

STATEMENT OF INTEREST

I am Ogunmiloro O.M. a doctoral student in mathematical modelling of infectious diseases. My interest for modelling became greatly developed during my undergraduate program in the university when my lecturers/advisors introduced to me the need for the representation of real life situations into models using mathematical abstractions. This made me to further more see the beauty of mathematics in explaining physical and biological phenomena and its evolution with time. After my undergraduate studies, the feeling to know more, made me enrol for my masters degree with special focus on dynamical systems and biomathematics. It was during the course of this postgraduate program that i started learning the importance of computational software like, Matlab, Maple, SPSS, e.t.c. in biomathematics. I am currently undergoing my doctoral research in mathematical modelling of co infection of malaria and soil transmitted helminths (STH). I took up this research because, these co infectious disease is highly endemic in the sub Saharan region with my focus on Nigeria as a case study. These co infectious disease, posed a public health challenge to public health practitioners because it has caused infant deaths, economic problems and high disease induced death to pregnant women.

As part of my work, i want to formulate models which will incorporate some important features/parameters to describe the dynamics of these diseases. Also, the important basic threshold known as the reproduction number (R_0) will be obtained to know if the co infectious disease will invade or completely be eradicated from the human host population, if (R_0) is greater or less than unity. This will allow for appropriate optimum intervention strategies to be employed when controls are imposed on the model system. It is to my understanding that no Model can incorporate all important features and variables due to the complexities attached to the dynamics of malaria and soil transmitted helminths.

However, Numerical simulations will be carried out with the aid of computational softwares to confirm the theoretical results obtained, and data collected will be fitted using statistical computational software.

My high motivation to work has helped me to attend research conferences to learn this subject in terms of both theory and application. In order to keep up pace with new trends in mathematical modelling, I still need to learn and work more on mathematical, statistical and computational techniques. It is with this in mind that i am looking forward to a long lasting relationship with this highly esteemed workshop on mathematical modelling in Madagascar. From the tremendous research options and availability of researchers in this workshop, i

am confident that i will have the opportunity to work professionally with members and participants on research projects and at the same time make my doctoral dissertation more robust and meaningful. Based on my aforementioned abilities and interests, i feel that pursuing a scientific knowledge from this work shop will be beneficial and i hope that with a positive attitude, i earnestly look forward to be a part of this incoming workshop on mathematical modelling.

Abstract

This abstract concerns the mathematical analysis and model formulation of the human co - infection with malaria and soil transmitted helminths. We adopted mathematical techniques to describe the transmission of the co - disease both in the human and vector host populations respectively. However, the Basic reproduction number R_0 is obtained using the next generation matrix method. While, it was investigated through established theorems that, if $R_0 < 1$, the co - disease equilibrium is locally and globally asymptotically stable, Thereby leading to the extinction of the co - infections in the host population. Also, if $R_0 > 1$ a unique endemic equilibrium is established, which implies that, the co – infectious disease persists in the host population and thus become locally asymptotically stable. However, the model formulation of malaria and soil transmitted helminths in this research work is carried out separately by incorporating different important features/parameters to describe the dynamics of the disease. The impact of soil transmitted helminths and its treatment on malaria epidemic is also investigated. Numerical simulations is carried out with the use of valid parameter values to show that, if the total number of infected individuals infected with soil transmitted helminths increases more in the presence of treatment, malaria infection cases will be reduced. Sensitivity analysis is performed to confirm the most or the least impact of the model parameters on the transmission and spread of malaria – soil transmitted helminths infection. This will allows us to determine control measures by considering different intervention strategies e.g vaccination, bed net usage, prophylaxis e.t.c. to curtail the spread of the disease.

CURRICULUM VITAE

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Biodata

Date of Birth : 09/02/1987

Sex : Male

Marital Status : Married

Nationality : Nigerian

Education

2017 till date Ph.D (in view), Federal University Oye Ekiti, Ekiti State, Nigeria.

2014 – 2015 M.Sc in Mathematics, University of Ilorin, Ilorin, Kwara State, Nigeria

2009 – 2013 B.Sc in Mathematics, University of Ilorin, Ilorin, Kwara State, Nigeria

1997 - 2003 Nigeria School Leaving Certificate

Employment

Ekiti State University, Ado – Ekiti, Ekiti State, Nigeria.

Designation: Assistant Lecturer/ 17th July 2017 – Present

Professional Affiliations

Nigerian Mathematical Society 2014 - Present

Nigerian Association of Mathematical Physics 2018 – Present

Teaching Experience

Undergraduate: Elementary mathematics, Calculus, Mathematical methods, linear Algebra, Ordinary Differential Equations, Real Analysis, Mathematical Modelling.

Conferences Attended

CEA – SMA Analysis School on Dynamical Systems. Universite d'Abomey Calavi, Cotonou, Republic of Benin, 2016.

Faculty of science Seminar lecture on Banach Algebra, delivered by Prof Yewande Olubunmo – Spellman College, Atlanta, USA.

Professional Skills

Mastery of Mathematical computational softwares like, Maple, Matlab, Latex, SPSS, R .

Ongoing Research (Ph,D)

Mathematical modelling of co – infection dynamics of malaria and soil transmitted Helminths (STH)

Advisor: Dr E. A. Bakare, Federal University, Oye – Ekiti, Ekiti State, Nigeria.

Accepted Papers in Learned Journals

i. Stability analysis and Optimal Control of Vaccination and Treatment of a SIR Epidemiological Deterministic Model with Relapse. (with S.E Fadugba and T.O Ogunlade), International Journal of Mathematical Modelling and Computations.

ii. Dynamic Response of an Elastically Connected Double Non – Mindlin Plate With Simply Supported End condition Due to a moving Load, (with J.A Gbadeyan, and S.E Fadugba), Khayyam Journal of Mathematics.

Ongoing Work Under Review In Learned Journals

i. Optimal and Global Analysis of the Transmission Dynamics of a SIS – VS Epidemic Model with Non linear Incidence Rate.

ii. Bifurcation and Global Analysis of the Transmission Dynamics of a Generalized SEIR Model with Non Linear Incidence Rate.

iii. Transmission Dynamics of cholera Epidemic Model with Latent and Hygiene Compliant Class.

Undergraduate Supervision (B.Sc)

i. Hakeem Hammed

Application of Differential Transform Method to Solve a generalized SEIR Epidemic Model with Non Linear Incidence Function.

ii. Abedo Fatimah

Stability Analysis of SIVR epidemic Model with treatment.

Referees

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