



J. Afr. Ass. Physiol. Sci. 11(2): S1-86, December 2023

Journal of African Association of Physiological Sciences

Official Publication of the African Association of Physiological Sciences

<https://www.ajol.info/index.php/jaaps>

Abstracts of the 1st East African Society of Physiological Sciences (EASPS) and Special African Association of Physiological Sciences (AAPS) Conference that was held from 29th November to 1st December, 2023 in Dar es Salaam, Tanzania

Foreword

This is a proceeding of the Abstracts presented by authors in the joint 1st East African Society of Physiological Sciences (EASPS) and Special African Association of Physiological Sciences (AAPS) that was held from 29th November to 1st December, 2023 in Dar es Salaam, Tanzania.

The Council of the EASPS would like to appreciate the support of various partners for the success of the conference, including the International Union of Physiological Sciences (IUPS), The Physiological Society - UK, The Physiological Society of Japan, The American Physiological Society (APS), The German Physiological Society (DPG), ADInstruments, Elsevier, Muhimbili University of Health and Allied Sciences (MUHAS), Catholic University of Health and Allied Sciences (CUHAS), Kilimanjaro Christian Medical University College (KCMUCo), Hubert Kairuki Memorial University (HKMU), Tanzania Health Summit (THS), Bugando Medical Center (BMC), Muhimbili National Hospital (MNH), and Muhimbili Orthopedic Hospital (MOI).

The EASPS Council also recognises and appreciates the meticulous efforts of the Scientific Committee, especially Dr. Dionis Ikunda and Dr. Jacktan Josephat Ruhigira from The University of Dodoma, Tanzania for their exceptional services towards the successful handling of the Abstracts throughout the conference processes.

Finally, the AAPS and the EASPS Councils commend the EASPS President, Prof. Abdullateef Alagbonsi from the University of Rwanda, for his exceptional leadership that culminated in the success of the conference.

Kennedy H. Erlwanger
Editor-in-Chief

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Resveratrol the magic bullet of 21st century mitigates *Plasmodium berghei*-induced malaria in diabetic male Wistar rats

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ABSTRACT

Background: Malaria parasites rely entirely on an exogenous source of glucose as they cannot store energy in the form of glycogen. Substantial increase in permeability of infected erythrocyte to low-molecular weight sugars is exhibited. The aim of this study was to elucidate the antioxidant and antimalarial effects of resveratrol in diabetes and malaria comorbidity.

Methods: Forty male Wistar rats n = 8 groups. Diabetes was induced in seven of the groups for eight weeks. Thereafter, they were injected with single streptozotocin (30 mg/kg) intraperitoneally. Malaria was inoculated by injecting 0.2 ml of *P. berghei* parasite preparation into the rats intraperitoneally. Significant values were set at $P < 0.05$.

Results: There were increases in mean body weight across the groups from day 0-6 after inoculation, but it was significantly lower when compared to the normal control. The blood glucose levels of the resveratrol groups significantly decreased on day 6 after inoculation. For the average infected erythrocytes, the diabetic control had the highest ($P < 0.05$) count, when compared across the groups. Superoxide dismutase and malondialdehyde (MDA) levels were relatively lower in resveratrol 50 mg/kg rats, compared to diabetic controls. It was lowest in the resveratrol 50 mg/kg group. Serum plasmodium lactate dehydrogenase enzymes concentrations of resveratrol groups were lower ($P < 0.05$) when compared with the diabetic controls.

Conclusion: It was concluded that resveratrol lowered BGL, exerts some modulatory effects on the malondialdehyde and superoxide dismutase and ameliorated adverse effect of *P. berghei*-induced malaria in diabetic Wistar rats.

Keywords: Body weight; blood glucose levels; diabetes; malaria; resveratrol, pLDH: plasmodium lactate dehydrogenase; SOD: superoxide dismutase. HFD: high fat diet; MDA: malondialdehyde concentrations.

Sponsored: Award of Tertiary Education Trust Fund (TETFund) Institutional Based Research Project Grant (IBR-Grant) **Year:** 2022 **Reference No.:** TETF/ DR&D/ UNI/ ZARIA/ IBR/ 2020/VOL.1/6

Adriamycin-Cytoxan Chemotherapy on hematological and electrolyte parameters among breast cancer patients

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Background: Adriamycin-Cytoxan (AC) is a common chemotherapy treatment for breast cancer (BC) patients. Its hematological and electrolyte and adverse effects have not been addressed adequately.

Objective: This study aimed to assess the effect of AC on hematological and electrolyte parameters among BC patients.

Methods: A hospital-based comparative cross-sectional study design was conducted from March to November 2022. Randomly selected AC-treated (n=100) and untreated (n=100) patients were included. Structured questionnaires and medical records were used to collect data. Anthropometric parameters, hematological indices, and serum electrolytes were measured. Cobas Integra 400 and SYSMEX-XT-4000i were used to analyze serum electrolytes and hematological indices respectively. The data were analyzed using SPSS version 25. Independent t-test and chi-square test were used. p-value <0.05 was considered statistically significant.

Results: AC-treated patients' mean total white blood cell (TWBC), neutrophil (NE), lymphocyte (LY), red blood cell (RBC), hemoglobin (Hgb), hematocrit (HCT), and sodium(Na⁺) values were significantly reduced (p<0.05) than patients with no treatment. However, mean eosinophils (EO), platelet (PLT) counts, red cell distribution width (RDW), potassium (K⁺), and plateletcrit (PCT) values were significantly increased (p<0.05).

Conclusion: The majority of blood cells and serum sodium were affected by AC treatment. Incorporating these parameters in the routine analysis and further studies including more than one control group is crucial.

KEYWORDS: Breast cancer, Adriamycin-Cytoxan, hematological indices, serum electrolyte

Effectiveness of interprofessional care on hypertension in low- and medium-income countries of Africa: a systematic review

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Abstract

Background: This systematic review sought to describe the extent as well as the effectiveness of the use of interprofessional care in the management of hypertension across the African regions.

Methods: A comprehensive literature search was conducted on Pubmed, Google Scholar and ScienceDirect. This review was done in line with the guidelines set out by Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement.

Results: A total of 35 articles were included in the review. The assessment of team cooperation, institutional or government support, right operational environment, free inter-professional communication, cost-effectiveness in patient management and easy access to care for the patients in the articles was generally affirmative to indicate effectiveness of interprofessional care. A few cases of interprofessional conflicts were also reported.

Conclusion: Interprofessional care of hypertension is proven to be beneficial and effective in the management of hypertension in Africa but grossly under-reported. Its use may be threatened by lack of team cooperation and occurrence of conflicts between the health workers among several other factors.

Keywords: African regions, effectiveness, hypertension, interprofessional care, review

Sedative-hypnotic effect of *Datura arborea* Linn leaves ethanol extract in Albino mice

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Background: *Datura Arborea Linn* has been studied for analgesic, anti-cholinergic effects among others. Studies on its CNS depressing action are still in progress. The sedative-hypnotic effects of *Datura Arborea Linn*'s ethanol extract were examined in this study. To achieve this, *D. Arborea* leaves were macerated in ethanol to extract the phytochemicals, which were then analysed.

Method: The extract was put through a thiopental sodium-induced sleep test, with diazepam serving as the reference medication.

Results: The plant possesses sedative-hypnotic qualities, the findings indicate. All doses—35 mg/kg (2.70.24 min), 70 mg/kg (3.80.19 min), and 140 mg/kg (4.30.20 min)—decreased the control's (9.2 min) latency to fall asleep. With comparison to the control, the length of sleep was increased by 23.46 minutes for 35 mg/kg (99.002.99 min), 70 mg/kg (132.605.53 min), and 140 mg/kg (118.606.04 min), respectively.

Conclusion: The acute toxicity of *Datura arborea Linn* was determined to be less than 600 mg/kg in mice by the current investigation. Additionally, our research raises the possibility that *D. Arborea* has sedative-hypnotic characteristics.

Key words: *Datura arborea Linn*, Sedative-Hypnotic Activity, Sleep.

Beneficial effects of medicinal plants in diabetes: immunological aspects

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Background: People in developing countries often rely on herbal concoction for their primary health care, as alternative option to costly modern synthetic drugs. But so far, scientific investigations supporting the use of plants in traditional medicine remain poor. Therefore, we investigated the anti-hyperglycemic capacities and immune-modulatory effects of some commonly used African medicinal plants (*Picralima nitida*, *Nauclea latifolia*, *Oxytenanthera abyssinica* and *Momordica charantia*.) in pregnant and non-pregnant diabetic rats.

Methods: Animals, rendered diabetic by multiple low injections of streptozotocin, were treated with selected plant extracts based on their antioxidant capacities. We evaluated the effects of plant juices on hyperglycemia, human T cell proliferation, and T cell differentiation through levels of Th1 (IL-2 and IFN- γ), Th2 (IL-4) and regulatory (IL-10) cytokines in plasma of treated-diabetic rats and human cell culture supernatants.

Results: Plant extracts exhibited substantial antioxidant capacities related to their content in polyphenols, decreased hyperglycemia in diabetic pregnant rats and exerted immunosuppressive effect on T cell proliferation. Hyperglycemic type 1 diabetic (T1D) rats exhibited high circulating IL-2 and IFN- γ and decreased levels of IL-4 and IL-10 compared to control animals. Interestingly, treatment of T1D rats with *Momordica charantia* fruit juice significantly decrease blood glucose and reversed the cytokine profiles by increasing IL-4 and IL-10 levels and decreasing IL-2 and IFN- γ concentrations, suggesting a Th2 phenotype in these animals.

Conclusion: Our contribution showed that these plants, having antioxidant, anti-hyperglycemic and immunosuppressive activities, could be good candidates for the treatment of diabetes and diabetic pregnancy and good sources of antioxidant compounds.

Keywords: Medicinal plants; Diabetic pregnancy; Th1/Th2 cytokines; T-cell proliferation; Antioxidants

Butyrate ameliorates hypothalamic inflammation in a rat model of polycystic ovarian syndrome by modulating GABA

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Background: Polycystic ovarian syndrome (PCOS) is a known endocrine disorder which has affected many women of reproductive age, and is accompanied with various neurodegenerative diseases including hypothalamic inflammation. Hence, the current study was designed to investigate the remedial properties of butyrate in reversing hypothalamic inflammation and its related abnormalities, via upregulation of gamma aminobutyric acid (GABA) levels in an experimentally induced PCOS rat model.

Methods: Eight-week-old female Wistar rats were allotted into four groups (n=5) and the groups received vehicle, butyrate (200 mg/kg), letrozole (1 mg/kg) and letrozole + butyrate respectively. Administration of Letrozole was carried out once daily by oral gavage for 21 days. Thereafter, the rats were treated with 200mg/kg of sodium butyrate daily for a period of 6 weeks.

Results: Rats with PCOS were characterized with insulin and leptin dysregulation, increases in plasma/hypothalamic triglyceride levels, inflammatory (SDF-1 and NF-kB) biomarkers, hypothalamic apoptotic (caspase-6) marker, and plasma testosterone were observed, while a decrease in FSH, plasma adiponectin, GnRH levels, and redox imbalance (HIF- α , NrF2). Interestingly, a notable decrease was observed in hypothalamic GABA. Nevertheless, supplementation with butyrate attenuated these alterations.

Conclusion: The present investigation reveals that butyrate protects against hypothalamic inflammation, leptin resistance and insulin resistance in a rat model of PCOS by modulating GABA levels.

Keywords: Butyrate; GABA; Hypothalamus; Inflammation; PCOS.

Evaluation of the effectiveness of lectures based on problems and traditional lectures in physiology teaching

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Background: This study introduces a new teaching approach: lectures based on problems (LBP) and evaluates their effectiveness compared to traditional lectures (TL) in physiology teaching.

Methodology: LBP and TL were applied in physiology teaching of 146 medical students at University of Science and Technology in Sudan for 3 months during their study of introduction and respiratory physiology. Equal number of lectures was given as LBP and TL in each course. Students were given quizzes at the end of each course which were used to compare the effectiveness of the two types of lectures. A questionnaire was used to assess students' satisfaction about LBP and the perceived effects of the two methods on the students' attitude and practice towards learning physiology.

Results: In LBP students have better attention ($P= 0.002$) and more active role ($P= 0.003$) than in TL. Higher percentage of students think that LBP stimulated them to use references more ($P= 0.00006$) and to use the lecture time more effectively ($P= 0.0001$) compared to TL. However, there was no significant difference between LBP and TL in the awareness of the learning objectives. Comparison of the students' quiz marks showed that the means of the students' marks in the introduction to physiology and respiratory courses were higher in the quizzes of LBP than in TL with a significant difference between them ($P=.000$), ($P=.006$) respectively.

Conclusions: LBP improved students' understanding of physiology concepts and increased students' satisfaction about physiology learning. LBP achieved some of the objectives of PBL with minimum resources.

Keywords: Traditional lectures, lectures based on problems, problem-based learning.

Neuroprotective effect of aqueous stem extract of *Costus afer* (Bush cane) against ethanol-induced neuronal degeneration in mice: Role of oxido-inflammatory pathway

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Background: Excessive alcohol causes memory impairment which presents with Alzheimer-like-dementia. The neuroprotective effects of aqueous stem extract of *C. afer* were assessed in ethanol-induced memory-impaired mice.

Methods: Forty-five male CD-1 mice (weighing 22-35g) were treated with vehicle (p.o., control) or ethanol (EtOH, 5g/kg, p.o, for 7 days) to impair memory. The other 3 groups were treated with EtOH (5g/kg, for 7 days) before administration of *C. afer* (100 mg/kg, 200 mg/kg and 500 mg/kg respectively). Animals had free access to food and clean drinking water. After administration for 28 days, memory impairment symptoms were evaluated using T-maze spontaneous alternation test. Thereafter, spectrophotometry, ELISA and histomorphometry estimated the degree and expression of biomarkers of neuronal inflammation: oxido-inflammatory stress and degeneration in the hippocampus, prefrontal cortex and cerebellum.

Results: Ethanol treatment significantly ($p < 0.01$) induced neurobehavioral impairment which was reversed by *C. afer* as evident in increased percentage alternation. Furthermore, EtOH altered the endogenous antioxidant and pro-inflammatory mediators seen by elevated lipid peroxidation, nitrite, tumor necrosis factor α , interleukin α -6 and decreased superoxide dismutase activity which promoted neuronal degeneration in the mice brains. However, *C. afer* (100 mg/kg, 200 mg/kg and 500 mg/kg) significantly ($p < 0.05$) ameliorated oxido-inflammatory stress by reducing level of MDA, NO-2, TNF- α , IL-6, through up-regulation of SOD activity and maintains neuronal integrity in the hippocampus, prefrontal cortex and cerebellum.

Conclusions: These findings suggest that *C. afer* decreased memory impairment progression induced by ethanol via mechanisms connected to inhibition of oxido-inflammatory stress mediators, suppression of cortico-hippocampal and cerebellar neuronal degeneration in mice.

Keywords: *Costus afer*, Ethanol-induced-memory-impairment, neuronal degeneration, oxido-inflammatory stress.

Serum uric acid levels as a biomarker for perinatal outcomes among mothers with pre-eclampsia in Tanzania

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Background: Preeclampsia is one of the hypertensive disorders of pregnancy with significantly high morbidity and mortality to both mother and fetus. Preeclampsia is associated with high Uric acid, yet its utility in predicting the perinatal outcome is still controversial. Therefore, this study was done to determine the utility of serum uric acid levels as a biomarker for perinatal outcomes among pregnant mothers with pre-eclampsia in Tanzania.

Methods: A Hospital-based cross-sectional study conducted at Muhimbili National Hospital. Data were summarised using frequency and percentages for categorical variable and mean and standard deviation for continuous variables. Binary logistic regression was used to determine factors associated with poor perinatal outcomes. A P-value of <0.05 was considered statistically significant.

Results: Out of 268 mothers, 211 (78.7%) had raised serum uric acid, whereas an overall mean (\pm SD) serum uric acid level was 0.42 ± 0.09 mmol/L. The magnitude of adverse perinatal outcomes was 51 (19%) stillbirth, 184 (68.7%) low birth weight, 33 (12.3%) neonatal intensive care unit (NICU) admission, 72 (26.9%) low Apgar score, and 190 (70.9%) for preterm delivery. Pre-eclamptic pregnant women with serum uric acid levels < 0.35 mmol/L were more likely to have good perinatal outcomes and the difference was statistically significant, OR (0.39 (0.18 – 0.80) 0.011)

Conclusion: Serum uric acid levels can predict perinatal outcomes among pre-eclamptic pregnant women. Further study to assess the sensitivity and specificity of uric acid levels as a biomarker for perinatal outcomes is recommended.

Keywords: Uric acid, perinatal outcomes, Biomarker, pre-eclampsia, Tanzania.

Erythroid specific 5-aminolevulinate synthase is stabilized by HSPA9 in mitochondria matrix

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Background: 5-aminolevulinate synthase (ALAS) is the rate-limiting enzyme of the heme biosynthesis pathway. ALAS has two isozymes, a ubiquitously expressed ALAS1 and an erythroid-specific ALAS2. The ALAS1 undergoes heme-induced degradation as a negative feedback regulation, while such regulation of ALAS2 remains unknown. This study aimed to clarify the mechanisms by which ALAS2 is stably expressed even in excess heme condition of erythroblast cells.

Methods: Cultured non-erythroid Flp-In T-Rex 293 (FT293) cells were constructed to express recombinant c-terminal FLAG-tagged ALAS1 and ALAS2 proteins (designated ALAS1F and ALAS2F, respectively) in a doxycycline (DOX) inducible manner. The protein's half-lives were determined under excess heme conditions using the Cycloheximide chase method. Moreover, ALAS2F interacting proteins were identified by immunoprecipitation and tandem mass spectrometry, and some mitochondrial matrix proteins were selected as candidate proteins that regulate ALAS2 stability for further analyses. Furthermore, we examined the role of these proteins on the expression and the half-life of ALAS2F by suppressing them using siRNAs or specific inhibitors.

Results: The half-life of ALAS1F or ALAS2F protein was less than 30 minutes or 3.5 hours, respectively, although both proteins associate with mitochondria matrix proteases, CLPXP and LONP1. ALAS2F protein also forms complexes with the mitochondria matrix chaperone HSPA9, suppression of which, using siRNA and the specific inhibitor MKT-077, resulted in the decrease of expression and the half-life of ALAS2F protein.

Conclusion: ALAS2 is more stable than ALAS1, and the preferred stability of ALAS2 may be conferred by its association with the mitochondrial matrix chaperone HSPA9.

Key words: ALAS2, protein stability, HSPA9, non-erythroid cells, chaperon protein.

Assessment of Factors Associated with Hepatitis B Among Non-Communicable Diseases Patients in Burera District of Rwanda

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Background: Hepatitis B virus (HBV) is a worldwide health care concern and among common infectious diseases globally. Hepatitis B and Non-communicable diseases share in common that characteristics of being prevalent among older people. However, there is limited research that demonstrated the prevalence of HBV among non-communicable disease patients. This study aimed to identify the possible factors associated with HBV infection among patients with non-communicable diseases (NCDs) in Burera District, Rwanda.

Methods: A cross-sectional study was conducted, involving 1552 NCD patients diagnosed at all 19 health facilities in Burera District who have been screened for HBV from October to December 2021. Data on sociodemographic characteristics, medical history, and risk factors for Hepatitis B were collected using structured questionnaires. Hepatitis B surface antigen (HBsAg) tests were performed to determine infection status. Descriptive statistics and logistic regression analysis were employed to analyze the data.

Results: The prevalence of Hepatitis B among NCD patients in Burera District was found to be 2.3%. The logistic regression analysis revealed that age group 45 years and above ($p=0.001$), unprotected sex ($p=0.015$), cohabitated with HBV infected ($p=0.001$), sharing of personal materials ($p=0.021$), having a history of STI ($p=0.024$), blood transfusion ($p<0.001$), and ever been operated ($p=0.009$) were significantly associated with increased risk of Hepatitis B infection ($p < 0.05$). Furthermore, patients with behavioral characteristics, such as tobacco ($p=0.04$) and alcohol use ($p=0.044$), were more likely to be infected with Hepatitis B.

Conclusion: The findings underscore the importance of targeted screening and preventive measures for Hepatitis B in this vulnerable population. Health authorities should consider integrating Hepatitis B testing and vaccination services into routine care for NCD patients, particularly for those with identified risk factors. Early detection and management of Hepatitis B in NCD patients could contribute to better health outcomes and reduced disease burden in the region.

Keywords: NCDs, HBV, prevalence, risk factors, blood transfusion, behavioural characteristics, Burera district

Effects of Different Intermittent Fasting Regimen on Total and Differential White Blood Cell Count, Erythrocyte Sedimentation Rate and Bleeding Time in Male Wistar Rats

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Background: Hematological parameters are associated with various diseases, including inflammatory conditions and bleeding disorders. Investigating the impact of intermittent fasting on these parameters may uncover potential strategies for disease prevention or management. This study evaluated the effects of different intermittent fasting regimen on erythrocyte sedimentation rate (ESR), bleeding time and differential white blood cell count.

Methods: This animal experimental study conducted between February to July 2022 utilized Fifty (50) male Wistar rats randomly assigned into six (6) groups based on their weight. Group 1 (control) were fed normally, experimental groups 2, 3, 4, 5 and 6 were fasted seven weeks and a day (50 days) intermittently for 12, 18, 24, 36 and 48 hours respectively. Blood samples were collected and analyzed for total and differential WBC counts and ESR. Data obtained were analyzed using IBM SPSS Statistics 25.

Results: There were no significant differences in the total white blood cell count, ESR, bleeding time, eosinophil count, basophil count, lymphocyte count and monocyte count between the different fasting groups and the control ($p < 0.05$). Neutrophil count showed a significant reduction in group 2, group 4, group 5 and group 6 ($p < 0.05$). Group 3 was not significant when compared to the control.

Conclusion: It can be deduced from this study that IF has no effect on ESR and bleeding time but has a slight effect on the differential white blood cell count. Because 36 hours and 48 hours fast can be extreme, the less strict ones that are 12 hours, 18 hours and 24 hours intermittent fasting are considered safe for healthy people.

Keywords: intermittent fasting, total white blood cell count, differential white blood cell count, erythrocyte sedimentation rate, bleeding time

Impacts of caffeine consumption on reproductive functions of peri-pubertal female Wistar rats

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Background: Consumption of over-the-counter medicines and caffeinated beverages is prevalent among adolescents. Caffeine has been associated with infertility. This study investigated the impacts of caffeine consumption on reproductive functions of peri pubertal female Wistar rats.

Methods: Twenty-five peri pubertal Wistar rats (70 ± 20 g) were randomly divided into five groups (n=5). I- control (distilled water), II and III received 120 and 180 mg/Kg/day caffeine orally for 28 days respectively, IV and V received 120 and 180 mg/Kg/day caffeine respectively for 28 days and allowed to recover for the same period. Vaginal smears were obtained daily to study the estrous cycle which occurs 4-5 days in rats. The animals were sacrificed, ovaries and uteri harvested for Malondialdehyde (MDA), Nitric oxide (NO), reduced Glutathione (GSH), Superoxide dismutase (SOD) and Catalase activities assayed by spectrophotometry. Serum lipid profile, Luteinizing hormone (LH), follicle-stimulating hormone (FSH), estradiol and tissue 8-hydroxyguanosine (8-OHdG), Tumour Necrosis Factor Alpha (TNF- α) and C-reactive protein levels were measured by ELISA, and histology by microscopy. Data were analysed using ANOVA and $p < 0.05$ was considered statistically significant.

Results: Caffeine reduced lipid profile, FSH and LH, but increased estradiol levels and disrupted metestrus and diestrus phases of the estrous cycle. Caffeine reduced tissue TNF- α and C-reactive protein but increased ovarian MDA, caused follicular atresia, and distorted theca cells which recovered after withdrawal. It increased uterine MDA and 8-OHdG, reduced SOD, distorted endometrium and epithelial cell layer which remain after withdrawal.

Conclusion: Caffeine consumption adversely alters the reproductive functions of peri pubertal Wistar rats.

Keywords: Caffeine; Ovary; Uterus; Infertility; Peri-pubertal rats.

Mentorship of Young Researchers in resource-limited settings: Experiences of the mentees from selected health sciences Universities in Tanzania

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Background: Mentorship is an essential component of research capacity building for young researchers in health sciences. This article accounts for mentees' experiences in a mentorship program for junior academicians amid the COVID-19 pandemic in Tanzania.

Methods: This is an exploratory study narrating the experiences of mentees under the mentorship program of the Transforming Health Education in Tanzania (THET) project. Senior faculties were designated as mentors for junior faculties. Quarterly reports submitted by mentees for the first four years of the mentorship program from 2018 to 2022 were used as data sources.

Results: A total of 12 mentees were equally selected from each of the three health training institutions in Tanzania. Females made up 42% of all mentees in the program. All mentees had a master's degree and a 66.7% were from faculties of medicine. All mentors had academic ranks of senior lecturer and professor. Despite COVID-19, the regular weekly meetings were not affected. By the fourth year of the mentorship program, more than three-quarters of mentees had published their research works, over half had enrolled in Ph.D. studies and 50% had applied and won grants. Almost all mentees were satisfied with the mentorship program and the achievements made.

Conclusion: Despite the COVID-19 outbreak, the mentorship program has enriched the skills and experiences of the mentees, and the quality of their research outputs. We recommend the roll-out of similar programs in other institutions to expand capacity in biomedical and clinical research for the present and future generations, especially in resource-limited settings.

Keywords: Mentorship, Research, Mentees, Lesson learned, Tanzania

Effects of orchidectomy and testosterone hormone on blood pressure of male wistar rats

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Background: Gender has an important influence on blood pressure with sex hormones contributing to gender differences in cardiovascular functions and diseases. This study investigate the effect of orchidectomy and testosterone on blood pressure of male wistar rats.

Methods: Thirty male wistar rats weighing 180-200g were grouped into five groups with six rats each. Group I and II received normal saline (1 ml/kg) and testosterone (25 mg/kg) subcutaneously for four weeks respectively. Groups III and IV were sham operated and orchidectomized respectively. Group V were orchidectomized and treated with testosterone (25mg/kg) for four weeks. Systolic, diastolic and mean arterial blood pressure were recorded daily for all the groups.

Results: A significant decrease and increase in all the blood pressure parameters for the orchidectomised and non-orchidectomized treated with testosterone group respectively throughout the four weeks of experiment compared to control ($P < 0.05$). The orchidectomised treated with testosterone group showed a significant increase at weeks 2 and 3 only for systolic, at week 4 for diastolic and at weeks 2 and 4 for MABP ($P < 0.05$). Orchidectomized and orchidectomized treated groups showed significant increase ($P < 0.05$) only at weeks 2 and 4 respectively, while non-orchidectomized treated group showed significant increase ($P < 0.05$) throughout the four weeks for pulse pressure (PP) compared to control. The sham operated group showed no significant difference in all the blood pressure parameters throughout the four weeks compared to control.

Conclusion: Increased testosterone increases blood pressure while orchidectomy decreases blood pressure.

Keywords: orchidectomy, testosterone, blood pressure.

Molecular docking and ADMET properties of *Anacardium occidentale* methanolic nut extract against inflammatory, oxidative and apoptotic markers of diabetes

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Background: The contemporary antidiabetic drugs have side effects and adverse reactions. This demand to search for less toxic and effective treatments for diabetes from medicinal plants using computational methods. The present research investigated the molecular docking of *Anacardium occidentale* nut methanolic extract compounds with selected proteins related to diabetes and the compounds' ADMET properties.

Materials and Methods: The compounds were identified using Gas chromatography-mass spectrometry analysis. The compounds' 2-dimensional structure was retrieved from the PubChem compound database. Three-dimensional crystallographic structure of selected proteins; B-cell-lymphoma-2, caspase-3, glucocorticoids, interleukin-1 β , myeloperoxidase and tumor necrosis factor-alpha (TNF- α) was downloaded from Protein Data Bank. Molecular docking was performed using Autodock vina and the active site of binding interactions was detected with the Computed Atlas of Surface Topography of proteins (CAST-P). The compounds' drug-likeness, physicochemical and ADMET were evaluated using molinspiration and admetSAR online tools.

Results: Ten compounds were identified from the *Anacardium occidentale* nut methanolic extract. All the compounds exhibited drug-likeness properties with violation of one Lipinski's rule. Two compounds, oleic acid and 3-(p-methoxyphenyl)-propionic acid exhibited the best binding energy with the active receptors site of Bcl-2, caspase-3, TNF- α and glucocorticoid. Also, tridecanoic acid exhibited good binding energy with the active site of glucocorticoid receptors. Only 3-(p-methoxyphenyl)-propionic acid exhibited moderate binding energy with the active receptors site of interleukin-1 β and myeloperoxidase. All the compounds displayed excellent ADMET and non-toxicity properties.

Conclusion: Novel antidiabetic drugs with the least side effects could be explored from these compounds.

Keywords: properties Diabetes mellitus, *Anacardium occidentale* Nut, Molecular docking, Drug likeness, ADMET.

Acute consumption of flavonoid-rich cocoa does not lower blood pressure not act through the modulation of the sympathetic nervous system

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Background: Prolonged cocoa consumption lowers blood pressure (BP). Bioavailability studies show that bioactive compounds in cocoa reach peak plasma levels in 2 hours suggesting that its hypotensive effect should be evident at this time. However, evidence in support of this notion through BP measurement is lacking and the role of the sympathetic nervous system (SNS) in the hypotensive effect of cocoa is unknown. This study was designed to address these knowledge gaps.

Methods: Following informed consent and ethical approval, a randomized double-blind placebo-controlled study was conducted in healthy subjects (age=23±1 years). The BP and pulse rate (PR) were measured at baseline and 2 hours after oral consumption of 28g of cocoa powder, browning-placebo or water-placebo (200ml and n=15 each). Both cocoa and browning were dissolved in water and had similar colouration. The cold pressor test (CPT) was used to activate the SNS and it was performed before and after intake of cocoa and the placebos. Statistical analyses were done appropriately using paired t-test and one way ANOVA with a post-hoc Tukey test. P<0.05 was considered significant.

Results: The BP and PR (mean±SEM) after 2 hours of cocoa consumption showed no significant difference from baseline nor differ from corresponding placebo values. The CPT raised the BP significantly (P<0.05) suggesting SNS activation. The CPT-induced changes (Δ) in the BP and PR showed no significant difference between the cocoa and the placebo groups.

Conclusion: It is concluded that acute (2 hours) cocoa consumption neither lowers BP and PR nor modulates SNS activity.

Keywords: Cocoa, Blood Pressure, Sympathetic nervous system, Cold Pressor Test

Molecular identification of *Plasmodia* species and levels of tumor necrosis factor-alpha, interleukin-10, fibrinogen in antimalarial drug naïve individual with uncomplicated malaria in Nnewi, Nigeria

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Background: Malaria is a global endemic in Africa and a life threatening disease which affects the Nigerian population. There is currently few or no information on the *Plasmodia* species and patterns of immunological responses of patients with uncomplicated malaria (UM) in Nnewi, Nigeria.

Aim: This study was designed to evaluate the patterns of immunological responses by evaluating the levels of tumor necrosis factor alpha, interleukin-10, fibrinogen, mean cell volume, mean cell hemoglobin and mean cell hemoglobin concentration in antimalarial drug naïve individuals with UM in Nnewi, Nigeria.

Method: The case and control study randomly enlisted one hundred-six microscopically confirmed positive cases as test individuals and one hundred-six microscopically confirmed negative cases of malaria as controls individuals. Cytokines and some hematological parameters were assessed by ELISA and flowcytometric methods respectively. Malaria confirmation were done polymerase chain reaction method. Data were analyzed using SPSS software.

Results: There was a significant increase in the levels of TNF α , IL-10, FIB and MCHC in individual with UM when compared with the control (P<0.01). There was also no significant difference in the levels of MCV and MHC when compared with the control (P>0.05). Both microscopic and polymerase chain reaction methods were able to detect 80% 98% positive cases of *Plasmodium falciparum* malaria respectively.

Conclusion: UM significantly increases the levels of TNF α , IL-10, FIB and MCHC in antimalarial drug naïve individuals. Thus, suggesting that observed significant increase parameters could be protective in cases of UM in Nigeria. Both microscopic and PCR methods are valuable tools in the detection of malaria cases, but PCR is more specific in speciating the causative agent of Plasmodiasis.

Keywords: Malaria, PCR, cytokines, Nnewi.

On-line Assignments at Kilimanjaro Christian Medical University College during the COVID-19 pandemic

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Background: During COVID-19 closure of the Kilimanjaro Christian Medical College (KCMUCo) in 2020 (8 weeks) most of the first year medical students (MD1) returned to their home villages in rural areas in Tanzania. To facilitate physiology self-study during this period, an assignment-based e-learning module has been developed using the on-line learning management system (LMS).

Methods: On Monday, lecture slides were provided defining the weekly study material. On Tuesday, the assignment (~10–15 essay questions) was made available. Students (199) were asked to submit the answers to the questions via LMS. Thereafter, model answers to the questions and the scoring key were made available. A novel aspect of the module was self-grading. The answers and scores of 10 (randomly chosen) students were checked to verify the grading process and to see if there were common gaps in the knowledge. After four weeks a survey was conducted to obtain feedback and to assess the hours/week spent by the students on the assignments.

Results: The average score of the assignments (\pm SEM) was 80.8 ± 1.8 (scale: 0–100). The median of the hours spent was 15.5 hours/week (average: 19.5 hours/week). The students reported to spend $7.2 \pm 0.1\%$ of the time on discussion with other students. Before the exam, the study material was reviewed via Zoom. The exam scores were similar to the scores of the preceding student cohort.

Conclusion: The format and content of the assignments used, tailored to be used in Sub-Saharan Africa, could be adopted in e-learning and blended learning in general.

Keywords: E-learning, Assignments, Physiology, COVID-19

Effects of processed foods on the physiology of microbiota-gut axis: a narrative review

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Background: Unfettered access to processed foods has escalated the burden of cardiometabolic and neuropsychiatric conditions. While end products of digestion influence various physiologic aspects, molecules at intestinal level may modify the microbiota with diverse impact on gut brain axis. This review intends to address changes at gut level that are induced by processed foods. Additionally, it provides insights into how these derangements affect overall gut-brain interaction.

Methodology: This is a narrative review of published literature, involving mammalian *in vitro* and *in vivo* studies. All articles published in the English language between 2018 and 2023 were retrieved from the following databases: EMBASE, PubMed, Scopus. Search terms included “processed or refined or fast or junk foods,” “microbiota-gut-brain axis.” Articles that met eligibility criteria were selected and reviewed by study authors. Key themes were identified, collated and subsequently included in this review.

Findings and discussion: Key domains identified include exploration of the physiology of microbiota gut brain axis(MGBA), influence of fatty foods, sugars, food additives and preservatives on MGBA, role of MGBA in controlling consumption of fats and sugars and pathophysiologic aspects. Increased consumption of processed foods disturbs homeostatic set up of MGBA, predisposing to neuropsychiatric derangements, gastrointestinal and metabolic pathologies.

KEYWORDS: Processed or refined or fast or junk foods, Microbiota-gut-brain axis

Impact of Zinc supplementation on high fat diet-induced metabolic changes in male Swiss albino rats

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Background: The vital role of zinc in numerous physiological processes, such as antioxidant defense and cellular regulation, highlights the significance of this mineral for general health. In this study, rats fed a high-fat diet (HFD) are examined to determine the effects of zinc supplementation on body weight, blood sugar levels, liver function, and antioxidant enzyme activities.

Methodology: Three diets were given to male Wistar albino rats: Normal Diet (ND), the High-Fat Diet (HFD), and the High-Fat Diet plus Zinc (HFD + Zn). The HFD + Zn group underwent dietary modification for 35 days before receiving 28 days of zinc supplementation. Blood sugar, enzyme, and antioxidant activity levels in the serum were measured.

Results: HFD rats gained more weight ($302.5g \pm 13.0$) than ND rats ($274.7g \pm 33.9$) or HFD + Zn rats ($263.3g \pm 18.4$). Fasting blood sugar levels in HFD animals were higher ($6.4 \text{ mmol/l} \pm 0.4$) than in ND ($5.4 \text{ mmol/l} \pm 0.2$) and HFD + Zn ($5.8 \text{ mmol/l} \pm 0.2$). Liver function studies revealed that HFD group had higher AST and ALT levels than the HFD + Zn group, indicating that zinc had hepatoprotective effects. Antioxidant enzyme activity did not differ significantly across groups.

Conclusion: Zinc supplementation demonstrated potential benefits in mitigating weight gain, managing blood sugar levels, and protecting against liver damage induced by a high-fat diet in rats. This study suggests that zinc could be explored as a nutritional intervention in metabolic syndrome and liver disease contexts. Further research is needed to clarify the impact of zinc on oxidative stress mechanisms.

Keywords: Zinc supplementation, high-fat diet, weight gain, blood sugar, liver function, antioxidant enzymes.

The Effect of Wood Dust on Pulmonary Functions Test in a Group of Sudanese Carpenters

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Background: The number of people suffering from occupational lung disease has increased rapidly over the years. Only a limited number of studies have focused on the effects of wood dust on carpenters, who are frequently exposed to this harmful substance. This study was conducted to assess the effect of wood dust exposure on pulmonary function tests (PFTs) in healthy Sudanese carpenters.

Methods: This study included 65 carpenters with no history of respiratory or chronic diseases. For each participant, forced vital capacity (FVC), forced expiratory volume in one second (FEV1), and peak expiratory flow rate (PEFR) were measured, and the results were compared with controls from the normal reference values for Sudanese subjects matched for age and height.

Results: All measured parameters of PFTs in carpenters were significantly lower than their matched control from Sudanese reference values. The mean values of FEV1, FVC, FEV1/FVC ratio, and PRFR in carpenters were found to be 2.5±0.61 L/min, 2.9±0.62 L/min, 86.0±6.3% and 467.3±37.6 L/min, respectively, compared to 3.0±0.27 L/min, 3.3±0.26 L/min, 90±1.2% and 476.7±29.5 L/min in the control group. The results showed a significant reduction in all parameters of the PFT with increasing years of exposure to wood dust. The mean FEV1/FVC% was significantly higher among smokers compared to non-smoking carpenters (P value = 0.037).

Conclusions: Wood dust harms the respiratory systems of carpenters. Awareness campaigns should be conducted to educate carpenters about respiratory health risks and the protective measures that can be taken. Key Words: PEFR, FVC, FEV1, PFT, respiratory symptoms, Sudanese, Carpenters

Lipids and liver enzyme biomarkers derangement as predisposing factors to dementia in Kampala Uganda

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Background: Dementia is a degenerative neurological syndrome that affects memory, thinking and causing individual behavioural changes. The World Health Organization (WHO) in the year 2021 reported that more than 50 million people were living with dementia, and about 10 million new cases are detected every year. There is a paucity of data in the area of dementia research from Sub-Saharan Africa and Uganda. Many patients are undiagnosed clinically due to non-consideration of readily accessible laboratory blood biomarkers. Using blood lipid and liver enzyme biomarkers may be useful in dementia diagnosis. This study aimed to investigate lipid profile and some liver enzymes as possible diagnostic biomarkers of Dementia among patients attending five referral Hospitals in Kampala, Uganda.

Methods: Sixty elderly patients aged fifty years and older diagnosed with dementia by a Specialist Neurologists /or Medical Officers were recruited as case subjects, while 60 cohort subjects age and sex matched with no history of dementia served as controls. Questionnaires with close-ended questions and Dementia diagnostic tool (MMSE) were distributed to participants to collect data. Ten millilitres (10 mls) of blood samples were collected from participants for assessment of lipid profile and liver enzymes biochemical assays. Data were expressed as mean \pm SD. Comparisons between groups were made using two-tailed Student's t-test and Mann-Whitney rank-sum test. SPSS Version 21 was used for the analyses; values with $p < 0.05$ were considered statistically significant.

Result: The results revealed ALT was significantly ($p < 0.009$) higher in the dementia group (22.124 ± 6.115 IU/L) than the control (7.820 ± 1.063 IU/L) and AST mean value was also significantly ($p < 0.005$) higher in the dementia group (18.475 ± 7.029 IU/L) compared to control (16.630 ± 1.062 IU/L). There were increase in the mean values of triglyceride for the dementia group (5.417 ± 2.650 mMol/L) compared to the control (4.734 ± 2.888 mMol/L) and the mean values of 2.508 ± 1.002 mMol/L and 1.843 ± 1.018 mMol/L; 1.640 ± 1.273 mMol/L and 1.429 ± 1.276 mMol/L for the dementia and control subjects for LDL and HDL respectively, however, no significant difference observed.

Conclusion: Based on the result obtained, liver enzymes surge may be possibly involved in the pathogenesis of dementia.

Keywords: Alzheimer's Disease, AST, ALT, Lipid profile and Vascular Dementia.

Reliability of visual assessment of neonatal jaundice among neonates of black descent: a cross-sectional study from Tanzania

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Background: Jaundice is common among neonates and if untreated can lead to kernicterus. Diagnosing neonatal jaundice (NJ) using Kramer's method (visual assessment) is considered user-friendly in resource-limited areas. However, there are conflicting findings on accuracy of the Kramer's method in the diagnosis of NJ, particularly of black descent. This study aimed to determine the accuracy of Kramer's method in the diagnosis of NJ among neonates of black descent in Tanzania.

Methods: A cross-sectional study of 315 neonates was conducted between June and July 2020 at Muhimbili National Hospital in Dar es Salaam Tanzania. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive and negative likelihood ratios (+LR/-LR), and diagnostic accuracy of Kramer's method were compared with Total Serum Bilirubin (TSB) levels as the gold standard. Association between independent variables and presence of jaundice were assessed using the chi-squared test.

Results: The prevalence of NJ was 49.8% by Kramer's method and 63.5% by TSB. The Sensitivity, Specificity, PPV, and NPV of Kramer's method were 70.5, 86.1, 89.8, and 62.6%, respectively. The +LR and -LR were 5.07 and 0.34, respectively. The diagnostic accuracy of Kramer's method was 76.1%. There was a moderate agreement between Kramer's method and TSB results ($\kappa = 0.524$, $P < 0.001$).

Conclusion: Kramer has a good positive predictive value. However, due to low sensitivity and NPV one cannot say that overall predictive ability is good. Further studies are needed to investigate the utility of other non-invasive techniques in detecting NJ among neonates of black descent.

Keywords: Black descent; Diagnostic accuracy; Kramer; Neonatal jaundice; Sensitivity; Specificity.

Spirometry performance quality and lung function pattern during pregnancy; should testing conditions and interpretation criteria be re-evaluated?

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Background: Despite the prevalence of respiratory disorders in the gravid state, and the crucial role of spirometry in respiratory medicine, its utility for assessing lung function during pregnancy remains infrequent. Putative reasons for this include reservations regarding spirometry performance and its potential influence on test outcomes, although the literature documenting such concerns is insufficient. This study sought to evaluate whether variations in spirometry test performance could impact the diagnosis of pulmonary function patterns throughout gestation.

Methods: We used spirometry data from a cross-sectional study of 120 pregnant and 114 non-pregnant women who underwent spirometry with uniform instructions given to all subjects. Data were subjected to chi-square testing and subsequently evaluated through logistic regression analysis.

Results: The acceptable performance rate among pregnant participants was 77.3%, with the most common quality grade being C (37.5%) while it was 90.4% amongst non-pregnant participants, with the majority achieving grade B (30.7%). Pregnant individuals exhibited 2.1 times the odds of achieving a B grade ($p=0.037$, 95% CI=1.0-4.2) and 4.1 times the odds of achieving an F grade ($p=0.02$, 95% CI=1.6-9.9) instead of an A grade. Additionally, they manifested 2.9 times the odds of generating unsatisfactory performance ($p=0.007$, 95% CI=1.3-6.1) compared to non-pregnant participants. Also, pregnant participants displayed 2.5 times the odds of exhibiting a restrictive pattern ($p=0.021$, 95% CI=1.1-5.7); but pattern classification was not associated with quality grades.

Conclusion: Despite the higher likelihood of suboptimal spirometry quality, the observed pattern classification remains as expected physiologically, suggesting that spirometry is still a valid tool for assessing lung function in pregnancy.

Key words: spirometry, pregnancy, lung function, restriction, obstruction, quality, women

Evaluation of the Ameliorative Role of Vitamin C on Fluoxetine-Induced Sexual Dysfunction in Male Wistar Rats

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Background: Antidepressant use, particularly selective serotonin reuptake inhibitors (SSRIs), is widespread among adult males, yet their sexual side effects are a major concern. Fluoxetine, a well-known SSRI, often leads to decreased libido and erectile dysfunction. Vitamin C, an antioxidant, has shown promise in countering antidepressant effects. This study investigates the potential ameliorative role of Vitamin C in mitigating fluoxetine-induced sexual dysfunction in male Wistar rats. By evaluating various sexual activity parameters, we aim to determine if Vitamin C supplementation can alleviate fluoxetine-associated sexual side effects, potentially enhancing patient well-being during antidepressant treatment.

Methods: Female rats were induced into estrus using ethinyl estradiol and progesterone. Male rats and receptive females were paired in mating cages. Sexual activity was assessed on days 0, 14, and 21, recording mount latency, intromission latency, mount frequency, intromission frequency, and ejaculation frequency using digital cameras.

Results: On day 14, there was a significant decrease in mount and intromission frequencies in the fluoxetine-only group. However, groups treated with Vitamin C and fluoxetine showed improved sexual behaviour. On day 21, these groups exhibited increased mounting and intromission frequencies and reduced latencies compared to the fluoxetine-only group.

Conclusion: The study demonstrated that Vitamin C supplementation alongside fluoxetine improved sexual behaviour in male rats, enhancing mounting and intromission frequencies while reducing latencies. This suggests that Vitamin C's antioxidant properties may counter fluoxetine-induced sexual dysfunction by mitigating reactive oxygen species, ultimately improving overall sexual function. This research provides valuable insights into potential strategies for managing antidepressant-induced sexual side effects.

The Effect of Wild Yam (*Dioscorea Villosa*) Tincture on Memory and Learning in Mice.

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Background: Loss of memory occurs as part of the ageing process and memory deficits related to age have been significant sources of morbidity in any human population. Cognitive functions such as long-term memory and working memory are impaired by the ageing brain. The purpose of this study was to determine the potential benefits of wild yam in enhancing memory. In this work, the effect of orally administered tincture of wild yam (*Dioscorea villosa*) on learning and memory in young mature mice has been studied.

Methods: The wild yam tincture was administered to the test animals by oral gavage and FELASA guidelines were adhered to. Twenty male swiss albino mice (n=20): ages 3 – 6 months were randomly allocated into a control and test group (n=10 each) during the experimental period of 8 months. The animals were subjected to learning and memory tests using the T-Maze apparatus. Long term memory was assessed using a left – right discrimination task in a T- maze. For the above test, four parameters were evaluated: Correct Response (%), Latency (sec), Distance Travelled (cm) and number of Omission Errors. In this study the effective food reward (bait) used was a breakfast cereal “Kelloggs Honey Loops”. Data was analyzed using STATA version 11 software, using independent t-test and results presented as mean \pm standard error of means (SEM). The significance level was $P < 0.05$. **Motivation** was measured by reduction in omission errors.

Results: The test and control mice showed no significant difference in memory tests before wild yam tincture was administered. After administration of wild yam tincture the young mature test mice showed increased learning ability and improved memory.

Conclusions: This study recommends that further studies be undertaken to explore the benefits of wild yam in human volunteers considering that wild yam products are widely used in Chinese and Western alternative medicine for other purposes rather than the enhancement of memory and learning.

Key Words: Wild Yam, Diosgenin, Tincture, Mice, T-Maze, Memory, Learning, Aging

Transgenerational programming of insulin resistance in offspring of white rice-fed female fruit flies

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Background: Chronic consumption of white rice (WR) causes an increased risk of insulin resistance (IR) and type 2 diabetes. Locally grown Nigerian WR was reported to induce IR in fruit flies. We examined the effects of chronic maternal WR consumption across multiple offspring generations.

Methods: Gravid, 3-4-day-old *Drosophila melanogaster* were placed on either control, 50% WR or 50% brown rice (BR) diets for 24 h. The eggs deposited were allowed to develop on the respective diets until adulthood when adult female flies were categorized into three groups (n=30/group) each in triplicate: Control, WR and BR; and maintained on their respective diets for 7 days. At the end of the intervention, changes in weight, glucose, trehalose, glycogen and triglycerides (TG) were evaluated. We further examined the impact of prolonged maternal consumption of WR on first (F1) and second (F2) filial generations that were either raised on a control diet or challenged with a high sugar diet.

Results: Chronic WR consumption induced IR in the female parent as evidenced by weight gain, significantly increased glucose, trehalose, TG levels and marked reduction in glycogen levels. Similarly, maternal WR consumption elevated glucose, trehalose and TG levels in F1 offspring with significant increases in trehalose and TG levels in F2 offspring. In contrast, the levels of these metabolic signatures in the BR groups were comparable to those of the control groups.

Conclusion: This study demonstrates the potential of WR but not BR to programme for transgenerational inheritance of IR-like phenotype in offspring.

Keywords: White rice, brown rice, insulin resistance, transgenerational inheritance, *Drosophila melanogaster*

External moderation of undergraduate physiology courses: an African experience during the Covid-19 pandemic

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Background: External moderation of examinations is an essential component of quality control/assurance of educational programs. However, it can be a resource intensive process in Africa when couriers are used to transport bulky hard copies of documents and moderators have to travel across borders to fulfil their mandate. The lockdown restrictions imposed by countries in 2020-2021 to mitigate the effects of Covid-19 provided an opportunity to make greater use of online, electronic and remote practices for moderation of exams.

Methods: A critical narrative personal perspective of positive and negative experiences as an external moderator of undergraduate Physiology programmes on the African continent is presented.

Results: Reviewing password encrypted examination papers rather than hard copies allowed for more feedback to be given. The online and electronic platform provided for a quicker turnaround time and dedication of more time to reviewing/moderating documents than couriered hard copies. Conducting viva voce exams online was time conserving and negated the need for cross-border travel. The use of online facilities opened up the possibility of greater trans-border interaction of academics as external moderators.

Conclusion: Despite the general negative impact of Covid-19 restrictions on most spheres of life, from my African perspective, it introduced opportunities to revisit our approach to external moderation of exams. The lockdown restrictions, though fraught with challenges, from an external moderator's viewpoint, resulted in savings of time and finances which could be channeled to other much needed educational resources and facilities for students and staff development.

Key words: Assessment, physiology, external moderation, Covid-19, perspective

Influence of endothelium-derived nitric oxide and calcium sensitivity on the relaxant action of lauric acid on the corpus cavernosum of male Wistar rats

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Background: Increased bioavailability of endothelial nitric oxide, as well as decreased calcium sensitivity of the corpus cavernosum tissues promote relaxation, thus improving penile erection. This study thus sought to evaluate the impact of endothelium-derived nitric oxide and calcium sensitivity on the relaxant action of lauric acid on the corpus cavernosum.

Methods: Corpus cavernosum tissues of male Wistar rats were extracted and mounted in an organ bath. With phenylephrine and KCl as contractile agents in separate experiments, relaxation responses of the tissues to lauric acid were evaluated in the presence of L-NAME (L-Nitro-Arginine Methyl Ester); a nitric oxide synthase inhibitor. In another experiment, the tissues were bathed in a Ca²⁺- free physiological solution and pre-incubated with EGTA (Ethylene glycol tetraacetic acid); a calcium chelating agent. Then, contraction responses to Ca²⁺ in the presence of lauric acid were evaluated

Result: In phenylephrine-contracted tissues, relaxation response to lauric acid was significantly higher ($p < 0.05$) in the presence of L-NAME compared to the control. In KCl-contracted tissues, relaxation was significantly lower ($p < 0.05$) in the presence of L-NAME compared to the control. No significant change was observed in the contraction responses to Ca²⁺ in lauric acid-treated tissues compared to the control.

Conclusion: Relaxation of the corpus cavernosum by lauric acid in phenylephrine-contracted tissues involves other mechanisms besides from the nitric oxide pathway. However, in KCl-contracted tissues, relaxation was completely dependent on the nitric oxide pathway. Modulation of calcium sensitivity did not account for the relaxant action of lauric acid.

Keywords: Lauric acid, Corpus cavernosum, Erectile function

In vitro immunomodulation of RAW 264.7 macrophages by medicinal plants used traditionally to treat pulmonary tuberculosis in South Africa

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Background: Pulmonary tuberculosis (PTB) is a global health burden, which continues to be a leading cause of death in developing countries. The search for natural products as indicators of pro-inflammatory M1 phenotype is gaining much attention in recent time. Therefore, this study aimed to evaluate the *in vitro* immunomodulatory effects of three plants used traditionally for the treatment of PTB in the Eastern Cape Province of South Africa, namely, *Anthraxia phillycoides*, *Lippia javaniva*, and *Sanicula elata*.

Methods: The plant extracts (70% ethanol) were tested at 50 µg/ml, 100 µg/ml and 200 µg/ml, for their immunomodulatory effects on the lipopolysaccharide-activated RAW 264.7 macrophages (LPS-RM), using the Griess method. A standard curve of sodium nitrite dissolved in culture media was used to determine the concentration of NO in each sample.

Results: The results showed that *S. elata* exhibit the best pro-inflammatory activity of 3.6 µM at 50 µg/ml, inducing more NO production at the lowest concentration, compared to the positive control (LPS at 3.5µM). It displayed considerable immunomodulatory activity of LPS-RM towards M1, which has the potential to degrade and destroy *Mycobacterium tuberculosis*. Phytochemical analysis of *S. elata* by UPLC-MS hyphenation technique showed that majority of the constituents are phenolic acids and phenolic glycosides, which may be responsible for the upregulation of the genes in the nitric oxide production pathway.

Conclusion: Thus, the study findings justified the folkloric use of this medicinal plant as a remedy for PTB. Further investigations of *S. elata* for anti-TB activity in the animal model are warranted.

Androgen receptors' expression in prostate cancer patients of different Gleason Grades attending treatment at the Kisumu specialists' hospital in Kisumu County, Western Kenya

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Background: Androgen receptors are drug targets in prostate cancer treatment. This study evaluated the correlation of AR expression to the clinico-pathological factors through the assessment of the distribution of Gleason Score (GS) and Grade Group (GG) in prostate cancer biopsies obtained from patients in the Kisumu Specialist Hospital (KSH), Western Kenya.

Methodology: This was a retrospective cohort study carried out on eighty (80) formalin-fixed prostate cancer biopsies obtained between 1st January 2017 and 30th June 2019. Secondary data on the histological GS, GG, age and tumor quantification of the specimens was obtained from clinical records. The tumor expression of AR was analyzed in 80 tumor tissues using immunohistochemical techniques. Non-parametric Kruskal-wallis and Spearman's correlation coefficient tests were used to analyze the relationship between parameters. The level of statistical significance was reported at $P \leq 0.05$.

Results: GG 1 and 2 had twelve cases (15%, N=80). In contrast, a majority (58; 72.5%) of the tissues were categorized under GG 4 and 5. Ten 10(12.5%) tissues were categorized under GG 3. Study results showed negative correlation between AR expression and both GS ($r = -0.466$, $p < 0.0001$) and GG ($r = -0.455$, $p < 0.0001$). Non-parametric Kruskal- Wallis test and one-way ANOVA analysis showed that, AR was not significantly related with either tumor quantification or age.

Conclusion: The results demonstrated that, AR showed negative significant correlation with both Gleason score and Grade Group and therefore cannot be relied upon as a treatment target. However, can be useful indicator for androgen deprivation therapy resistance at advance stages in PCa patients.

Keywords: Prostate cancer, Androgen receptor, Gleason Grades, Androgen deprivation therapy resistance

Monosodium Glutamate-Induced Changes in Some Mammary and Renal Hormonal Receptors and Gene Expression, Aquaporin-3 Channel Dysregulation, Markers of Oxidative Stress, and Some Lactogenic Parameters in Lactating Wistar Rats

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Background: Changes induced by monosodium glutamate (MSG) can negatively impact milk production and secretion, among other adverse effects. This study investigated the effects of MSG consumption on receptor gene expression and quantification of hormones and receptors, as well as oxidative stress biomarkers and other lactogenic parameters in lactating animals.

Methods: Twenty-four female Wistar rats, nine weeks of age, were randomly assigned to four groups, each containing six rats, at parturition. The rats in groups II, III, and IV were given varying doses of monosodium glutamate (MSG), while group I was given distilled water and served as the control. The experimental period lasted two weeks.

Results: The groups administered with MSG showed a significant decrease in mammary PRLR gene expression ($p < 0.05$), as well as a marked reduction ($p < 0.05$) in mammary PRLR, OXT receptor, AQP-3, brain antioxidant enzymes and pituitary SOD compared to the control group ($p < 0.05$). The kidney prolactin receptor was significantly reduced ($p < 0.05$), while the oxytocin receptor and aquaporin-3 channel were significantly ($p < 0.05$) increased in the MSG-administered groups. Furthermore, there was significant increase ($p < 0.05$) in reactive oxygen species levels in the serum and mammary gland and renal homogenates, and elevated ($p < 0.05$) brain and pituitary MDA levels in the MSG-administered groups compared to the control group. Daily milk yields were significantly decreased ($p < 0.05$) in the MSG-administered groups between days 10 and 14 of lactation.

Conclusion: The findings of this study suggest that prolonged consumption of MSG could interfere with lactation-associated activities.

Keywords: Monosodium glutamate; prolactin; oxytocin, growth hormone, gene; receptors, aquaporin-3, lactation

Mitigating copper sulphate-induced gonadotoxicity: the inhibitory effect of D-Ribose-L-Cysteine on oxido-inflammatory derangement, mitochondrial apoptosis and testosterone down-regulation

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Background: D-ribose-L-cysteine (DRc) has demonstrated its ability to diminish copper toxicity in the brain, an organ that also plays a vital role in regulating reproductive function. But, the interplay between DRc and copper toxicity in the testis has not been investigated.

Methods: To explore this hypothesis, male Swiss mice were administered oral treatments of copper sulphate [CuSO₄ (200 mg/kg)] and/or DRc (10, 25, and 50 mg/kg) once a day for 28 days. After euthanization, the epididymal sperm was immediately subjected to semen analysis, and the excised testicular tissues were processed for biochemical and histomorphological assays.

Results: The results revealed that CuSO₄ disrupts testicular biomarkers, as evidenced by increased copper levels in the gonads and the induction of oxidative/nitrosative stress (e.g., increased levels of MDA and NO, and decreased levels of GSH and SOD). In addition to the redox imbalance caused by CuSO₄, the impairment of the inflammatory (e.g., increased IL-6, TNF- α and IFN- γ) and caspase pathways contributed to a reduction in testosterone production, sperm quality (e.g., decreased sperm morphology, count, motility, and viability), and the gonadosomatic index, with significant impact on the gonadal histoarchitecture. However, treatment with DRc alleviated these effects induced by CuSO₄ intoxication.

Conclusion: Altogether, since testosterone dysregulation and oxido-inflammatory pathway disruption are implicated in gonadotoxicity, DRc's ability to inhibit these cascades during CuSO₄ exposure provides insights into the mechanisms of CuSO₄-induced gonadal dysfunction as well as the therapeutic value of DRc in the testes.

Keywords: Copper sulphate, D-Ribose-L-Cysteine, Gonadotoxicity, Inflammation, Mitochondrial apoptosis, Oxidative stress

Panax ginseng ameliorates pituitary-ovarian dysfunction induced by radiofrequency electromagnetic radiation from cell phone by upregulation of CREM signaling pathway.

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Background: Chronic exposure to radiofrequency electromagnetic radiation (RF-EMR) from cell phone contributes to increased prevalence of infertility globally, including female infertility through the disruption of hypothalamic-pituitary-ovarian function. Panax ginseng (PG) is a plant considered as adaptogens that confer cellular protection. However, the impact of PG on pituitary-ovarian dysfunction and subsequent infertility was unknown. The present study therefore investigated the hypothesis that PG would attenuate pituitary-ovarian dysfunction associated with RF-EMR from the cell phone in experimental rat model.

Methods: Twenty adults female Wistar rats were randomly divided into 4 groups of n=5; Control group received vehicle (0.2 mls of normal saline; po), PG group received 0.2 mls of PG extract (po), RF-EMR group was exposed to 900MHz of radiation and RF-EMR+PG group was exposed to 900MHz of radiation and treated with 0.2 mls of PG (po). The treatment was done daily and lasted for 28 days. The animals were sacrificed and biochemical parameters in addition to the histology of ovaries/pituitary glands were evaluated.

Results: Serum levels of LH, FSH, estradiol and progesterone were significantly decreased (p 0.05), in addition, the levels of SOD and GPx significantly decreased in RE-EMR group compared with control. The expression of CREM gene was significantly lower with corresponding disrupted pituitary/ovarian morphology in RE-EMR group compared with control. However, administration of PG reversed these alterations.

Conclusion: The present results demonstrate that Panax ginseng extract protects against pituitary-ovarian damage/dysfunction associated with RF-EMR from the cell phone by enhancement of antioxidant capacity and upregulation of CREM dependent pathway.

Keywords: Cell phone; CREM; Electromagnetic radiation; Panax ginseng; Pituitary gland; Ovary.

Effect of Ficus exasperata ethanol leaf extract on leptin, blood glucose, olanzapine-induced obesity in female albino Wistar rats

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Background: Obesity is an important public health problem throughout the world and is a major risk factor for several chronic diseases. Increased Serum leptin concentration is directly related to obesity severity and Ficus exasperata ethanol leaves extract has been shown to possess hypolipidemic properties, thus the study evaluated its effect on leptin level in olanzapine-induced obesity in female albino Wistar rats.

Materials and methods: The study had five (5) groups of six (6) rats each. Group 1 (Control) were fed ad libitum, Group 2 had Ficus exasperata ethanol extract (100 mg/kg/day). Group 3 had olanzapine (4 mg/kg/day). Group 4 were administered Ficus exasperata ethanol extract (100 mg/kg/day) and olanzapine (4 mg/kg/day). Group 5 were given orlistat (10 mg/kg/day) and olanzapine (4 mg/kg/day). After 28 days of treatment, the rats were sacrificed, and serum analyzed for lipid profile, leptin, and blood glucose levels.

Result: Leptin (2.2 ± 0.8) ng/ml and blood glucose (16.0 ± 14) mg/dl. $P < 0.05$ levels were significantly lowered in the obese groups treated with Ficus exasperata compared to the non-treated obese groups (3.8 ± 0.5) ng/ml, (19.7 ± 2.0) mg/dl respectively. Also, significant decreased in total cholesterol (88.3 ± 10) mg/dl, Triglyceride (76.2 ± 10) mg/dl and low-density lipoprotein (52.3 ± 1.9) mg/dl levels untreated group compared with non-treated obese groups (119.0 ± 22.9) mg/dl, (116.1 ± 16.2) mg/dl and (60.6 ± 3.3) mg/dl respectively.

Conclusion: Ficus exasperate ethanol leaves extract has antihyperglycemic and anti-hyperleptinemic properties that may be beneficial in obesity management.

Keywords: Ficus exasperate, Leptin, Obesity, Olanzapine, Orlistat.

Biostress marker levels in lactating Wistar rats exposed to radiofrequency electromagnetic radiation from mobile phones

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Background: The use of Mobile phones has drastically increased the Radiofrequency Electromagnetic radiation (RF-EMR) exposure encountered in daily life. The study investigated the effect of radiations from mobile phones on the biological stress markers in lactating wistars rats.

Methods: Rats (n=20), at parturition were exposed to radiations from mobile phones at varying frequencies from day 1 to day 21 of lactation, the animals were randomly divided into four groups thus: Group A: Normal control (Rats not exposed to any radiation). Group B: (Rats exposed to 900MHz of radiation from phone in talk mode), Group C: (Rats exposed to 1800MHz in standby mode and Group D: (Rats exposed to 1800MHz of radiation from phone at talk mode). The body temperature, cortisol and superoxide dismutase levels were then measured.

Results: An analysis of variance was done and tukey's post -hoc test was used to assess the significance between groups, it indicated a statistically significant increase $p \leq 0.05$ in the daily mean basal body temperature all through the twenty-one days (0.24 ± 0.07 °C) and Superoxide Dismutase (16.03 ± 1.05) $p \leq 0.05$ in the Group exposed to RF-EMF 1800MHz talk mode), there was also significant increase in the levels of cortisol in groups B,C and D (16.72 ± 0.79 , 16.45 ± 0.65 , 15.35 ± 1.96) in all the groups (B, C, D) exposed to radiation compared to the control group.

Conclusion: Exposure to radiation from mobile phones is a major biological system stressor.

Keywords: Lactation, radiofrequency electromagnetic radiation, mobile phone

Ursolic acid prevents metabolic syndrome-related insulin resistance through decreased expression of PTP-1B gene in male Wistar rats fed a high-carbohydrate high-fat diet

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Background: High-carbohydrate high-fat diet (HCHFD) induces metabolic syndrome (MS). Insulin resistance (IR) has been identified as a major risk factor of MS. PTP-1B is a major negative regulator of insulin sensitivity. We have shown that ursolic acid (UA) prevents the development of HCHFD-induced MS. However, the mechanism by which UA ameliorates MS-related IR has not been established. This study investigated the mechanism by which dietary UA supplementation prevents MS-related IR in male Wistar rats fed a HCHFD.

Method: The animals were randomly divided into 4 groups (n =5): 1- normal diet (ND) + distilled water (DW); 2 – ND+UA; 3 – HCHFD+DW; 4 – HCHFD+UA. HCHFD was formulated in house and augmented with 20% fructose in drinking water. The animals were fed daily for 20 weeks. A dose of 250 mg/kg body weight of ursolic acid was adopted and administered orally starting 12 weeks after initiation of HCHFD for a further 8 weeks. Body weight, BMI and FBG were measured every four weeks and percentage increase was determined. OGTT was performed and AUC_{glucose} was determined. Blood samples were obtained for insulin and lipid profile assessment. Insulin resistance was determined using HOMA-IR. Liver PTP-1B mRNA level was evaluated using RT-PCR technique. Liver tissue was evaluated histologically. All results presented are statistically significant at P<0.05.

Results: HCHFD+UA-fed animals had a lower BMI and FBG increase compared to the HCHFD+DW. In the HCHFD+DW, HOMA-IR and AUC_{glucose} were higher compared to HCHFD+UA. There were decreases in insulin; cholesterol; triglyceride and LDL-C in the HCHFD+UA compared to the HCHFD+DW, while HDL-C was increased in HCHFD+UA compared to HCHFD+DW. Liver PTP-1B mRNA was less expressed in HCHFD+UA compared to HCHFD+DW.

Conclusion: In this study, UA supplementation prevented metabolic syndrome-related insulin resistance through decreased expression of PTP-1B.

Keywords: Ursolic acid, Metabolic syndrome, HCHFD, 20 weeks, insulin resistance.

Effect of ethanol leaf extract of *Manniophyton fulvum* müll. arg. on memory in scopolamine-induced amnesic male wistar rats

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Background: The memory-enhancing potential of *Manniophyton fulvum* Ethanol leaf Extract was evaluated on scopolamine-induced memory impairment in rats. The objective of this study was to determine the effects of ethanol extract of *Manniophyton fulvum* leaves on memory in scopolamine-induced amnesic male Wistar rats.

Objectives & methods: The Morris water maze swimming test and Object Recognition Test were performed to evaluate spatial memory retention. The activity of the acetylcholinesterase enzyme was determined using the Ellman method while lipid peroxidation was estimated as TBARS was determined using malondialdehyde. The Beer and Sizer method was used to assess catalase enzyme activity. Sliced slices of the hippocampus were stained for general cytoarchitecture using the Hematoxylin and Eosin staining method, mounted, and then imaged under an optical microscope.

Results: LMFEF reduced AchE levels in the hippocampus of scopolamine-injected rats by 60.9%. Scopolamine injection significantly depleted the antioxidant activities in hippocampal tissue, that is catalase activity and malondialdehyde, but these changes were reversed by LMFEF treatment. The neuroprotective properties of the extract were demonstrated by H&E staining, and LMFEF at doses of 100 and 200 mg/kg significantly repaired pyramidal cells.

Conclusions: The results showed that LMFEF attenuated the learning and memory impairment induced by scopolamine, improved memory impairment by inhibiting AchE, and reduced antioxidation in catalase activity and MDA. The study findings suggest that LMFEF could be a potent medication against memory loss.

Keywords: Amnesia, Learning, Memory, Memory Loss, Ethanol extract

The *in vitro* effect of kynurenine metabolites on cell morphology, cell cycle progression and the induction of apoptosis in tumour endothelioma cells.

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Background: The development of anticancer therapies plays a crucial role in mitigating tumour progression. Kynurenine metabolites including L-kynurenine, 3-hydroxykynurenine, 3-hydroxyanthranilic acid and quinolinic acid inhibit T-cell proliferation resulting in a decrease in cell growth of natural killer cells.

Methods: This study explored the influence of kynurenine metabolites on endothelioma cells at concentration ranges of 1 mM – 4 mM for 24 h, 48 h and 72 h on cell morphology, cell cycle progression and induction of apoptosis.

Results and Discussion: The half inhibitory concentration (IC₅₀), determined using GraphPad Prism, for L-kynurenine, quinolinic acid and kynurenic acid was 10.77 mM, 14.78 mM and 535.4 mM respectively. Cell morphology revealed cells blocked in metaphase and formation of apoptotic bodies in L-kynurenine- and quinolinic acid- treated cells. A statistically significant increase in the number of cells in the sub-G₁ phase was observed in L-kynurenine-treated samples.

Conclusion: L-kynurenine exerts an antiproliferative effect on endothelioma cells by a decrease in cell proliferation. Further research will be conducted on L-kynurenine to assess the effect on cell adhesion *in vitro* and *in vivo*.

Keywords: L-kynurenine, quinolinic acid, kynurenic acid, endothelioma, apoptosis

Prevalence of hypogonadism and associated risk factors among newly diagnosed ART naïve HIV-infected males in Mwanza, Tanzania

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Background: Hypogonadism is frequent among human immunodeficiency virus (HIV) infected males and might have significant clinical impact leading to sexual impairment and metabolic derangement. The causes of hypogonadism is not clearly known but can be intensified by various factors including age, infectious and noninfectious commodities, weight loss and drugs among others. Aim of this study was to determine the prevalence of hypogonadism and its associated risk factors among newly diagnosed antiretroviral therapy (ART) naïve HIV infected men in Mwanza, Tanzania.

Methods: This was a multicenter hospital based study involving newly diagnosed ART naïve HIV infected men in Mwanza. All enrolled participants underwent thorough clinical and physical examination including anthropometric measurement. Data including socio-demographic and clinical data was collected using a pre-structured questionnaire. Serum total testosterone, follicle stimulating hormone, luteinizing hormone and estradiol were estimated. Serum testosterone <300 ng/dl, or testosterone >300 ng/dl with high luteinizing hormone and follicle stimulating hormone were taken as markers of hypogonadism. Data were analyzed using STATA version 15.

Results: A total of 388 newly diagnosed ART naïve HIV infected males with a median age of 40 [33 – 46] years were enrolled in this study. The median BMI and CD4 count were 21.1 [19.4 – 23.5] Kg/M² and 301.5 [169.0 – 410.5] respectively. Hypogonadism was found in 186 (47.9%), with secondary hypogonadism (83.9%, 156/186) being the most frequent form. Predictors of hypogonadism among HIV infected males were age above 46 years (Odds ratio [OR], 2.3; 95% confidence interval [CI], 1.1 – 4.6; p = 0.023), herbal medicine use (OR, 2.4; 95% CI, 1.5 – 3.9; p < 0.001), WHO clinical stage 3 (OR, 2.7; 95% CI, 1.4 – 5.2; p = 0.003) and weight loss (OR, 1.8; 95% CI, 1.1 – 3.0; p = 0.016).

Conclusion: Hypogonadism was found in almost one half (47.9%) of ART naïve HIV infected men. Majority (83%).had secondary hypogonadism. Older age above 46 years, herbal medicine use, weight loss and advanced clinical stage 3 might help identify patients at risk.

Key words: human immunodeficiency virus, antiretroviral naïve males, hypogonadism, risk factors

Gestational Weight Gain and Associated Cardio-metabolic and Lifestyle Changes among Pregnant Women Attending Antenatal Clinics in Dar-es-Salaam, Tanzania.

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Background: Physiological changes during pregnancy are associated with maternal weight gain and an increase in weight of the growing foetus. Excessive weight gain is linked to cardiometabolic changes that affect pregnancy outcomes. In Sub-Saharan Africa, excessive antenatal weight gain has not been a traditional concern, and studies exploring antenatal weight gain and associated cardiometabolic changes are limited. Therefore, this study aimed to assess the association between gestational weight gain, lifestyle and cardio-metabolic variables among pregnant women attending an antenatal clinic in Dar-es-Salaam, Tanzania.

Methods: Cross-sectional study on 125 pregnant women attending the antenatal clinic (ANC) at Mnazi Mmoja Hospital, age: 18-40 years, using consecutive sampling. Exclusion criteria: pre-pregnancy diabetes, hypertension, obesity. Antenatal cards (RCH 4) were reviewed for information on: mean blood pressure (BP), Hb levels, proteinuria, weight and height. Blood samples were analysed for HbA1c. A questionnaire was used to assess physical activity and sedentary time. Gestational weight gain (GWG) was assessed by comparing first-trimester weight (baseline) to third-trimester weight. $P < 0.05$ was considered statistically significant. Ethical clearance was obtained from the Institutional Review Board (IRB) of Muhimbili University of Health and Allied Sciences and permission was obtained from relevant authorities.

Results: The prevalence of excessive GWG among the population studied was 28.8%. GWG showed a statistically significant association with mean BP ($p=0.008$) but not with Hb ($p=0.464$) and HbA1c levels ($r=0.064$, $p=0.478$). The association between GWG, physical activity, and sedentary time was not statistically significant ($p=0.734$, $p=0.451$ respectively).

Conclusion: Excessive gestational weight gain is alarmingly high among pregnant women attending ANC at Mnazi Mmoja Hospital and is related to increased BP during pregnancy.

Keywords: gestational weight gain; pregnancy; hypertension; lifestyle.

Anti-seizure effects of hydro-ethanolic extracts of *Artemisia afra* (Jacq.Ex Willd.), in an *in vitro* in an entorhinal cortex-hippocampal slices of rat

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Background: Epilepsy is a chronic neurological disorder that affects people of all ages. Many synthetic anti-epileptic drugs are available; however, their effectiveness is a major challenge. In Ethiopia, traditionally, the aqueous extract of the whole plant of *Artemisia Afra* is being used for the treatment of epilepsy. The study aimed to investigate the anti-seizure effects of the 70% ethanol extract of *A. afra* in an *in vitro* animal model.

Methods: The study and experimental protocol was approved by the Institutional Review Board (IRB). Pharmacological experiments were performed with bath application of 70% ethanol *A. afra* crude extract (100 μ L), vehicle control (100 μ L), and control (1.2mL/m of mACSF). Data were presented as the mean \pm standard error of the mean and analyzed using a one-way analysis of variance (ANOVA) and followed by post-hoc Tukey's multiple comparisons test. $P < 0.05$ was considered statistically significant.

Results: *A. afra* crude extract showed significant delay or increase [46.300 ± 2.309 min $p < 0.05^*$]; in latency to the onset of the seizure-like event, delay or increase [2.438 ± 0.139 min $p < 0.05^*$] in the mean latency between seizure-like event, against the low magnesium models of epilepsy compared to the control [35.231 ± 0.795 min.; 1.671 ± 0.0512 min.] and vehicle [39.444 ± 0.886 min; 1.712 ± 0.0473 min.].

Conclusion: % ethanolic extract of the plant *A. afra*, alleviates low magnesium-induced seizure-like events in brain slices of rats.

Keywords: ethanolic, seizure, *Artemisia afra*,

Blood donation practice among first-year medical students of the University of Dodoma, Tanzania

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Background: Blood demand remains relatively high in all regions of Tanzania. University students aged 18-25 make up a sizable portion of the potential donors. This study aimed to determine the knowledge and practice of blood donation among first-year medical students at the biggest Tanzanian university.

Methodology: A cross-sectional study was conducted at the School of Medicine and Dentistry, The University of Dodoma, Tanzania. A self-administered questionnaire was distributed among all the first-year medical and nursing students before “Blood Groups and Blood Transfusion” physiology lecture. A total of 221 completed questionnaires were analyzed.

Results: Only 57 (25.8%) of the surveyed students had donated blood. Most of them gave blood once (54.4%) or twice (33.3%) within the last two years. The non-donor respondents refused the request to give blood due to fear of health risks (33.3%) and fear to donate (26.4%) because of insufficient knowledge about the procedure itself. Despite a high level of awareness about blood donation, 29.4% of students were confident that infections could be transmitted to the donor during blood collection. According to the survey, 86% of donors and 68% of non-donor medical students showed a willingness to donate blood if the blood drive is conducted at the University’s campus.

Conclusion: Educational lectures and active recruitment through the organization of blood donation days may contribute to an increase in the number of voluntary donors. The blood physiology lecture session is recommended to be used as a way to raise awareness of and motivation for blood donation among medical students.

Keywords: blood donation, medical students, Tanzania

Practice of self-medication among adults attending primary health care centres at Bunda district, Tanzania

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Background: The self-medication practice remains a major public health concern in both industrialized and developing countries. This study was focused on the assessment of knowledge, attitude, and practice toward self-medication among adults attending primary health care facilities.

Methods: A cross-sectional study using questionnaire was conducted among 402 individuals aged 18 years and older who attended AICT and Bhoke dispensaries, Designated District Hospital and Manyamanyama Hospital at Bunda district, Tanzania. Data were analyzed using SPSS.

Results: Out of 402 respondents, 91.8% had practiced self-medication in the previous six months. 83.6% believed that self-medication is part of self-care, and all of them responded that people should have medication for immediate use when they get sick. The major reason for self-medication was a minor illness (45.5%) followed by experience from a previous treatment (27.4%). The common group of drugs was analgesics (91.1%), followed by antibiotics (63.4%) and antimalarial drugs (18.4%). About 66.9% of participants were unaware that self-medication may result in antibiotic resistance. Factors such as sex, marital status, education level, religion and occupation were found to be significantly associated with self-medication ($p < 0.001$). Surprisingly, there was no significant association between self-medication and the availability of health insurance ($p = 0.073$).

Conclusion: This study revealed a significant prevalence of self-medication among adults in Bunda district and a low knowledge about its side effects, especially on antibiotic resistance. The necessary actions are advised in order to address this issue, including ongoing public education on the health implications of self-medication and increasing and reinforcing regulatory control over the distribution of drugs, particularly antibiotics, among the Tanzanian population.

Keywords: practice, self-medication, Tanzania

Gender implications of cardiometabolic alterations in acutely stressed Wistar rats

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Background: The stress type experienced in third-world countries like Cameroon has not been adequately modelled in rodents, making it unclear how this stress type affects cardio-metabolic health and if there are gender implications. The present study was thus designed to model the stress type experienced in third world countries and to determine its effects on cardio-metabolic health in both male and female young adult rats.

Methods: 56 Young female and male Wistar rats were randomly divided into four groups (n=14 with 7 rats from each gender). Group 1 animals were unstressed and untreated, Group 2 animals were stressed only, Group 3&4 animals were treated with cannabidiol (10 and 25 mg/Kg respectively) and stressed. For ten days, animals were stressed psychologically and by food deprivation. At the end of the study Cardiac histological and biochemical markers were determined. Sex-specific transcriptomic profiling of the left ventricle following stress was determined.

Results: Combined psychological and food deprivation stress increased plasma Corticosterone levels in females than in males (120±13 and 75±10 U/L respectively). It increased the risk for cardiovascular dysfunction especially in females with higher levels of inflammatory markers. Also increased cardiac lipid peroxidation and RELA gene expression. Cannabidiol mitigated the observed stress induced alterations and this was associated with altered Serum Arachidonic acid levels. Transcriptomic profiling showed that genes differentially up-regulated in females due to stress were related to fatty acid metabolism.

Conclusion: Combined psychological and food deprivation stress increases the risk for cardiovascular dysfunction, especially in female rats.

Key words: Stress, Cardio-metabolic, Gender

Dietary chemical ionic effects on gender progeny ratios

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Background: Historically, society has been rife with allegations that there does exist modalities of influencing its gender progeny although this has not been fully proven. These include folk methods, astrology, natural manipulation, cosmobiology, dietary and others. One of the various reasons for influencing gender ratio progeny can be in the management of genetic diseases as this has been examined and adopted as acceptable, easier, cheaper, safer, and legal mode of alleviating these conditions although this remains contentious. Of the various gender influencing methods, dietary societal allegations on gender progeny ratios influence were put under scrutiny.

Methods: 144 families of webster mice were randomly divided into 9 groups receiving different ionic formulations in their diet. In their life spans of 2 - 3 years, analysis of their progeny was performed using applicable statistics.

Results: There were a total of 1528 deliveries with 13,040 pups delivered comprising of 6,348 female pups and 6,692 male pups. The mean pups per delivery were 8.5/delivery. There was no significant statistical difference in sex ratio found in the control water group, $p=0.61$ while, glucose, Sodium, potassium, and sodium + potassium supplementation influenced the sex ratios towards male progeny ($p<0.001$). Calcium, magnesium, and calcium + magnesium ($p<0.001$) influenced sex ratios towards the female progeny. The cocktail of all the combined elements together had no significant influence towards either gender ($p>0.0609$).

Conclusion: This study does confirm that dietary ionic chemical contents do influence progeny ratios through their ionic influence along gender lines and that glucose seems to have similar influence on gender ratios towards the male gender.

Serum Thyroid hormones and Lipid levels in HIV patients on Highly Active Antiretroviral Therapy at the Jaramogi Oginga Odinga Teaching and Referral Hospital Kisumu, Kenya

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Background: This study determined the serum levels of Total Cholesterol, Triglycerides, High Density Lipoproteins, Low Density Lipoproteins, Thyroid Stimulating Hormone, Thyroxine, and Triiodothyronine among the HAART-treated and HAART-naïve subjects at the Jaramogi Oginga Teaching and Referral Hospital in Kisumu, Kenya.

Methods: HAART-treated (84) and HAART-naïve (20) participated in this study. Blood (5ml) was collected and centrifuged to obtain serum. Colorimetric method was used to determine the serum levels of TC, TG, HDL, and LDL while immunofluorescence method was used to determine the TSH, T4 and T3 serum levels. The means were compared using Mann Whitney U test while Association between the serum lipid and thyroid function hormones levels was determined using Spearman correlation test.

Results: Although Thyroid function hormones were within normal levels in both HAART-treated and HAART-naïve groups, TSH levels were significantly higher among the HAART-treated subjects than in HAART-naïve subjects, [median (IQR) 1.72 (1.71) nmo/L vs median (IQR), 0.87 (1.07) nmo/L, P=0.001]. The HDL levels were markedly reduced [median (IQR) 52.50 (24.00) mg/dl vs median (IQR) 44.00 (34.00) mg/dl, (P=0.280)], unlike for TC [median (IQR) 186.00 (91.50) mg/dl vs median (IQR) 149.50 (70.30) mg/dl, (P=0.092)], TG [median (IQR) 82.00 (62.80) mg/dl vs median (IQR) 94.50 (55.80) mg/dl, (P=0.504)], and LDL [138.00 (86.30) vs 117.00(46.50), (P=0.476)] respectively.

Conclusions: There was a positive correlation between T4 and LDL levels, ($\rho=0.240$, P=0.014). The study found varying serum levels of lipids and Thyroid function hormones between the HAART-treated and HAART-naïve subjects and therefore recommends routine monitoring.

Keywords: HAART, serum lipids, Thyroid hormones

Effects of combined psychological and food deprivation stress on cognitive function in adult Wistar rats

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Background: The stress commonly experienced in third world countries have not been adequately modelled in rodents as most stress models are tailored for developed countries. Thus, whether this stress type is capable of contributing to mental health challenges amongst youths is unverified. It was thus of interest to model combined psychosocial and food deprivation (CPFD) stress in young adult rats and ascertain its effect on cognition.

Methods: 56 young female and male Wistar rats weighing 80-93 g were randomly divided into four groups (n=14 with 7 rats from each gender). For ten days, animals were stressed and food was withheld from them from 7pm. to 7am. At the end of the study Cognitive function, brain histology and molecular markers were determined. Transcriptomic profiling was also determined.

Results: CPFD stress caused a significant decrease in discrimination index (DI) of both object and location recognition memory assessments irrespective of gender. CPFD stress caused a decrease in serum arachidonic acid in male rats but had no significant effect in female rats. CBD treatment in rats prevented CPFD stress induced decrease in DI of object recognition test but had no significant effect on DI in object location recognition test. CBD treatment ameliorated the stress induced increases in serum corticosterone levels and brain peroxidation which was associated with increases in acetylcholinesterase activity.

Conclusion: The present study demonstrates that CPFD stress impairs cognition and the endocannabinoid system may be involved in the observed gender difference.

Central Antagonism of Angiotensin II Type 1 Receptor attenuates placental ischemia-induced hypertension in rats

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Background: We previously reported that placental ischemia-induced hypertension in rat, a model for preeclampsia (PE) was associated with increased pro-hypertensive activity of the paraventricular nucleus of hypothalamus (PVN). Increasing evidence suggests that both circulating and brain local renin angiotensin system (RAS) plays important role in sympathoexcitation-mediated hypertension, which involves the PVN. In this work, we sought to verify the hypothesis that the onset and progression of hypertension in PE involves changes in central RAS components in the PVN that their antagonism may reduce hypertension in PE.

Methods: We induced PE-like symptoms by reducing the utero-placental perfusion pressure (RUPP) on gestational day (GD) 14 in Sprague Dawley rats, which were treated with intracerebro-ventriculaire (ICV) injection of losartan (100µg/day), an antagonist of Angiotensin II Type 1 Receptor (AT1R) for five days.

Results: On GD19, RUPP rats had hypertension ($P<0.05$), reduced litter size and fetoplacental weights ($P<0.05$). Changes in the PVN induced by RUPP operation are increased mRNA and protein expression of AT1R, NOX2 and NOX4, increased reactive oxygen species (ROS) production, elevated protein of tyrosine hydroxylase (TH), a marker of excitatory neurotransmission. Chronic infusion of losartan via ICV did not prevent RUPP-altered fetomaternal morphometrics; however, such infusion reduced increased blood pressure and attenuated the above-mentioned molecular changes within the PVN.

Conclusion: Our data suggest a potential role of central AT1R, the receptor of the most active peptide of RAS, in onset and progression of hypertension in PE. This may help in the design of more appropriate therapeutic interventional tools for PE.

Investigation of the cardiovascular effects associated with chronic growth hormone administration in an animal model of physical exercise

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Background: Chronic growth hormone is abused in doping. This study was done to demonstrate its chronic cardiovascular effects in an exercising rat model. This is due to paucity of data.

Methods: An Experimental study design. Rats were treated as follows. Normal group (normal saline), negative control (Exercise 30 minutes/day/five days weekly for four weeks + normal saline), positive control (subcutaneous growth hormone dose 0.2IU/kg daily/thirty days) and test group (subcutaneous growth hormone dose 0.2IU/kg daily/thirty days + exercise for 30 minutes per day for 5 days weekly for four weeks). A Lead I ECG was done at the end of the study. The rats were sacrificed and the hearts extracted for histology.

Results: The positive control and test group exhibited abnormal tracings with notched R waves with slight ST elevations in the test group. There was a significant increase in the R wave amplitude in the negative control group. The RR duration was significantly lower in the test group and positive control. Significant increase in QRS and QT interval was noted in all the groups as compared to the normal. On histology, the negative control had hypertrophy with slight disorganization of histological architecture. The test group demonstrated disorientation of the histoarchitecture, with necrosis, edema and infiltration.

Conclusion: GH combined with physical exercise induces cardiac remodeling. This compromises the structure, electrocardiography and the mechanical functioning of the heart. Further studies need to be done on its effects on cardiac biomarkers

Key words: Growth Hormone, Doping, Cardiac remodeling

Investigation into aortic smooth muscle activities of Terminalia glaucescens extract in male Wistar rats

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Background: Smooth muscle is involved in various physiological and pathological processes associated with the cardiovascular system. Terminalia arjuna a specie of Terminalia has been researched for its cardioprotective and inotropic effects. Terminalia glaucescens, a commonly use chewing stick in Nigeria may modulate smooth Amuscle activity in the cardiovascular system. This study investigates the aortic smooth muscle (ASM) activities of T. glaucescens extracts and the possible mechanisms.

Methods: Aortic smooth muscle from adult male Wistar rats was used for this study. Contractile activities of different solvent extracts of T. glaucescens on the ASM were determined using force isometric transducers, and the effective concentration dose 50 (EC50) was calculated from the solvent with maximum relaxation amplitude. The relaxation activity of this extract after precontraction of ASM by different agonists such as phenylephrine, KCl, CaCl₂, sumatriptan, sodium fluoride (NaF), and acetylcholine was investigated. Furthermore, the relaxation response after pre-incubation with some blockers like L-NG-Nitro arginine methyl ester, methylene blue (MB), indomethacin, glibenclamide, barium chloride (BaCl₂), prazosin, propranolol, and KT-5720 was determined.

Results: Ethanol extract significantly reduces ($p < 0.05$) phenylephrine contraction compared to NaF with no significant effect on other contractile agonists. The vasorelaxant effect caused by the extract was significantly reduced with pre-incubation with glibenclamide, BaCl₂, and MB but was enhanced by indomethacin, and there was an improved relaxation (%) response to acetylcholine.

Conclusion: It is suggested that Terminalia glaucescens has a vasorelaxant effect on ASM and the possible mechanisms involved endothelium-dependent and independent mechanisms, guanylyl cyclase, potassium channels, and Rho/Roh kinase pathways.

KEY WORDS: Terminalia glaucescens, aortic smooth muscle, cardiovascular system, vascular activities, and potassium channels

Investigation of the effects of *Camellia sinensis* TRFK306 on induced metabolic syndrome in Sprague Dawley rats

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Background: Metabolic syndrome (MetS) is a cluster of metabolic abnormalities characterized by central obesity, hypertension, atherogenic dyslipidemia, microalbuminuria, and insulin resistance (Rochlani et al., 2017). The prevalence of MetS is documented at 50% and 87.5% in Africa and Kenya respectively. Current management is a combination of lifestyle modification and pharmacotherapy. Although *Camellia sinensis* TRFK306 has been proven to induce weight loss in mice and humans, its effect on metabolic syndrome is yet to be investigated.

Aim: To investigate the effect of *Camellia sinensis* TRFK306 extract on MetS induced Sprague Dawley male rats.

Method: A high fat-high fructose diet was used to induce metabolic syndrome in the control groups for eight weeks. Afterwards, low dose test and high dose test groups were treated with *Camellia Sinensis* TRFK306, 100mg/kg and 200mg/kg respectively and the positive control was treated with orlistat 10mg/kg.

Results: The freeze-dried extracts of *Camellia Sinensis* TRFK306 possessed anti-obesity, antihyperglycemic and anti-dyslipidemic effects. The histology examination of the test groups' retroperitoneal fat and the liver showed less infiltration of inflammatory cells and less areas of necrosis and fat droplet deposition respectively, compared to the negative control. Histology examination of the kidney tissue indicated that although the test groups and the positive control group developed kidney injury, the high dose test group had less extensive kidney injury compared to the low dose test group and the positive control.

Conclusion: The freeze-dried extracts of *Camellia Sinensis* TRFK306 possessed significant beneficial effects on various markers of metabolic syndrome.

Keywords: Metabolic syndrome

The effect of ethanolic extract of *Annona muricata* leaf and Metformin on testicular oxidative stress markers, antioxidant status, and histology architecture in Arsenic trioxide induced toxicity in male Rats

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Background: Male infertility is linked to environmental toxicants like arsenic trioxide; treatment with medicinal plants improves it. The study examines the ethanolic extract of *Annona muricata* leaf and Metformin's effects on testicular oxidative stress markers and antioxidant status in male Wistar rats following arsenic trioxide toxicity.

Methods: Thirty male Wistar rats were used in the study and weighed 150-170 grams and were divided into six groups of five rats each. Group A received 50mg/kg of arsenic trioxide (As₂O₃) only. Group B received feed and water ad libitum. Groups C and D received 50mg/kg of As₂O₃ for two weeks and were treated immediately with 30mg/kg of metformin and 500mg/kg of ELAM, respectively. Group E received 500mg/kg of ELAM and As₂O₃, and group F received 30mg/kg of metformin (MET) and As₂O₃, respectively. Data obtained (testicular MDA, SOD, GSH, GPX, and CAT) were subjected to ANOVA using SPSS version 25, and the result was presented Mean±SEM and considered significant at p≤0.05.

Results: The result for MDA showed a significant increase in groups A to B, and groups C, D, E, and F significantly declined. SOD level decreases in groups A to B, groups C and D had a significant increase, and E and F were insignificant. As₂O₃ impaired CAT, GSH, and GPX levels in group A, and significantly improved in groups D, E, and F except for CAT level in group D. As₂O₃ affects testicular architecture negatively; treatments with MET and ELAM improve it.

Conclusion: The study concludes arsenic trioxide caused testicular lipid peroxidation; MET and ELAM improved antioxidant activity, and reduced lipid peroxidation, and histoarchitecture of the testes.

Keywords: testicular oxidative stress, testicular antioxidants, *Annona muricata*, metformin, arsenic trioxide, male infertility

Evaluation of Emotional Intelligence Levels in Healthy Young Adults

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Background: Emotional intelligence (EI) encompasses a group of abilities that are considered determinants of success both in personal and professional life. Gender, age, family, and the environment are among the main factors that affect the development of EI. Recently, studies on EI have been conducted with different groups of individuals from the schools of medicine, nursing, pharmacy, veterinary medicine, and engineering. However, we did not come across any studies that brought together all the different student groups from different study areas in a single study. The current study was aimed at investigating the relationship between EI scores of healthy young adults and their educational field.

METHOD: University students in Turkey were included in our study (n = 256). The Turkish version of the Trait Emotional Intelligence Questionnaire was used to determine the EI scores of the volunteers. The study was administered online. **Results:** The total EI scores of the participants in the natural and applied sciences, health sciences, and social sciences were found to be 4.50 ± 1.42 , 4.45 ± 1.19 , 4.43 ± 1.22 , respectively ($p = .932$). Similarly, the highest scores in well-being, self-control, emotionality, and sociability subgroups were found in natural and applied sciences, and the lowest scores were found in health education students ($p = .365$, $p = .678$, $p = .794$, $p = .441$, respectively).

CONCLUSION As a limitation of our study, although the targeted number of participants could not be reached due to the pandemic, moderate differences between the field of education and EI scores were observed. We believe that the results of the current study will be valuable for future research.

KEYWORDS: emotional intelligence; university education; education field

Effects of pyrethroids and carbamates on the immune system of *Culex quinquefasciatus*: enzymatic activities and genetic mutations in the commune of Natitingou

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Background: In order to better understand the immune system of the mosquito in relation to the use of insecticide in their ecological environment, a study was conducted on enzyme activities and resistance genes in *Culex quinquefasciatus* which is the main malaria vector in Sub-Saharan Africa in the district of Natitingou, northern Benin.

Methodology: To explore this goal further, Knowledge Attitude-Practice (KAP) surveys were organized in two urban areas (Founga and Zountori), and in two rural areas (Nima, Bougou 2) where leaders of farmer's organizations were interviewed on the treatment strategies, and the use of insecticides in the farms. These were complemented by bioassay studies, carried out in accordance with WHOPEs recommendations, to determine the susceptibility of *Cx. quinquefasciatus* to insecticide-impregnated papers (permethrin 0.75%, deltamethrin 0.05%, DDT 4%, and bendiocarb 0.1%). Mosquitoes from the susceptible tests were utilised to search for the existence of the knock down resistance (*Kdr*) and the Acetylcholinesterase (*Ace-1R*) mutations. Finally, F1 generation of the wild population of *Cx. quinquefasciatus* were employed for biochemical analysis to target Mixed Function Oxidase (MFO), non-specific esterase (NSE) and glutathione-S-transferases (GST) enzymes.

Results: This research showed: **1)** - Farmers' incorrect use of insecticides to combat vegetable pests has resulted in *Cx. quinquefasciatus* developing a significant resistance to DDT, permethrin, deltamethrin, and bendiocarb, with corresponding average mortality rates of 3%, 7%, 19%, and 75%; **2)** While the Ace-1 mutation was found at a relatively low frequency ($\leq 5\%$), the *Kdr* mutation was observed in all areas at varying frequencies (0.8 to 0.88); **3)** - Despite the areas of collection, enzyme activity (oxydase, esterase, and glutathion-S-transferases) were found in all mosquito populations.

Conclusion: This work has highlighted the high resistance of *Cx. quinquefasciatus* to the 3 classes of insecticides used in public health. Moreover, the high frequency of *kdr* and the presence of enzyme activity in *Cx. quinquefasciatus* will add to the information already available on the pesticide resistance of filariasis vectors and will be helpful for decision-making on the control of this mosquito.

Keywords : Resistance, *Culex. quinquefasciatus*, Insecticides, Natitingou, Benin

Evaluation of cardiac recovery in subjects with sickle cell trait after 400-meter run

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Background: The physical fitness of sports people with sickle cell trait is a highly controversial area of research. Some studies report normal aerobic fitness, while others suggest intolerance to endurance exercise. The aim of this study was to compare the recovery of subjects with sickle cell trait after a 400 m run with that of subjects with normal haemoglobin.

Methods: This study was carried out on 24 male students from the National Institute for Popular Education and Sport, in the 20-28 age group, who regularly practised sport. This population was divided into two groups : a group of 12 subjects with sickle cell trait, constituting the experimental group, and another group of 12 subjects with normal haemoglobin, constituting the control group. The principle was to have them run a 400 m race, record their heart rates at the finish, then every minute for 5 minutes of recovery and compare the mean values of the two groups using the T-STUDENT test.

Results: The mean heart rate values (beats/min) taken each minute during 5-minute recovery periods in sickle cell subjects (154.25±10 ; 139.25±8.25; 126.16±6.5; 115.41±8.12; 103.41±5.65) were always significantly higher than those in students with normal haemoglobin (145.50±8.58; 131.58±6.27; 117.66±5.38; 109.66±6.39; 92.91±5.90).

Conclusion: This study shows that students with sickle cell trait at the National Institute for Popular Education and Sport have a less developed recovery capacity than their peers with normal haemoglobin during the first five minutes after a 400 metre race.

Key words : sickle cell anaemia, sickle cell trait, cardiac recovery, 400m run, heart rate

Effects of aqueous root extract of *Citropsis articulata* on (African cherry orange) cardiac function in DOCA salt-induced hypertensive male Wistar rats

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Aim: This study assessed the effects of aqueous root extract (ARE) of *Citropsis articulata* (*C. articulata*) on cardiac function in DOCA salt-induced hypertensive male Wistar rats.

Methods: Acute toxicity of ARE of *C. articulata* was conducted on Wistar rats and showed safety with LD₅₀ > 5000 mg/kg body weight (b w). Twenty- four male Wistar rats were divided into six groups (n = 4). Hypertension was induced using DOCA salt and 1ml of NaCl in drinking water in groups II, III, IV, V, IV with groups III, IV, V treated orally with ARE of *C. articulata* at doses 200, 400, 600 mg/kg b w respectively and group VI treated with Propranolol at 1mg/kg given. Blood pressure was measured using a power lab non-invasive blood pressure machine, serum electrolytes (sodium, potassium, calcium) were measured using the ion selective electrode method, Creatine Kinase-Myoglobin was measured first by using gel electrophoresis, and then measured using densitometry, Cardiac troponin was measured using an immunoassay, histological studies of the cardiac tissues was done and tissues were stained using Hematoxylin & Eosin (H and E).

Results: DOCA salt administration significantly increased the mean arterial pressure, serum sodium ion levels, cardiac troponin levels, and creatine kinase- myoglobin levels. Treatment of rats with ARE of *C. articulata* significantly ($p < 0.05$) reduced the mean arterial blood pressure, and improved cardiac function as determined by the levels of cardiac troponin and creatine kinase-myoglobin. Histopathology examination also showed a significantly reduced the damage of the myocardium following administration of ARE of *C. articulata* to rats.

Conclusion: It can be concluded that DOCA salt administration to animals induces hypertension via increase in cardiac-troponin, creatine-kinase-myoglobin, and sodium ion leakage. However, treatment of animals with ARE of *C. articulata*, produced a significant improvement on cardiac functional parameters and histopathological abnormalities of the myocardium.

Key words: Deoxycorticosterone acetate salt (DOCA), hypertension, aqueous extract

Ameliorative effects of quail (*Cortunix japonica* L.) and chicken eggs on fasting blood glucose, insulin levels and some organ dysfunctions in streptozotocin–induced diabetic male Wistar rats

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Background: Many people, particularly in Asian nations eat quail eggs as treatment regimen for diabetes mellitus (DM). Despite this, there is paucity of scientific data to justify this claim. This work was carried out to deduce the upshot of Japanese quail egg on fasting blood glucose, insulin levels and some organ dysfunctions in streptozotocin–induced diabetic male Wistar rats.

Methods: Diabetes mellitus was induced with 45 mg/kg body weight of streptozotocin (STZ) intraperitoneally. Thirty six rats were divided into 6 groups; group 1 was healthy rats fed rat chow alone, group 2 was healthy rats fed rat chow and chicken egg, group 3 was healthy rats fed rat chow and quail egg, group 4 was diabetic rats fed rat chow alone, group 5 was diabetic rats fed rat chow and chicken egg while group 6 was diabetic rats fed rat chow and quail egg. They were fed for fourteen (14) weeks. Thereafter, fasting blood glucose (FBG), insulin and tissue histopathology were conducted.

Results: The upshot of quail and chicken eggs intervention significantly reduced the FBG levels in diabetic animals. Quail and chicken eggs significantly increased the body weight and levels of insulin in the control and diabetic groups of the diabetic animals that received its intervention ($p < 0.05$). Quail and chicken eggs did not have any noticeable effect on pancreas histology but quail eggs had a protective effect on hepatic cells.

Conclusion: Treatment regimen with quail and chicken eggs reduced FBG and elevated insulin level in streptozotocin-induced male diabetic rats.

Keywords: Diabetes mellitus, quail eggs, insulin level, hepatoprotective effect

The Effect of natural honey on biochemical markers in STZ-induced diabetic mice

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Background: There are many drugs for diabetes mellitus, still no one has improved from complications of diabetes mellitus. The rapid increase in diabetic patients, drug-related toxicity, and cost of treatments have initiated the finding of new anti-diabetes. There is still a great need for the best drugs from natural products such as natural honey. The potential of natural honey as a source of novel drugs remains unexplored so it is the best candidate.

Object: To investigate the Effect of Natural Honey on STZ-Induced type-2 Diabetic Mice.

Methodology: Thirty-one mice were divided into six groups. And treated as follows Normal mice with 0.5 ml distilled water, normal mice 1 gm/kg honey, diabetic mice with 0.5ml distilled water, Glibenclamide treated diabetic mice 0.6 mg/kg, and honey-treated diabetic mice 1gm/kg and diabetic mice treated with both Glibenclamide 0.6mg/kg and natural honey 1gm/kg respectively. Diabetes was induced by streptozotocin (40 mg/kg; i.p.). The animals were treated with oral gavages once daily for four weeks. At the end of the treatment, the animals were sacrificed their blood sample was collected.

Results: The animals in the diabetic control showed hyperglycemia (459 ± 45 mg/dL) while the natural honey-treated diabetic mice (220 ± 6.5 mg/dL), reduced blood glucose levels with p-values ($p < 0.05$). While Glibenclamide-treated mice had ± 19.0 mg/dL of blood glucose. However, the normal mice with natural honey and distilled water did not show any significant changes in their blood glucose and body weight. Those with natural honey and Glibenclamide reduced their blood glucose to (120 mg/dL ± 5.0) ($p < 0.05$).

Conclusion: The results of the present study demonstrated that consuming natural honey with glibenclamide improves hyperglycemia, and has a change in body weight than consuming glibenclamide alone.

Keywords: Diabetes mellitus, streptozotocin, glibenclamide, natural honey

Effect of varying dietary compositions on glucose regulatory mechanisms and inflammation in sleep-deprived male Wistar rats

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Background: Sleep deprivation has been linked to alterations in food metabolism, which can contribute to the etiology of diverse disease conditions. The effects of consuming a diet rich in specific nutrient classes are well documented. However, there is a dearth of information with respect to sleep deprivation and the consumption of specific food classes. This study was therefore designed to investigate the effect of varying dietary (high carbohydrate, protein and fat) compositions on glucose regulatory mechanisms and inflammation in sleep-deprived male Wistar rats.

Methods: Sixty-animals (200-220g) were divided in 5 equal groups and treated for 21-days as follows; Group I(control) received standard diet and were not sleep-deprived. Animals in groups II-IV were sleep deprived and exposed to standard, high carbohydrate, high protein and high fat diets respectively. Body weight, food intake and fasting blood glucose was monitored throughout the experiment. Thereafter, blood samples were obtained for serum insulin, lipid profile, cortisol, C-reactive protein, HbA1c, TNF- α , IL-1 α and 1 β , leptin, SOD, catalase, GSH, GPx, glutathione reductase, NO and malondialdehyde, respectively. Liver glycogen was also evaluated per group.

Results: Sleep-deprived animals on standard diet exhibited signs consistent with impaired glucose metabolism, dyslipidemia, oxidative stress and increased inflammation. Exposure of sleep-deprived animals to either high carbohydrate or high fat diets, but not high protein diets, exacerbated the observed sleep deprivation-induced pathologies.

Conclusion: Exposure to sleep deprivation and either high carbohydrate or high fats, but not high protein diet, aggravates sleep deprivation-induced derangements in glucose and lipid regulatory mechanisms, and exacerbates oxidative stress and inflammation.

Keywords: Diet, sleep deprivation, glucose regulation, dyslipidemia, inflammation

Knowledge, Attitude and Practice of Oral Rehydration Therapy in Treatment of Diarrhea Among Mothers of Under 5 years Children Attending the Dodoma Regional Referral Hospital

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Background: Oral rehydration therapy (ORT) has been shown to significantly reduce diarrhea-related mortality and morbidity.

Aim: This study aimed to assess knowledge, attitude and practice of ORT among mothers of under 5 years children.

Methods: A descriptive cross-sectional, health facility-based study with quantitative approach was conducted between October 2021 and March 2022 at Dodoma Regional Referral Hospital. A total of 248 mothers/caregivers were recruited randomly. Semi-structured questionnaire was used. Data analysis was done through SPSS, version 26. Frequency and proportion were used to describe qualitative data and the $p < 0.05$ was statistically significance.

Results: Of all participants, 210 (84.6%) have heard about ORT, 186 (74.4%) were knowledgeable, however only 40.7%, admit to use ORT when their children had diarrhea. 56% of the participants had negative attitude towards the use of ORT, the leading misperception was that the use of ORS in diarrhea will aggravates the disease 11.2%. Additionally, 54.1% of participants were unable prepare ORT at home.

Conclusion: The findings indicate the need for the health care workers to emphasize about the significance of ORS in prevention of dehydration due to diarrhea and its preparation at home.

Keywords: Diarrhea, ORT, ORS, under 5 years children, Dodoma, Tanzania

Preclinical models of cardio-pulmonary critical illness through research collaboration

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Background: Pre-clinical large animal models of clinical disease in heart and lung critical illness are necessary for understanding disease pathophysiology, mechanistic pathways as well as investigation and testing of novel therapies. However, there are few large animal laboratories in East Africa due to the capital costs and infrastructural investment required to set up and run a large animal research facility.

Methods: Through a unique collaborative partnership between the Critical Care Research Group (CCRG), Queensland (Australia) and the Initiative to Develop African Research Leaders (IDeAL), Kilifi (Kenya), there has been access to cutting-edge large animal model development research for acute lung and heart diseases. Ethics approval was sought and obtained from the Queensland University of Technology, Office of Research Ethics and Integrity (QUT-OREI) for the development of a large animal model of hyperdynamic endotoxaemic shock (QUT: 1400000032) and acute respiratory distress syndrome, ARDS (QUT1600001108, UQPCH/483/17).

Results: Large animal models of acute critical illness namely hyperdynamic endotoxaemic shock and ARDS were successfully developed and now form a platform for research investigating novel therapies. Endotoxin infusion was successful in producing distributive shock with the mean arterial pressure decreasing from 84.5 ± 12.8 mmHg to 49 ± 8.03 mmHg ($p < 0.001$). Two sub-phenotypes of ARDS were characterized.

Conclusion: Through strategic multi-disciplinary and inter-institutional collaboration across institutions in Africa, it should be possible to replicate similar collaborative arrangements aimed at developing high-fidelity large animal models for quality research without unnecessary duplication and attendant high costs

Effects of hippadine on the blood pressure and heart rate in male spontaneously hypertensive Wistar rats

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Background: Hippadine is an alkaloid isolated from *Crinum macowanii*. *Crinum macowanii* is used in South Africa to treat oedema, 'heart disease', rheumatic fever, cancer and skin diseases, and belongs to the plant family Amaryllidaceae. The study assessed the effect of hippadine on the blood pressure (BP) and heart rate (HR) in anaesthetized male spontaneously hypertensive Wistar rats (SHR); and to find out if α_1 and/or β_1 adrenoceptors contribute to its effects.

Methods: Hippadine (2.5–12.5 mg/kg), adrenaline (0.05–0.20 mg/kg), atenolol (0.5–40 mg/kg) and prazosin hydrochloride (100–500 μ g/kg) were infused intravenously, and the BP and HR measured via a pressure transducer connecting the femoral artery and the PowerLab.

Results: Adrenaline increased the systolic, diastolic and mean arterial BP, while hippadine, atenolol and prazosin respectively decreased the systolic, diastolic and mean arterial BP. Increases in HR were observed with both adrenaline and prazosin, while reductions in HR were observed with atenolol and hippadine. Infusion of adrenaline in rats pre-treated with atenolol (30 mg/kg), prazosin (400 μ g/kg), and hippadine (10 mg/kg) led to similar increases in BP and HR in all groups. All changes in HR or BP were significant ($p < 0.05$) and dose dependent.

Conclusion: Hippadine decreases the BP and HR in SHR, and these effects may be due to α_1 and β_1 adrenoceptor inhibition.

Keywords: Hippadine, spontaneously hypertensive rat, blood pressure, heart rate, α_1 adrenoceptor, β_1 adrenoceptor

Effect of dietary supplementation with Hibiscus sabdariffa calyces meal on egg production and egg quality of Japanese quail

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Background: There is an urgent need to replace synthetic feed additives in poultry production following reports that they cause adverse effects in human health. We investigated the effect of supplementing Japanese quail pullet diets with Hibiscus sabdariffa calyces meal (HSCM), a natural source of antioxidants, on egg production and egg quality.

Methods: A standard Japanese quail layer diet was supplemented with HSCM at 0%, 5% and 10% in diet 1, 2 and 3, respectively. Ninety, 5-week old Japanese quail hens were randomly allocated to and fed the layer diets for 56 days. Feed intake, egg production, internal and external egg quality parameters as well as the proximate content and fatty acid profile of the egg albumen and yolk were determined.

Results: Dietary supplementation with HSCM did not affect feed intake and conversion rate of the quail ($P > 0.05$) but delayed the onset of laying and reduced ($P < 0.0001$) the number of eggs laid. It did not affect the external and internal egg quality parameters of Japanese quail ($P > 0.05$), however, at 10% it significantly increased the dry matter and reduced the fat content of the yolk and albumin of Japanese quail eggs ($P < 0.05$). The meal reduced the omega 3 fatty acids in yolk and significantly increased arachidonic acid ($P = 0.0019$).

Conclusion: H. sabdariffa in laying hens may result in losses to producers of Japanese quail eggs and may result in production of eggs which may compromise consumer health.

Key words: Poultry, Eggs, Feed supplements, Hibiscus sabdariffa, Quail, Quality

The effects of maternal HIV/ART and preeclampsia on the cardiometabolic health and growth of the offspring in Mthatha, South Africa

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Background: Both preeclampsia and HIV/ART during pregnancy have been associated with adverse birth outcomes. However, there is paucity of information on the cardiometabolic health of children exposed to these conditions in-utero.

Method: In a prospective cohort study, children exposed to preeclampsia and HIV/ART in-utero were recruited at the NMAH, Mthatha – South Africa. Ultrasound foetal biometry: head circumference (HC), femoral length (FL), abdominal circumference (AC) and estimated foetal weight (EFW) were measured. Cord blood was collected at birth for the assessment of random glucose, creatinine, and lipid profiles. Anthropometry: birth weight, length at birth and HC were measured.

Results: The results showed that 16 children (5 control, 3 exposed to HIV/ART and 8 exposed to preeclampsia in-utero) participated in the study. Foetal EFW, HC and FL were significantly different ($p < 0.01$). Birth weight, length at birth and HC at birth were also significantly different among these groups ($p < 0.01$). A significant correlation was observed between AC and creatinine, glucose, and lipids among children exposed to HIV/ART ($p < 0.01$). In addition, children exposed to HIV/ART also showed significant differences in length at birth, random glucose and lipids ($p < 0.01$). A significant correlation was observed between FL and TG among HIV/ART exposed children, between HC in-utero and glucose and TG among children exposed to preeclampsia ($p < 0.05$) and HIV/ART ($p < 0.01$), respectively.

Conclusion: The growth pattern among the children was different. The foetal biometry and anthropometry at birth showed significant correlation with cardiometabolic biomarkers suggesting that HIV/ART exposure in-utero may play a role in cardiometabolic diseases risk later in life.

Antioxidant Action and Reparative Effects of Ipomoea batatas in Alloxan-Induced Diabetic Male Rats

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Background: Diabetes mellitus is a metabolic disorder that disrupts the equilibrium between the reactive oxygen species and antioxidants. This disorder leads to oxidative stress and interferes with spermatogenesis, resulting in male reproductive dysfunction. The present study is aimed at evaluating the antioxidant action and reparative effects of Ipomoea batatas in alloxan-induced diabetic male rats.

Methods: Twenty adult male rats were randomly selected and divided into four groups. Alloxan was injected intraperitoneally into ten rats at a fasting state, which formed groups B and D (Diabetic control group and Test group), and the remaining ten rats formed the non-diabetic groups A and C (Non-diabetic control and Test group). The results were expressed as mean \pm standard error of the mean, a one-way analysis of variance following the Bonferroni post hoc test for data comparison. Results were considered significant at $p < 0.05$.

Results: The result showed the presence of heavy metals, phytochemical contents, amino acids, vitamin A, B and D. The fasting blood glucose level, insulin and homeostatic index of insulin resistance showed a significant increase in group B compared with group A and a significant decrease in group D compared with the control groups. There was an increase in body weight and food consumption. The hormonal profile showed an increase in the testosterone and triiodothyronine levels. Oxidative stress activity showed a significant decrease in all groups for glutathione peroxidase activity and total antioxidant capacity. There were no changes in the sperm parameters of all the animals.

Conclusion: The consumption of sweet potatoes has demonstrated their anti-diabetic benefits and therapeutic efficacy in the management of diabetes mellitus and associated health problems linked to antioxidant activity and its reparative effect on reproductive functions.

Keywords: amino acids profile, antioxidant, diabetes mellitus, hormonal profile, Ipomoea batatas, phytochemical, vitamin

Impact of specific training on respiratory function in elite rowers

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Background: Rowing is an enduring sport and has the particularity of imposing additional requirements on respiratory muscles. The purpose of this study was to evaluate the body composition, maximal respiratory pressures and spirometric profil of elite rowers.

Methods: A group of well-trained male elite rowers (n=13) were interviewed and underwent bio electric impedance analysis, maximal inspiratory pressure (MIP), maximal expiratory pressure (MEP) and a simple spirometry.

Results: Mean age and mean body mass index were respectively 17.3 ± 1.84 years and 21.30 ± 2.23 kg/m². Mean values of different body mass were: $7.61 \pm 2.8\%$ for fat mass, $64.32 \pm 4.5\%$ for water mass, $48.51 \pm 4.98\%$ for muscle mass and $18.14 \pm 1.4\%$ for bone mass. Only one athlete had a low muscle mass estimated 39%. The mean MIP was 117.84 ± 28.2 cm H₂O and the mean MEP was 138.92 ± 27.71 cm H₂O. All measurements of MIP and MEP were in norms except for two athletes, one showed a decrease in MIP and the other one a decrease in MEP. The mean values of Forced expiratory volume in the first second (FEV₁) and Forced vital capacity (FVC), expressed as a percentage of predicted values, were respectively $103.53 \pm 10.7\%$ and $103.38 \pm 7.14\%$. The mean value of FEV₁/FVC ratio was $84.23 \pm 6.35\%$. Spirometry profile was normal in 11 rowers. Presence of an obstructive ventilatory defect in 2 athletes may suggest an asthma although the absence of any symptoms.

Conclusion: The study of lung function in elite rowers is a way not only for optimizing performance but also for screening an asthmatic disease.

Key-words: Maximum inspiratory pressure - Maximum expiratory pressure - Spirometry - Body composition - High level athletes

Normal electroencephalogram variants: analysis of unusual physiological brain activities in adults

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Background: The electroencephalogram EEG remains the reference examination to confirm epilepsy and dysfunctions of the central nervous system. The recording technique is performed at the level of the scalp causing interindividual physiological variations. The objective of our study was to identify and describe the different variants of a normal waking adult EEG.

Methods: A descriptive cross-sectional study conducted during November 2021. A collection of clinical data and analysis of the waking EEGs of patients that have consulted during January 2019 the Neurology department at Razi hospital.

Results: The study included 98 normal EEGs. Mean age of the patients was 48.26±19.63 years with a male predominance (57.1%). The EEG indications were dominated by epilepsy in 29.59% of cases, confusional syndrome in 10%, delusional syndrome in 10%, memory disorders 10%. Normal amplitude was found in 70.41% and 29.59% had a low voltage rhythm. A symmetrical rhythm was present in 85.71% against asymmetric rhythm was found in 14.28%. Hyperventilation was not done in 8.2% of EEGs. All patients had a reactiv EEG to the opening of the eyes and showed no response to hyperventilation and Intermittent Light Stimulation. The physiological normal variants were: slow alpha in 2 cases (2%), fast alpha in one case (1%), mu rhythm in 2 cases (2%) and lambda wave in one case (1%)

Conclusion: It is necessary that neurophysiologists be aware of the unusual physiological variants of the EEG in order to avoid a misinterpretation in favor of epilepsy.

Keywords: Electroencephalogram – Normality – Brain waves

Predictive factors of severe obstructive sleep apnea

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Background: Obstructive Sleep Apnea syndrome (OSAs) is a common but often under diagnosed disease. The aim of this study was to identify the factors predicting the severity of OSAs.

Methods: A prospective comparative study was performed including 83 patients with OSA divided into two groups: Group 1 with severe OSAs (n=63) and Group 2 with non-severe OSAs (n = 20). Clinical, biological, radiological, functional respiratory and polygraphic data were collected.

Results: Mean age was 57.21±10.27 years with a female predominance (73.5%). Android obesity was observed in 80%. Patients' medical history was dominated by hypertension (57%), diabetes (43%), metabolic syndrome (36%), dyslipidemia (32%). Diurnal fatigue was observed in 70%. The biological abnormalities were dominated by hypercholesterolemia (35%), hypertriglyceridemia (24%) and hyperuricemia (19%). Cardiomegaly was noted on chest X-ray in 24% of cases. OSAs was mild in 22% of cases, moderate in 2.4% and severe in 76%. Patients with severe OSAs had significantly more android obesity (p = 0.02), higher neck circumference and higher abdominal perimeter (respectively p = 0.056, p = 0.03 and p = 0.001). After multivariate analysis, the predictive factors of OSAS severity were a high risk of OSA in the Berlin questionnaire (p< 10⁻³), daytime fatigue (p=0.017), cardiomegaly (p=0.027), hyperuricemia (p=0.028) and diabetes (p=0.038).

Conclusion: The development of reliable scores that can screen the severe OSAs patients seems essential in order to organize their care in the shortest time. It can be based on Berlin questionnaire, daytime fatigue, diabetes, cardiomegaly on chest X-ray and hyperuricemia.

Keywords: Obstructive sleep apnea syndrome, Obesity, Severity

Impact of diet on body composition and iron metabolism in elite athletes of combat sports

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Background: Diet, body composition and iron metabolism have an impact on the performance of high-level combat athletes. The objective of our study was to evaluate the dietary intake of high-level combat sport athletes and its relationship with hematological parameters and body composition.

Methods: a retrospective, descriptive and analytical study conducted at the sports medicine center of El Menzah in February and March 2022 including 48 elite athletes in combat sports (judo, karate and taekwondo). A dietary survey was made and a collection of hematological parameters from medical records.

Results: Mean age 19.75 ± 3.78 years with a male predominance (54.7%). Spontaneous feeding presents excess intake of vitamins B1 (81.25%), B2 (91.66%), B9 (100%), B12 (100%), magnesium (81.25%) and calcium (52.08%) and deficits in vitamin A intake (56.25%). Normochromic normocytic anemia was present in 23% of women and 19% of men. Hypochromic microcytic anemia was present in 18% of women and 3% of men. Significant associations were found between hemoglobin and respectively body weight ($p=0.017$), Body Mass Index ($p=0.026$), and fat mass ($p=0.023$). Between hemoglobin and calcium phosphate ratio ($p=0.020$). Between water intake and respectively red blood cells ($p=0.041$), hematocrite ($p=0.001$), and hemoglobin ($p=0.003$). A significant association between red blood cells and vitamin B1 ($p=0.037$), between Mean corpuscular volume (MCV) and vitamin C ($p=0.042$), and between iron and hemoglobins ($p=0.038$).

Conclusion: A balanced diet, good hydration and nutritional education are essential for elite athletes in order not to fall into iron deficiency.

Keywords : Iron - Body composition – Nutrition- High level athletes

Epidemio-clinical profile of overactive bladder in Tunisian women

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Background: Overactive bladder syndrome (OABS) is considered a real social disability. The objective of our work was to draw up a clinical profile of female patients with OABS

Methods: A retrospective descriptive study of women with (OABS) that had consulted the urodynamic unit of Urology department at Charles Nicolle hospital between 2018 and 2020. Clinical, biological, radiological data were collected.

Results: Seventy-six patients were included. Mean age was 55.89 ± 12.18 years. Patients waited between 1 and 5 years in 43.5% of cases and 16.5% up to 10 years from the onset of urinary symptoms before consulting. They were urban dwellers (91%), housewives (61%), illiterate (53%), non-smokers (57%), obese (47%), postmenopausal (88%), multiparous (41%) and giving birth to baby macrosom in (63%). Urogenital prolapse was found in 28%. Patients' medical history was dominated by hypertension (28%), functional colopathy (29%), and recurrent urinary tract infections (34%). Urgency-pollakiuria was present in 70% and urgency-nicoturia was present in 53%. Neuroperineal examination was normal except testing of the levator ani muscles was rated between 2 and 3 in 46% of patients. High score of urinary symptom profil (USP) was recorded in 65%. Uro-Renal complications were noted in 5% of patients with renal insufficiency and 3.5% had a struggling bladder at renal ultrasound

Conclusion: Majority of female patients (60%) consulted after at least 1 year from the onset of urinary symptoms which can delay its management depending on complications. Screening obese, menopause, multiparous patients in order to treat them on time

Keywords: Overactive bladder, nocturia, urinary incontinence,

Estimation of salt consumption from spot urine samples in kidney transplant patients

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Background: Estimation of salt intake in kidney transplant recipients is often difficult due not only to variability in the salt content of foods but also to collect 24 hour urine in this categorie of patients. The aim of study is to assess the association between salt intake estimated by the nutritional survey and sodium excretion in spot urine samples.

Methods: A Cross-sectional and analytical study included 30 renal kidney transplant recipients. Patients treated with diuretics and those who had an estimated glomerular filtration rate less than 30 ml/min/1.73m²SC were excluded. The estimated daily salt intake using the NUTRILOG software. The estimation of the salt intake of each patient from the spot urine sample was obtained by dividing the sodium excretion by 17.

Results: The average age was 43.8 years \pm 9.7 and the sex ratio was 2.75. Thirteen people (43.3%) had diabetes and 21 patients (70%) had arterial hypertension. Mean creatinine was 12.6 \pm 5.3 mg/l. According to the results of the nutritional survey, the average salt consumption per day was 10.7 \pm 3.36 g. Median natriuresis was 9.6mmol/l [2.6–29.16mmol/L]. Estimated salt intake from sodium excretion was 4.2 \pm 1.7g/day. There was a statistically significant difference between the salt intake estimated by the nutritional survey and that estimated by spot urine sample (p = 0.015).

Conclusion: Our study suggest that estimating salt intake from sodium excretion in spot urine sample may underestimate salt consumption in kidney transplant recipients

Keywords: Renal transplantation- Nutrition – Urine - Natriuresis

Kinematic effects of pulling a two wheeled shopping trolley: a pilot study

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Background: Running errands is a common daily practice, as it is a necessary task to buy necessities. For shopping on foot, two-wheeled shopping trolleys have long been popular. Since, the impact of these bags on the musculoskeletal system has not been investigated; the present study aims to examine the gait changes when pulling a shopping trolley with different loads.

Methods: Five healthy adults were asked to perform comfortable normal gait when pulling a two wheeled shopping trolley with loads between 0 kg and 15 kg (at least 0-25% BW). 3D angular joints and Ground Reaction Forces were collected using a set of Vicon cameras and two AMTI force plates.

Results: Kinematic parameters have observed major modifications between loaded and unloaded sides and were highly dependent on the carrying a load. The hip flexion is more pronounced for loaded side when the load increases (+4°) and excessively rotated (+7°) with 15 Kg of load. Lumbar spine observed an increased ROM particularly in flexion-extension motion (up to 15°). GRF were more noticeable during the swing phase (80% GC) in 15Kg for the loaded side.

Conclusion: Our findings confirm that there are significant changes in body posture when carrying shopping trolleys with different weights with greater rotation of the trunk and adaptations of the lower limbs. It's suggested that if the trolley is overloaded and pulled for a long period of time, it can lead to fatigue and may cause injury, which need a deep focus and investigations, especially for elderly populations.

Keywords: Trolley, Kinematics, Gait, Trunk, lower limbs

***Telfairia occidentalis* inhibits gluconeogenesis and increases glycolysis in high-fat diet/streptozotocin-induced diabetic rats**

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Background: *Telfairia occidentalis* has been shown to reduce blood glucose in diabetic rats, but the mechanisms involved are poorly understood. The present study investigated the effect of acetone extract of *Telfairia occidentalis* leaves (ACETO) on glucose production and disposal in type 2 diabetes.

Methods: Thirty (30) male Wistar rats (180-210 g) were randomly distributed into 6 groups (n=5 rats/group): normal control, diabetic control and diabetic treated rats that received 5 mg/kg Glibenclamide (GLI5), 100, 200 and 600 mg/kg ACETO (ACETO-100, -200 and -600), respectively for 14 days. Experimental diabetes was induced with high-fat diet and streptozotocin (50 mg/kg) in succession. Standard laboratory methods were used to assay serum, skeletal muscle, and liver parameters.

Results: The diabetic rats that received GLI5 and ACETO had significant ($p < 0.001$) reductions in blood glucose levels after 7, and 14 days of treatment. HbA1c and hepatic G6P reduced with GLI5, ACETO-100 and ACETO-600. Only ACETO-100 and ACETO-600, but not GLI5 reduced liver glycogen. Moreover, muscle glycogen was reduced with GLI5, ACETO-100, ACETO-200, and ACETO-600 treatment. Only ACETO-600 and GLI5 increased pyruvate level, while all ACETO and GLI5 reduced FFAs, lactate level, and lactate dehydrogenase activity in treated diabetic rats. G6Pase activity was reduced with GLI5 and ACETO-100. GCK activity and G6Pase/GCK ratio were increased and decreased, respectively following GLI5, ACETO-100 and ACETO-600 treatments.

Conclusion: The results suggest that ACETO-induced inhibition of G6Pase and activation of GCK resulted in improved glucose disposal and reduction in blood glucose.

Keywords: *Telfairia occidentalis*; Diabetes; Glucokinase; Glucose-6-phosphatase; glucose disposal.

Is There a Relationship between Endothelin-1, Vascular Cell Adhesion Molecule-1 and the Arterial Hypotension Observed during Spinal Anesthesia?

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Background: The involvement of the endothelial dysfunction (ED) in arterial hypotension (AHPT) post of spinal anesthesia (SA) has not been established.

Objective: To determine if there is a relationship between ED and AHPT observed during the 1st 15 minutes after SA.

Population and Methods: The study concerned 40 people who were to benefit from a programmed herniorrhaphy under SA and 40 controls (SA⁻). The correlations between mean plasma concentrations of endothelin-1 (CmET-1,pg/ml) and Vascular Cell Adhesion Molecule-1 (CmVCAM-1,pg/ml) taken from SA⁺ one hour before (H0), then 15 minutes after the SA(H15) and the mean arterial pression (AMP, mmHg) with heart rate (bpm) were analyzed ($p < 5\%$).

Results: CmET-1 and CmVCAM-1 of SA⁻ were 1.07 and 3.34, respectively, compared to 1.12 ($p=0.735$) and 3.57 ($p = 0.862$) in SA⁺ at H0 and H15. In SA⁺, at H15, CmET-1 was 1.13($p=0.823$) and CmVCAM-1 was 3.57 ($p=0.257$). In SA⁻, a negative correlation existed between CmET-1 and CmVCAM-1 ($r = -0.438$; $p=0.005$). Conversely, in SA⁺, whether at H0 ($r = -0.31$; $p = 0.051$) or at H15 ($r = 0.024$; $p=0.883$), no correlation existed between CmET-1 and CmVCAM-1, nor between MAP and ED markers ($r =0.111$; $p=0.325$).

Conclusion: These results show that there is no relationship between the AHPT which occurs during the first fifteen minutes post SA, CmVCAM-1 and CmET-1. Moreover, these data suggest that ED is not involved in AHPT post SA.

Keywords: Endothelin-1, VCAM-1, Hypotension, Endothelial, Dysfunction, Spinal, Anesthesia

The assessment of cardiometabolic health in HIV infected pregnant women on antiretroviral treatment in Mthatha, South Africa

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Background: Cardiovascular diseases (CVDs) are a major cause of death worldwide. The association of CVDs and human immunodeficiency virus (HIV) infection/ antiretroviral treatment (ART) is well documented. Further, it is well recognized that pregnancy affects the cardiovascular system. However, there is little data on the cardiometabolic health of pregnant women. Therefore, we aimed to assess cardiometabolic risk among 11-14 weeks HIV positive pregnant women on antiretroviral treatment.

Methods: General anthropometry and blood pressure parameters were measured. BMI and mean arterial blood pressure were calculated. Carotid-femoral pulse wave velocity (cf-PWV) and flow mediated slowing were performed to assess arterial stiffness and endothelial function. Lipid profile and markers of kidney function were determined in serum.

Results: The results showed that 24 pregnant women (12 HIV positive and 12 HIV negative) participated in the study. General anthropometric parameters, hemodynamic parameters, lipid profile and markers of kidney function were similar in both HIV positive pregnant women and HIV negative pregnant women. The prevalence of overweight/obesity by BMI and waist to hip ratio was higher in HIV positive pregnant women (33.33% and 37.5%) compared to HIV negative pregnant women (29.15% and 25.00%), respectively. Blood pressure parameters correlated modestly with anthropometric parameters in HIV positive participants. Endothelial function modestly correlated with anthropometric parameters, cf-PWV correlated strongly with height, BMI correlated strongly with albumin creatinine ratio, while triglycerides correlated with weight among HIV positive pregnant women.

Conclusion: Although anthropometric parameters between HIV infected and HIV uninfected pregnant women were similar, HIV positive women showed greater risk

Mitigative role of cysteamine against unilateral renal artery occlusion-induced reperfusion injury via inhibition of AOPP, p65NFkB and pro-apoptotic related proteins

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Background: Ischemia-reperfusion injury (IRI) is unavoidable during kidney transplant and it is responsible for delayed or non-function after kidney transplantation. Cysteamine has been reported to possess activity against pathways of reperfusion injury. Thus, we designed this study to investigate its potential against renal reperfusion injury.

Methods: Twenty-eight male Wistar rats were divided into four groups (seven rats per group): sham, Ischemia-reperfusion injury (IRI), 50 mg/kg, and 100 mg/kg cysteamine treatment IRI. The right renal artery was clamped without crushing to induce ischemia for 45 minutes and later sutured. After 30 minutes, the clamp was removed to induce reperfusion injury for 24 hours. Activities of protein thiol, H₂O₂, GPx, GSH, and MDA were estimated. The serum levels of creatinine, AOPP, nitrite, MPO, TNF- α , and IL-1 β were evaluated. Caspase 3 and p65NFkB were evaluated by immunohistochemistry. Statistical significance was set as $p < 0.05$

Results: Significant elevation of H₂O₂, MDA, and nitrite and reduced GPx, GSH, and protein thiol in the IRI rats was reversed by cysteamine (50 and 100 mg/kg). Serum MPO, TNF- α , IL-1 β , creatinine, and AOPP were significantly elevated in IRI while rats treated with cysteamine revealed a significant decrease ($p < 0.05$) in the activities of these pro-inflammatory and renal injury markers.

Conclusion: Based on its activity against inflammation, apoptosis, and free radical-induced stress, cysteamine has great potential to be used as a kidney transplant pre-operative drug to prevent renal reperfusion injury.

Race and Gender as Determinants of Red Blood Cell Osmotic Stress Haemolysis in South Indian and African populations

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Background: Osmotic fragility (OF) is a vital measure of the ability of red blood cells (RBCs) to resist rupturing when exposed to a non-isotonic solution, creating osmotic stress. This test is commonly used to evaluate RBC membrane integrity and can provide crucial diagnostic information for specific diseases. Increased osmotic fragility, reflected in a higher percentage of RBCs bursting in a hypotonic solution, may indicate hereditary spherocytosis, chronic lymphocytic leukaemia, or transfusion-acquired hemolytic anaemia. In this study, we explore the fundamental principle of the fragility test, which hinges on the RBC membrane's resistance to rupture when subjected to a decrease in salt concentration in the surrounding medium.

Methods: A cross-sectional study was performed in the Department of Physiology, Kasturba Medical College, Manipal. The study involved healthy young adults between 18 to 40 years old. The study's total sample size was 50 healthy individuals, 25 South Indians (13 female and 12 male) and 25 Africans (13 female and 12 male). The blood sample of 5ml was collected from the brachial vein using a syringe and transferred to a heparinized test tube according to standard operating procedures. All sterile precautions for collecting blood were followed.

Results: The mean percentage of haemolysis for South Indian origin subjects was significantly higher at 32.16% compared to 20.01% for subjects of African origin. This shows that the osmotic fragility of South Indians is more elevated than that of Africans.

The mean percentage of hemolysis for gender was 28.07%, in males and 24.01% in females irrespective of ethnicity.

The mean percentage of hemolysis was 35.50%, in males and 29.07%, in females among subjects of South Indian origin. The mean percentage of hemolysis was 21.22%, in males and 18.70%, in females among subjects of African origin.

Conclusion: The present study has identified and quantified the impact of race/ethnicity and gender as the determinant factors of red blood cell osmotic stress haemolysis.

In conclusion, the percentage of haemolysis is higher for the South Indian population than the African population. This study could be an eye-opener on the racial, ethnic, and even regional differences that could impact the interpretation of laboratory results.

KEY WORDS: Ethnicity, Gender, Haemolytic disorders, Osmotic fragility, Osmotic stress hemolysis,

Effects of Non-Severe COVID-19 on the diaphragm as a contributing factor to long COVID symptoms

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Background: Diaphragm is the main muscle of respiration and innervated by the phrenic nerve. Some people get persistent respiratory symptoms post non-severe COVID-19 infections. This could be due to the effects of the virus on the diaphragm itself or the phrenic nerve. This study investigated the phrenic nerve and diaphragm morphology and function in patients who had non-severe COVID-19 and compared to those who did not get COVID 19.

Methods: The participants underwent valuation of the Diaphragm and phrenic nerve function by use of nerve conduction studies (NCS), ultrasound and spirometry. Statistical analyses were carried out through R software.

Results: For those who had non-severe COVID 19, the FEV1/FVC ratio was above 70% of the predicted value, which could indicate a restrictive pattern. The amplitude and area of the compound muscle action potentials (CMAP) were reduced, suggesting a phrenic nerve axonal degeneration and conduction block that could result in diaphragm weakness and contribute to the restrictive pattern.

Conclusion: Non-severe COVID-19 infection results in phrenic nerve axonal loss and conduction block, thus resulting in less muscle fibre depolarization and diaphragm weakness. Diaphragm exercise could be recommended as therapy to strengthen the diaphragm and improve recovery in long COVID patients.

KEY WORDS: Axonal degeneration; Compound muscle action potentials (CMAP); FEV1/FVC ratio; Mild COVID 19; Restrictive pattern.

Understanding the role of GP130 signalling during chemotherapy-induced cardiotoxicity

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Background: Cancer and cardiovascular diseases (CVDs) pose substantial challenges within the spectrum of non-communicable diseases (NCDs). Doxorubicin (DOX), a well-established chemotherapeutic agent, demonstrates efficacy by virtue of its capacity to target topoisomerases and intercalate DNA within cancer cells. However, the clinical utility of DOX is hindered by dose-dependent cardiotoxicity. Although oxidative stress has been implicated, antioxidant interventions have exhibited limited effectiveness. This study thus investigated alterations in GP130 signaling in response to DOX treatment and its potential contribution to the pathophysiology of DOX-induced cardiotoxicity.

Methods: Female Sprague-Dawley rats were utilized to generate acute and chronic models of cardiotoxicity induced by DOX. Following the induction of mammary gland tumors using LA7 cells, the animals received intraperitoneal DOX injections at a rate of 2.5 mg/kg/week for four and eight weeks. After euthanization, blood samples and cardiac tissue specimens were collected for subsequent molecular and biochemical analyses.

Results & Discussion: The study successfully established a tumor-bearing model, with DOX effectively retarding tumor growth in both four-week and eight-week tumor groups. Notably, DOX-treated rats exhibited reduced weight gain, reflecting the adverse impact of DOX on body weight. ELISA analysis disclosed elevated levels of cardiac troponin I in both four-week (186.50 ± 83.66 ng/ml) and eight-week (187.50 ± 83.50 ng/ml) DOX groups compared to the control group (119.40 ± 29.75 ng/ml), signifying myocardial injury. Histomorphological examination revealed moderate tissue degeneration in DOX and tumor and DOX groups, indicative of augmented cell death mechanisms. Western blotting results suggested GP130 signaling dysregulation during DOX treatment.

KEYWORDS: Cancer, Cardiotoxicity, Doxorubicin, GP130

Renal function of hospitalized adult patients with trauma at Mulago national referral hospital.

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Background: Trauma remains a leading global cause of death among individuals aged 5 to 44 years contributing 10% of total mortality. In Uganda, urban areas witness over 25% of deaths attributed to trauma. One significant complication post trauma is acute kidney injury, though comprehensive data on renal function following trauma is scarce. This study aimed to evaluate renal function in trauma patients at Mulago National Referral Hospital.

Method: A cross-sectional study which enrolled 303 participants with major trauma assessed using the Injury Severity Score was done. Renal function was evaluated through measurement serum creatinine levels, comparing the results with established physiological norms. Data was analyzed by one way ANOVA. The study received ethical approval from the Ethics Review Board.

Results: The study included 271 (89.4%) males and 32 (10.6%) females, with an average age of 28 years. 291(96%) had trauma due to road traffic accidents, 9(3%) physical assault and 3 (1%) due to falls. 255/303 (84.2%) participants exhibited normal serum creatinine (mean 83.6 μ m/l), while 48/303(15.8%) displayed elevated creatinine (mean 118.8 μ m/l) indicating renal dysfunction. 41/48(85%) participants had injury greater than 5hours prior renal assessment while 7/48(15%) participants had injury less than 5hours prior assessment. 42/48 (87.5%) participants with high creatinine (mean 115.6 μ m/l) hadn't received intravenous fluid resuscitation and 35/48 (72.9%) participants (Cr mean 116.7 μ m/l) had head injury and low Glasgow Coma Scale scores (<14, p = 0.001).

Conclusion: A substantial proportion of patients exhibited elevated serum creatinine, particularly evident in those with head injuries and lacking prior intravenous fluid resuscitation. Therefore, clinicians should exercise vigilance concerning these patients, aiming to enhance renal function and prevent deterioration of renal health.

Elevated level of surfactant protein A (SP-A) and reduced lung function indices in poorly controlled diabetes mellitus (DM) subjects

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Background: DM is metabolic disorder, clinically described as a syndrome with various reported multi-organ complications. Pulmonary complications of DM have been poorly characterized. This study therefore assessed pulmonary status of DM subjects.

Methods: Sixty four female subjects consisting of 32 control and 32 DM subjects were used for this study. Forced vital capacity (FVC), forced expiratory volume in one second (FEV₁), percentage of forced expiratory volume in one second (FEV₁ %), peak expiratory flow rate, oxygen saturation, oxygen content of blood, haemoglobin concentration, SP-A, Fasting blood sugar (FBS), glycated haemoglobin (HbA1c) and β-hydroxybutyric acid were measured.

Results: From the results FEV₁, FEV₁%, SPO₂, O₂ content and Hb concentration and HCO₃⁻ were significantly decreased (P<0.05) in DM subjects when compared to control. BHBA, HbA1c, SP-A were all significantly raised (P<0.05) in DM subjects when compared to control. There was a strong positive correlation between HbA1c and SP-A. There was a strong negative correlation between oxygen content, oxygen saturation, FEV₁ %, duration and DM and SP-A. There was a negative correlation between duration of DM and FVC. In this study, most DM patients recruited were poorly controlled as seen in their HbA1c values above 6.8%.

Conclusion: This study revealed a reduction in FEV₁, FEV₁ %, SPO₂, O₂ content of blood as well as changes in related parameters (SP-A, BHBA, HBA1c, HCO₃⁻). The level of SP-A, a lung inflammatory marker as seen in this study is worrisome. From the results of this study, DM poses a threat on pulmonary function of poorly controlled DM subjects.

Keywords: Diabetes mellitus, lung function test, forced expiratory volume, Surfactant protein A, oxygen saturation.

***Thunbergia alata* (Boxer ex Sims) improves fertility hormones and sperm quality in male Wistar rats**

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Background: *Thunbergia alata* (*T. alata*) leaves have been documented to enhance sexual activity but the parameters it affects remain unknown.

Aim: This study investigated the effect of aqueous leaf extract (ALE) of *T. alata* on fertility hormones and sperm quality in male Wistar rats.

Methods: Twenty-five male Wistar rats were grouped as follows; Group A: 1 mL of distilled water (DW); Group B: Sildenafil citrate 25 mg/kg; Group C: ALE of *T. alata* 250 mg/kg; Group D: ALE of *T. alata* 500mg/kg, Group E: ALE of *T. alata* 1000mg/kg. The animals were orally treated daily for a period of 30 days and thereafter sedated with diethyl ether, and sacrificed. The testes and epididymis were removed and sperm variables examined microscopically.

Results: There was a significantly ($p < 0.05$) increased testosterone levels in animals treated with 1000 mg/kg of ALE of *T. alata* when compared to DW treated group. The follicle stimulating hormone showed a significantly ($p < 0.05$) increased levels in the animals treated with 500 and 1000 mg/kg ALE of *T. alata* when compared to DW treated group. The luteinizing hormone (LH) level showed a significantly ($p < 0.05$) increased LH levels produced with 500 and 1000 mg/ kg treated animals when compared to DW. There was a significantly ($p < 0.05$) increased sperm motility in the animals treated with 1000 mg/kg of ALE of *T. alata* only when compared to DW treated group. A significant ($p < 0.05$) increase in sperm count was seen in the animals treated with 1000 mg/kg of ALE of *T. alata* when compared to DW treated group. There was a significant ($p < 0.05$) increase in sperm viability especially in the animals treated with 500 and 1000 mg/ kg of ALE of *T. alata* when compared to DW treated group.

Conclusion: It can be concluded that ALE of *T. alata* improved male fertility hormones and semen quality both of which provides credence to the traditional use of *T. alata* as an aphrodisiac in the management of male sexual dysfunction.

Keywords: *Thunbergia alata*; fertility; aphrodisiac; phytochemical; Sexual behavior

Relationship Between Anthropometric Indices and Oxidative Stress Markers among Homozygous Sickle Cell Disease among Young Adult Nigerians

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Background: Oxidative stress has been implicated in the pathogenesis of sickle cell anaemia (SCA). This study aimed at evaluating the relationship between some selected oxidative stress markers on SCA and body anthropometric indices among young adults with sickle cell anaemia

Methodology: It was a case-control comparative study involving 72 known HbSS and 72 confirmed HbAA age and sex-matched young adults between 18-35years. Their weight, sitting and standing height were measured by using Seca stadiometer-model 216 following standard protocol. Body mass index (BMI) and cormic index (CI) were calculated from the measured parameters using standard formula. Plasma levels of total antioxidant capacity (TAC), nitric oxide (NO) and catalase (CAT) were assayed using standard methods. The data were analyzed using descriptive and inferential statistics and alpha value was set at $p < 0.05$.

Results: The mean \pm SD of TAC (mg Ascorbic acid equivalent), NO (mM) and CAT (units/ mg of protein) of HbSS and HbAA participants were 0.047 ± 0.035 and 0.183 ± 0.072 ($t=-14.495$, $p<0.0001$), 24.068 ± 6.118 and 26.219 ± 3.898 ($t=-2.508$, $p=0.013$) and 0.947 ± 0.298 and 1.733 ± 0.993 ($t=-6.413$, $p<0.0001$) respectively. The NO was positively correlated with the weight ($r=0.387$, $p=0.001$), sitting height ($r=0.233$, $p=0.049$), cormic index ($r=0.283$, $p=0.016$) and BMI ($r=0.461$, $p < 0.0001$) but negatively correlated with the subischial leg length ($r=-0.332$, $p=0.004$) among HbSS participants.

Conclusion: This study showed that the weight, sitting height, CI and BMI were directly proportional to NO while the subischial leg length was inversely proportional to NO among HbSS participants.