidemia, defined as total cholesterol $\geq$ 5.17 mmol/l (200mg/dl), low density lipoprotein cholesterol (LDL-C) $\geq$ 3.36 mmol/l (130 mg/dl), high density lipoprotein cholesterol (HDL-C) $\leq$ 1.03 mmol/l (40mg/dl) for males, $\leq$1.3 mmol/l (50mg/dl) for females and Serum triglycerides(TG) $\geq$ 1.7 mmmol/l (150mg/dl) using ATP III criteria.[7] Subjects who had evidence of an inflammatory disorder or on anti-inflammatory drug were excluded. Dyslipidemic patients with similar illness as the case subjects who have given informed written consent, but are to be on life style modification were recruited as control subjects. Ethical approval was obtained from the Research Ethics Committee of the University of Port Harcourt Teaching Hospital and University of Port-Harcourt.

Subjects were recruited into the study using a systematic sampling technique. After adjusting for 10% attrition, 366 subjects were recruited, but 46 were lost to follow-up. 160 test and 160 control subjects were used for the final analysis. It was a cohort study carried out over a period of 9 months from June 2017 to February 2018. Patients who met the study criteria were recruited and followed up for 3 months. Patients were counseled to fast for at least 8 hours prior to the determination of fasting lipid profile. Patients had fasting lipid profile and serum uric acid done at baseline and repeated 3 months later. Total-cholesterol was measured using the enzymatic method (cholesterol oxidase method), which the principle is based on the hydrolysis of cholesteryl esters and oxidation of the 3-OH group of cholesterol. The very low density lipoproteins and low density lipoproteins were precipitated with a polyanionic reagent and the HDL-cholesterol was then determined with colorimetric enzymatic method at an absorbance of 510nm.[8] Triglycerides were measured enzymatically in serum using a series of coupled reactions in which triglyceride was hydrolyzed to produce glycerol. Glycerol was then oxidized using glycerol oxidase, and $H_2O_2$, which was measured at an absorbance of 546nm.[9] LDL-c values was calculated using the Friedewald equation. LDL-c = TC – (HDL-c + TG /2.2). Uricase method was used for uric acid estimation, whereby uric acid is transformed by uricase to hydrogen peroxide which reacts with 4-aminoantipyridine in the presence of peroxidase to produce a colored complex which is directly proportional to the uric acid levels in the sample.[10]

Statistical Package for Social Sciences 22 (SPSS-22) was used for data analysis. Results were presented as mean±standard deviation for continuous variables. Continuous variables were compared with the students T-test, while proportions or categorical parameters were compared with chi-square test. A p value of less than 0.05 was considered statistically significant.

Results.

*Table 1: Socio-demographic characteristics of the study population.*

| Socio-demographics | Test Group N=160(%) | Control Group N=160(%) | Total N=320(%) |
|---|---|---|---|
| Age(years): group | | | |
| 21-30 | 0(0.00) | 24(15.00) | 24(7.50) |
| 31-40 | 22(13.75) | 22(13.75) | 44(13.75) |
| 41-50 | 17(10.63) | 16(10.00) | 33(10.31) |
| 51-60 | 58(36.25) | 42(26.25) | 100(31.25) |
| 61-70 | 43(26.88) | 56(35.00) | 99(30.94) |
| >70 | 20(12.50) | 0(0.00) | 20(6.25) |
| Mean ± SD | 57.02 ±12.45 | 51.86±13.27 | - |
| Sex: | | | |
| Female | 98(61.25) | 94(58.75) | 192(60.00) |
| Male | 62(38.75) | 66(41.25) | 128(40.00) |

*The mean age± SD of the test subjects was 57.02±12.45 and that of the control was 51.86±13.27. Among the test subjects, 61.25% were females while 38.75% were males, however, 58.75% of the recruited control subjects were females compared to 41.25% who were males.*

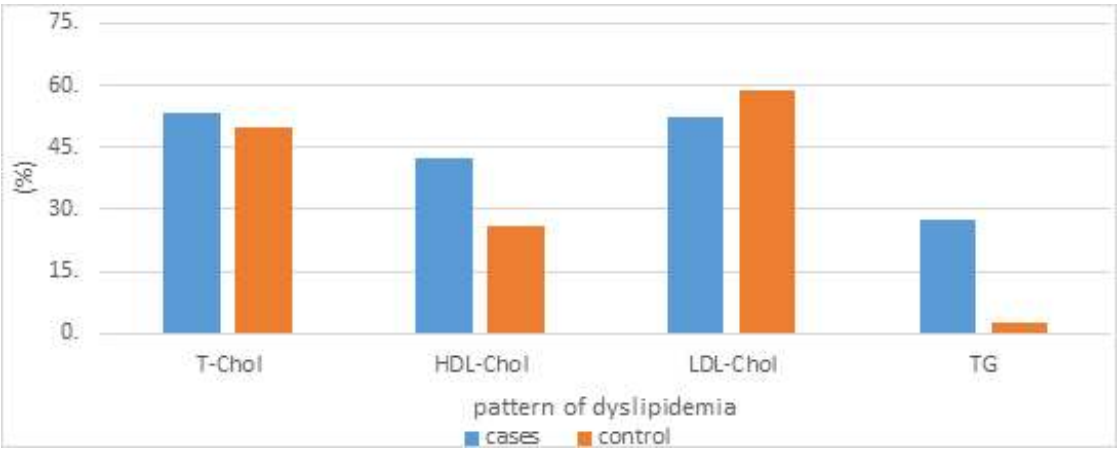


*Figure 1: Pattern of dyslipidemia among the test subjects and control*

Among the test subjects, the commonest form of dyslipidemia was high T-cholesterol reported in 53.1% of the recruited subjects, while hypertriglyceridemia (27.5%) was the least pattern of dyslipidemia. However, high LDL-Cholesterol was the most prevalent pattern of dyslipidemia seen in 58.7% of the control subjects, while low-HDL cholesterol found in 26.2%, represented the least type of dyslipidemia among the control subjects.

*Table 2 : Comparison of the mean serum uric acid of the test and control subjects at the start and after 3 months of statins therapy.*

| Inflammatory marker | Baseline(mean±SD) | 3months (mean±SD) | Mean ±SD (decrease-) or (increase+) | Paired t test | p-value |
|---|---|---|---|---|---|
| Uric acid(umol/l) | | | | | |
| Test subjects | 297.38±69.16 | 284.91±86.28 | -12.47±34.50 | 4.57 | 0.001* |
| Control | 320.31±63.08 | 317.74±65.21 | -2.5±32.65 | 0.99 | 0.32 |
| Independent t-test(p-value) | 1.55(0.123) | 2.20(0.03)* | 3.11(0.002)* | | |

**Statistically significant (p<0.05)*

There was a significant reduction of the mean serum uric acid of the subjects on statins by 12.47±34.5 after 3months of therapy as well as a significant difference between the mean serum uric acid of the test and control subjects after 3 months (p=0.002)

*Table 3: The effects of different statins on serum uric acid*

| Type of statin | Baseline Uric acid | Uric acid at 3months | Mean decrease | p-value |
|---|---|---|---|---|
| Artovastatin | 274.74±63.08 | 254.88±60.79 | 19.86±32.65 | 0.0001* |
| Rosuvastatin | 305.70±68.00 | 295±67.78 | 9.76±23.53 | 0.006* |

**Statistically significant (p<0.05)*

There was a significant reduction of the mean serum uric acid of patients on artovastatin and rosuvastatin by 19.86±32.65 and 9.76±9.76 respectively. The mean decrease among patients on artovastatin was found to be more than rosuvastatin.

*Table 4: Comparison of the effects of the various doses of statins on the serum uric acid of the test subjects after 3months of therapy*

| Statins | n(% frequency) | Uric acid(umol/l) start | Uric acid(umol/l) 3 months | Mean decrease(-) or increase(+) | Paired t test |
|---|---|---|---|---|---|
| Rosuvastatin | 117(73.13) | | | | |
| 5mg | 5(4.3) | 280.00±100.00 | 274.20±99.04 | -5.80±10.20 | 1.27 |
| 10mg | 97(82.9) | 302.95±69.00 | 290.81±67.77 | -12.13±39.02 | 3.06 |
| 20mg | 15(12.8) | 332.07±42.25 | 336.33±40.85 | +4.27±30.47 | 0.54 |
| Artovastatin | 43(26.88) | | | | |
| 10mg | 22(51.2) | 266.64±72.60 | 250.77±62.93 | -15.86±30.75 | 2.41 |
| 20mg | 16(37.2) | 265.50±43.75 | 243.38±41.84 | -22.13±11.14 | 7.94 |
| 40mg | 5(11.6) | 340.00±87.38 | 309.80±84.03 | -30.20±11.88 | 5.68 |

**Statistically significant (p<0.05).*

Among patients on rosuvastatin, 5mg and 10mg, serum uric acid was reduced by 5.80±10.20 and 12.13±39.02 respectively, while 20mg increased the mean serum uric acid by 4.27±30.47. However, 10mg, 20mg and 40mg of artovastatin reduced serum uric acid by 15.86±30.75, 22.13±11.14 and 30.20±11.88 respectively.

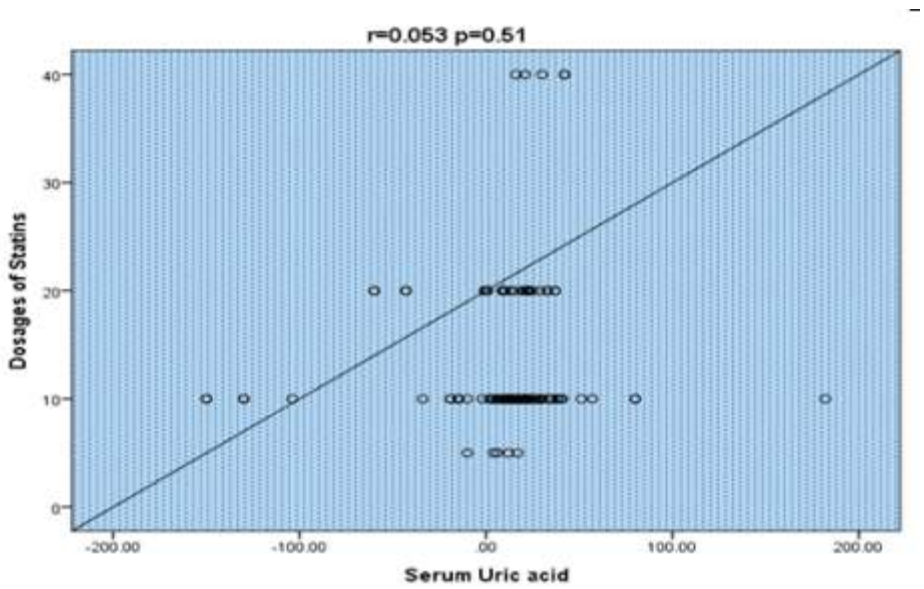


Figure 2: A scatter plot showing the Pearson correlational co-efficient between the doses of statins and the changes in the serum uric acid of the case subjects. There was no significant correlation between the doses of statins and their effects on serum uric acid.

## Discussion

The mean serum uric acid of the subjects on statins was significantly reduced when compared to the statin-free subjects and the reduction in uric acid was more among patients on artovastatin when compared to rosuvastatin. This implies that statins have significant hypouricemic effect on patients with dyslipidemia. This finding was similar to a retrospective study by Ogata and his colleague[11] who reported a significant reduction of serum uric acid of dyslipidemic patients on artovastatin and rosuvastatin by 6.5% and 3.6% respectively after 6 months of therapy. This suggests that artovastatin may have a better hypouricemic effect than rosuvastatin. Additionally, Millionis et al[12] reported that 40mg of artovastatin had a significant hypouricemic effect after 3 months of therapy, while, there was no change in uric acid level with the same dose of simvastatin after the same duration of therapy.

On the contrary, Derosa et al[13] reported a significant reduction in serum uric acid level among patients on artovastatin and simvastatin therapy and this effect was not evident on patients who were on pitavastatin and rosuvastatin therapy. This suggests that this pleiotrophic effect of statin is linked to the individual drugs rather than the class of drug. Moreover, artovastatin has also been found to be a more potent statin than simvastatin because of its additional binding interactions.[14] In this study, there was no significant correlation between doses of statins used and serum uric acid, a possible explanation could be due to the short duration of the medication. Moreover, most patients were on moderate intensity statins.

## Conclusion

Statins were found to significantly reduce the serum uric acid of dyslipidemic patients, although there was no significant dose dependent effect of statins on serum uric acid.

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# Post caesarean delivery pain control with bilateral ultrasound-guided transversus abdominis plane block using 18G intravenous cannula: a case report.

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## Summary

In recent time ultrasound guided transversus abdominis plane block has become popular in the developing countries as option in post-operative pain management. Its use in multimodal setting spares the use of opioids and the associated side effects like sedation however; availability of materials could most time limits its routine use. We present a case of transversus abdominis plane block that was performed on a 36 year old female with America Society of Anaesthesiologist physical status classification II. She was a gravida 3 para 2 female with 2 previous Caesarean section. Transversus abdominis plane block (TAP) was administered with 18G intravenous cannula needle because our stock of regional anaesthetic needle was exhausted at the time we intended conducting the block. Her weight and height, were 63kg, 1.57 meters. Transversus abdominis plane block in a multimodal setting was planned for the patient at preoperative anaesthetic review. This was because the patient specifically did not want any form of sedation in the post-operative period. The Cesarean section was done under subarachnoid block. Immediately after the surgery, it was observed that our stock of regional anaesthetic needle was exhausted. Consultation with the patient was made and consent was obtained to use available alternative. A Size 18G intravenous cannula needle was considered as alternative. It was therefore use in place of regional anaesthesic needle to access the transversus abdominis plane under ultrasound guide. After confirming the correct needle placement, bilateral in plane transversus abdominis plane block was conducted using a total of 40mL of 0.25% plain bupivacaine.

The numerical pain score–was consistently low in the post operative period. On a four point satisfaction scale, patient rated her satisfaction with post operative pain control as 4. There was no incidence of complication from the performance of transversus abdominis plane block. This observation shows that ultrasound guided transversus abdominis plane block can be done with regular intravenous cannula needle with minimal injury in the absence of regional anaesthesia needle.

Keywords: Post Caesarean pain management, transversus abdominis plane block (TAP), regional anaesthesia needle.

## Introduction

The anterior abdominal wall is innervated by the ventral rami of the thoracolumbar nerves ( T7- T12). These nerves pass through the transversus abdominis plane (TAP).The transversus abdominis plane lie between the internal oblique and the transversus abdominis muscle. Transversus abdominis plane block has been shown to be effective in post operative pain control in a multimodal setting with significant opioid sparing. It is expected that in regions where there are challenges with opioid use and supply, TAP block in

combination with other analgesics could provide pain control especially in post caesarean delivery where early ambulation and bonding is an important consideration by the parturient and obstetricians.There are few reported incidences of complications from ultrasound guided TAP block.[4]

Ultrasound guided TAP block is often performed using regional anesthetics needle. These needles are expensive. Because of the cost implications less interest is shown in their purchase by hospital management and thus they may not be readily available in our environment. We present a case of TAP block performed on ASA II obstetric patients with two previous caesarean deliveries desirous of adequate post operative pain control devoid of sedation.

Case Report

A 36 year old ASA 11, gravida 3 para 2 with a history of two previous Caesarean section presented for elective Caesarean delivery in our facility. Her weight and height were 63kg, 1.57 meters. The estimated gestation age was 37weeks. There was no history of inter-current medical disorders. The two previous Caesarean sections were done under subarachnoid block with significant unsatisfactory post operative pain control using pentazocine, promethazine and diclofenac suppository combination.

The full blood count (FBC), electrolyte, urea, creatinine, and urinalysis result at preoperative review were normal. The general and systemic examinations were essentially normal. Patient requested for post operative pain control with minimal sedation to allow for early ambulation, room-in and bonding. This required the selection of effective multimodal pain control technique. Ultrasound guided TAP block in combination with rectal diclofenac 100mg 12 hourly, IV paracetamol 1g 8 hourly and tramadol 100mg for break through pain on demand was planned for the post operative pain control. Preoperative anesthesia was achieved with inthrathecal 12mg of 0.5% hyperbaric bupivacaine. Patient had a Pfannenstiel incision. Surgery lasted two hours. At the end of surgery the post spinal block height was L12. The regional anaesthetic needle scheduled for the TAP block was not readily available therefore a bilateral lateral ultrasound-guided TAP block was done with 18G IV cannula. The 20mL syringe containing local anaesthetic (LA) solution was connected to the IV line extension (B/Braun original perfusor®-Leitung) that was attached to the 18G IV cannula. While the patient was in supine position Sonoace R®linear ultrasound probe was position on the lateral abdominal wall between the costal margin and the iliac crest. The ultrasound probe, oriented in a longitudinal axis was moved forward and downward until a clear image of the abdominal muscle layers was obtained. Using the in-plane needling technique the 18G cannula was advanced into the clearly visualized transversus abdominis plane. Under direct vision, 20mL of a 0.25% of plain bupivacaine was injected into the transversus abdominis plane. The same procedure was conducted on the contralateral side of the abdominal wall. A total of 40mL of 0.25% plain bupivacaine was thus injected into transversus abdominis plane (20mL on each side of the abdominal wall). After each injection of 5mL of local anaesthetic solution, test aspiration was done to exclude intravascular migration of the needle tip.

Successful location and injection of local anaesthetic solution was further confirmed by the presence of Kayak sign. Patient was transferred to the ward after 45 minutes of monitoring in the recovery room.

The numerical pain rating score (NPS) at rest, done four hourly (done at 4,8,12 and 24 hour) in the postoperative period were: 3, 4,3,2. On a 4 point likert scale (dissatisfied, mildly satisfied, moderately satisfied, and fully satisfied) patient rated satisfaction with pain control as 4. Patient did not request for break through pain analgesic. There was no report of sedation, no incidence of LA toxicity neither were there incidence of complication due to TAP block.

## Discussion

This case presentation shows that effective ultrasound guided TAP block can be done using IV cannula with IV extension tubing. Correct location of transversus abdominis plane was evidenced by Kayak sign, low postoperative pain score and a high satisfaction score. Patient did not also request for additional analgesics for pain control in the postoperative period.

The method of confirming successful position of our IV needle within transversus abdominis plane agrees with that of Khedke etal.,[6]Iyere and coworkers. The location of the IV needle within the TAP was confirmed by real time visualization of the needle tip within the transversus abdominis plane and by the spread of the local anaesthetic solution within the transversus abdominis plane (presence of kayark sign)[6]. Iyere etal[8] did a continuous ultrasound guided transversus abdominis plane block using 16G intravenous cannula. The study aimed at comparing the analgesic efficacy of TAP block to that of epidural analgesia. Although the primary focus was different from ours, it nevertheless shows that IV cannula can be improvised for the performance of transversus abdominis plane block.

The low pain score at rest agreed with results from other studies that used regional anaesthesia needle in the performance of TAP block. " This observation further buttresses the idea that a successful TAP block could be achieved with 18G IV cannula. Similar to our findings, patients in Carney and co-workers[9]study did not request for additional analgesia for pain management in the post operative period after the conduct of a successful TAP block in a multimodal setting. Thirdly, although the high satisfaction expressed by the patient could be related to the difference in expected pain and actual pain experience it nevertheless; underscore the success in location of TAP using IV cannula without complications.

The use of intravenous cannula needle for ultrasound guided transversus abdominis plane block is unexpected because both needles are rigid and are made from steel alloy that could reflect sound waves. However, the graded regional anaesthetic needles have various lengths which give them advantage over IVcannula needle. Longer needle is required in obese patients with more adipose tissues. In this case report our patient was not obese. Another useful feature of some sheathed blunt regional anaesthetic needles is the presences of two extensions. One of the extensions connects to a port for injecting the local anaesthetic solution. The second extension tubing connects to a peripheral nerve stimulator. There are also regional anaesthetic needles without these features. Intravenous cannula does not have these features at all; their tips are not blunt. This

could be a disadvantage when using IV cannula for TAP block. Although most of these regional anaesthetic needles have blunt tip compared to IVcannula that are design to cut through the skin IV cannula needles can be blunted by rubbing the tip over drug ample edge.

These differences could affect the overall performance of the IV needle in accessing TAP and thus the choice of needle to use in the performance of ultrasound guided TAP block. Although these similarities and differences should be considered when choosing a needle to use for TAP block, in the final analysis it is the cost, situation and availability that could determine the needle of choice. Nevertheless, evidence from this case report suggests that intravenous cannula can be used safely for TAP block. It should be considered when regional anaesthesia needle are not available.

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