



International Journal of Biology Sciences

ISSN Print: 2664-9926
 ISSN Online: 2664-9934
 Impact Factor: RJIF 5.45
 IJBS 2023; 5(2): 01-03
www.biologyjournal.net
 Received: 01-05-2023
 Accepted: 05-06-2023

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Assessment of the prevalence of diabetes and malaria co-infection among patients attending clinic at Umuguma general hospital, Owerri west local government Area, Imo State

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DOI: <https://dx.doi.org/10.33545/26649926.2023.v5.i2a.162>

Abstract

Malaria and diabetics are frequent diseases especially in Sub-Sahara African countries. To assess diabetes and malaria co-infection among patients attending clinic at Umuguma General Hospital, Owerri West Local Government Area of Imo State, a total of 169 subjects including 70 males and 99 females within the age range of 20 and above 60 years were included in the study. The data was analyzed using simple percentage and frequency table. Results revealed overall prevalence of (23.1%) diabetes, (71.0%) malaria and (20.7%) co-infection. Age 51-60 years recorded higher prevalence of diabetes (33.3%) and malaria (79.2%) while age <60 years recorded higher coinfection (28.6%). Gender relation shows that females had high prevalence of (24.2%) diabetes, (71.7%) malaria and (21.2%) co-infection but not significantly different from their male counterparts. In relation to their occupation, it was observed that civil servants recorded higher prevalence of diabetes and co-infection (26.7%), while artisans were higher in malaria infection (87.1%). Therefore, this study recommends that regular check of malaria and diabetes should be made.

Keywords: Diabetes, malaria, co-infection, patients, Umuguma

Introduction

Diabetes is a persistent metabolic infection characterized by chronic hyperglycemia resulting from absolute deficiencies in insulin secretion; its effects cause significant morbidity, disability and premature mortality (Adeleye, 2021) [2]. Diabetes is a disease characterized by abnormally high blood glucose and the excretion of excess glucose in the urine (Gosh *et al.*, 2004, Wild *et al.*, 2004) [6, 15]. Malaria is prevalence in Nigeria resulting to morbidity and mortality. Nigeria is among the 15 African countries responsible for 80% of global malaria cases and 78% of deaths (WHO, 2015) [14].

Co-infection of malaria and diabetes mellitus is a threatening common disease in developing countries with high rate of deaths (Ikekpeazu *et al.*, 2010) [7]. According to Acquah *et al* (2014) [1], malaria and diabetes co-infection continues to suppress millions of people globally especially in developing countries. Diabetes and malaria co-infection are regarded as a global phenomenon signifying that developing countries independently or dependently struggle for diabetes and malaria. As a result of this, hence the need to adequately examining the interaction between diabetes and malaria co-infection and its compounding health effects accumulated to increased incidences of diabetes and the prevalence of malaria in sub-Saharan African (Acquah *et al.*, 2014) [1]. It has been reported that co-infection of diabetes and malaria diseases are common in developing countries including Nigeria. Assessment of the biochemical profile of diabetic patients with malaria is urgently needed to examine the likely contribution of malaria infection of the hepatic organ to the pathophysiology of diabetes (Ikekpeazu *et al.*, 2010) [7]. Danquah *et al* (2010) [5] suggests that increased diabetes prevalence could increase the number of people at risk for malaria infection. Treatment of patients with malaria and diabetes has been challenging (Brown, 2008, Mohapatra, 2001) [3, 9], because of the effect of the parasites and anti-malarial particularly quinine on glucose homeostasis.

Effective management of both diseases can help reduce the risk (Buse *et al.*, 2008, Brown, 2008) [4, 3]; however, many people are not even aware that they are under attack of malaria and diabetes until they develop one of its complications. The essence of this study is to assess the prevalence of Diabetes and Malaria Co-infection among patients attending clinic at Umuguma General Hospital.

Study Area

This study was carried out at Umuguma General Hospital in Owerri West Local Government Area from September to December 2014. Umuguma General Hospital is located in Owerri West Local Government Area, Imo State. Owerri West is a Local Government Area of Imo State. Its headquarters is in the town of Umuguma, it has an area of 295km² and a population of about 99,265 (Census, 2006). It is located in the rain forest zone, about 120 kilometers north of the Atlantic coast. Its latitude is 060 54¹N and longitude 060 07¹E. The General Hospital Umuguma is run by the State Government patients from all over Imo State and beyond with varied diagnosis, medical and surgical needs seek medical care from this hospital. This is the main justification for choosing the hospital for this study.

Study Sample/Population

The study sampled 169 subjects between the age of 20 years to 60 years and above, including 70 males and 99 female patients visiting Hospital for medical services.

Ethical Considerations

Approval was obtained from the Department of Animal and Environmental Biology, Faculty of Biological Science, Imo State University Owerri. Informed consents of the participants sought for and they were assured of the confidentiality of information. However, since the data was extracted from archives of secondary data, the ethical violation of the confidentiality and consequences of data collection on respondents were ruled out. Also, an administrative approval was obtained from the chosen hospital to conduct the study in their hospital.

Sample Collections

Local dialect was used for the participants. Blood sample were collected using a septical means for fasting blood glucose level everyday, from Monday to Friday. Glucometer was used to measure blood glucose using World Health Organization (WHO) criteria for diagnosis of diabetes (2006). The questionnaire covered the subject's sex, age, weight, height, local government area, family history of diabetes, blood sugar status, knowledge and management of diabetes, type of diabetes suffering, interval of blood sugar monitoring, diabetes complications experiencing, ulcers, diet, management medications, blood pressure status etc.

Statistical Analysis

The data obtained was subjected to statistical analysis using percentage and frequency table.

Results

The result of the study recorded an overall prevalence of diabetes (23.1%), malaria (71.0%) and co-infection (20.7%) as shown in Table 1. Prevalence in relation to age category revealed that 20-30years recorded no case of diabetes but had malaria prevalence (56.3%), age 31-40years recorded prevalence of 16.1% diabetes and 67.7% malaria of which 16.1% of the participants were co-infection. Also, age 41-50 years had infection prevalence of 20.5% diabetes, 74.4% malaria and 17.9% co-infection; 51-60 years recorded case prevalence of 28.6% diabetes, 65.7% malaria and 28.6% co-infection. In gender relation, it was observed that males recorded prevalence of 21.4% diabetes, 70.0% malaria and 18.6% co-infection while their female counterparts were seen to have highest percentage infection prevalence of which 24.2% had diabetes, 71.7% malaria and 21.2% were co-infected. In relation to occupation, result shows that civil servants (26.7%) recorded highest of diabetes and co-infection prevalence, followed by farmers (23.1%); artisans had highest (87.1%) of malaria prevalence followed by traders (81.1%).

Table 1: Prevalence of diabetes, malaria and co-infection among patients in relation to age

| Age in years | No. Examined | Diabetes (%) | Malaria (%) | Co-infection (%) |
|--------------------------|--------------|--------------|-------------|------------------|
| 20-30 | 16 | 0 (0.0) | 9 (56.3) | 0 (0.0) |
| 31-40 | 31 | 5 (16.1) | 21 (67.7) | 5 (16.1) |
| 41-50 | 39 | 8 (20.5) | 29 (74.4) | 7 (17.9) |
| 51-60 | 48 | 16 (33.3) | 38 (79.2) | 13 (27.1) |
| <60 | 35 | 10 (28.6) | 23 (65.7) | 10 (28.6) |
| Total/Overall prevalence | 169 | 39 (23.1) | 120 (71.0) | 35 (20.7) |

Table 2: Prevalence of diabetes, malaria and co-infection among patients in relation to gender

| Age in years | No. Examined | Diabetes (%) | Malaria (%) | Co-infection (%) |
|--------------------------|--------------|--------------|-------------|------------------|
| Male | 70 | 15 (21.4) | 49 (70.0) | 13 (18.6) |
| Female | 99 | 24 (24.2) | 71 (71.7) | 21 (21.2) |
| Total/Overall prevalence | 169 | 39 (23.1) | 120 (71.0) | 35 (20.7) |

Table 3: Prevalence of diabetes, malaria and co-infection among patients in relation to Occupation

| Occupation | No. Examined | Diabetes (%) | Malaria (%) | Co-infection (%) |
|--------------------------|--------------|--------------|-------------|------------------|
| Farmers | 39 | 9 (23.1) | 23 (58.9) | 8 (20.5) |
| Traders | 54 | 12 (22.2) | 44 (81.1) | 9 (16.7) |
| Artisans | 31 | 6 (19.4) | 27 (87.1) | 6 (19.4) |
| Civil servants | 45 | 12 (26.7) | 26 (57.8) | 12 (26.7) |
| Total/Overall prevalence | 169 | 39 (23.1) | 120 (71.0) | 35 (20.7) |

Discussion

Diabetes has been a chronic and costly disease associated with severe complications which pose severe risks for families (Vangen *et al.*, 2003; WHO, 2008) ^[12, 13]. Malaria is another human disease which pose huge risk to human and its a vector-borne infectious disease caused by protozoan parasites (genus *plasmodium*) widespread in the tropical and subtropical regions including parts of the America, Asia and Africa. In this study, a total of 169 patients participated in the study. The highest age range of participants revealed that more respondents falls between the age range of 51-60 with their numbers and percentage recorded to 48 (28.4%), followed by age range 41-50 recording 39 (23.1%), >60 recording 35 (20.7%), 31-40 recording 31(18.3%), and 20-30 recording the least of 16(9.5%). More so, it was revealed that females participated more than males indicating 58.6% females against 41.4% males. Furthermore, their occupational status, showed that more of the respondents were traders (32.0%) followed Civil servants (26.6%), farmers (23.1%), and the least participants were artisans (18.3%). Result on the prevalence of diabetes, malaria and co-infection among patients in the study area revealed overall prevalence of diabetes (23.1%), malaria (71.0%) and co-infection (20.7%) as shown in Table 1. This agreed with the work of Okell *et al* (2009) ^[11], Muller *et al* (2005) ^[10], Jones, and Ward (2002) ^[8]. In gender relation, it was observed that males recorded prevalence of 21.4% diabetes, 70.0% malaria and 18.6% co-infection while their female counterparts were seen to have highest percentage infection prevalence of which 24.2% had diabetes, 71.7% malaria and 21.2% were co-infected. In relation to occupation, result shows that civil servants (26.7%) recorded highest of diabetes and co-infection prevalence, followed by farmers (23.1%); artisans had highest (87.1%) of malaria prevalence followed by traders (81.1%). The impact of semi-immunity on controlling parasitemia may weaken with advancing diabetes mellitus and immune dysfunction (Muller *et al.* 2005) ^[10], as suggested by the observed risk increase with increasing glucose concentration. Moreover, low-level infections in patients with 2 diabetes mellitus may constitute an unrecognized infectious reservoir in areas where malaria is endemic (Okell *et al.* 2009) ^[11]. Our data stem from a study that was not designed to assess influences on malaria infection in a heterogeneous population. The actual reasons for the increase of malaria infection are unclear; the risk increase with rising glucose concentration is a sign of biologic plausibility. Such risk could result from impaired defense against liver and/or blood-stage parasites and from prolonged persistence.

Conclusion and Recommendations

This connection of diabetes and malaria co-infection in this study is fascinating but not certain. The groups with diabetes were significantly small compared to the population of the study. The finding of this study shows a low prevalence of co-infection of diabetes and malaria in relation to socio-demographic characteristics (age, gender and occupation) of the study participants. Therefore, this study recommends studying the profile of severe malaria in diabetics.

Acknowledgments

The teams of researchers sincerely thank all participants at Umuguma General Hospital, Owerri West Local Government and also acknowledge the research team of the

Imo State University, Owerri, especially team from public health physiology, public health parasitology and microbiology for their unrelented efforts in making this study a success.

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