International Journal of Advanced Multidisciplinary Research (IJAMR)
ISSN: 2393-8870
www.ijarm.com
Impact Factor: 2.153 Volume 3 Issue 3 -2016

Research Article

SOI: http://s-o-i.org/1.15/ijarm-2016-3-3-3

The prevalence of selected autoimmune diseases

Okoroiwu, I.L[1]. Obeagu, E.I.[2*], Obeagu, G.U.[3], Chikezie, C.C[4]. and Ezema, G.O.[5]

[1].Department of Medical Laboratory Science, Imo State University, Owerri,Nigeria.
[2].Diagnsotic Laboratory Unit,Health Service Department, Michael Okpara University of Agriculture,Umudike, Nigeria.
[3].Department of Nursing Science, Ebonyi State University, Abakaliki, Nigeria.
[4].Department of Health Services, Michael Okpara University of Agriculture, Umudike, Nigeria.
[5].Department of Biochemistry, Michael Okpara University of Agriculture, Umudike, Nigeria.
Corresponding Author :
emmanuelobeagu@yahoo.com,obeagu.emmanuel@mouau.edu.ng,obeaguemmanuel@gmail.com

Keywords

Prevalence, autoimmune diseases, rheumatoid arthritis, systemic lupus erythematosus, insulin dependant diabetes mellitus

Abstract

The prevalence of rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), insulin dependant diabetes mellitus (IDDm) and their effects on some haematological variables were determined. A thousand four hundred and ninety three persons drawn from public health jtions and some private ones in Imo State were screened between January 2003 and March)7, using hospital records, clinicians' reports, and some relevant laboratory screening tests as rheumatoid factor, LE cells and fasting blood sugar. Six hundred and twelve persons screened for RA, seventy for SLE and eight hundred and eleven for IDDm. RA had /alence of 25.5% (89.7% female and 10.3%) males, SLE 7.1% (all female,) IDDm 1.8% 3.3%) female and 46. 7%. The total prevalence for all the diseases were 11.8%. The age ips mostly affected by RA, SLE and IDDm were 41 - 50, 31 - 40, and 20 - 30 respectively. They all had female gender preponderances.

Introduction

Rheumatoid arthritis (RA), systemic lupus erythmatosus (SLE) and insulin dependent diabetes mellitus(IDDM) belong to the group of diseases known as autoimmune (Rose and Bona,2005).The word “auto” is the Greek word for self (NIH,1999).The healthy human body is equipped with powerful set of tools of haematopoietic cells comprising T and B of lymphoid progenitor as well as neutrophil and macrophages of myeloid progenitor.

There could be a breakdown in the recognition mechanism of self by the immune system resulting in misdirected responses to self. These misdirected responses are referred to as autoimmunity (Graunger et al.,1995).

In organ specific, the target organs, the target organs are usually the thyroid as seen in Hashimotor thyroiditis,adrenals as in autoimmune disease of the adrenal gland, stomach as seen in pernious anaemia and pancreas .In non-specific ,target organs are usually the skin as in dermatitis Herpetiformis ,kidney as in SLE and joint as in RA (Vered and Michael,2005).Autoimmune diseases are the major thtreat to the health of many individuals, past study reported that about ten million Americans suffer from more than eighty illnesses caused by automminunity, Incidence and prevalence rates vary among the AIDS(Cooper and Strhla,2003).

Risk factors are not known, but genetic, environment and hormone have been suggested (NIH,1999).Genetic because it clusters in families, has association with histocompatibilty genes and occur in animals (Alamany et al.,2005).

Pathological mechanism involves chronic and gradual destruction of organs and tissues associated with infiltration of the affected sites by Lymphocytes and plasma cells (Stites et al.,1997). Anaemia has been identified as a risk factor in autoimmune disease(Tomas et al.,2003).

Aim

The study is aimed at determining the prevalence of rheumatoid arthritis, systemic lupu erythematosus and insulin dependent diabetes mellitus among patients in public health institutions and some private ones in Imo State, Nigeria.

Materials and Methods

Study area

Imo state lies in the tropical rainforest belt of South Eastern Nigeria. It is made up of 27 local Government areas and has projected population of 3.4 million people. The people enjoy two distinct seasons; the rainy season which starts in May and ends in October with annual rainfall of 222.2mm and high relative humidity of 78 percent while the dry season begins in November and ends in April with high temperature of 22.0°C. The topography of the state remains flat land around Owerri zone and some adjoining local government areas from other zones (Orlu and Okigwe). It is surrounded by neighboring states like Abia, Anambra, River, Enugu, Akwa-Ibom and Cross River. The people accommodate immigrants from all over the world. The people of Imo state are served by 28 government owned hospitals and many private ones.

Study population:

This study was carried out in Imo State from 2003 to 2007. Participants were both male and female aged 10-80 years drawn from twenty eight (28) government owned health institutions and some private clinics in the state; presenting with symptoms and signs for any of the three diseases. The total number of patients screened within the period of study was one thousand four hundred and ninety three (1493) comprising seven hundred and fifty males (750) and seven hundred and forty three females (743). The subjects screened within the period of study per year were as follows:

In 2003, two hundred and twenty six (226) subjects were screened comprising ninety-eight (98) males and one hundred and twenty eight (128) females.

In 2004, four hundred and one subjects (401) were screened comprising two hundred and nineteen (219) males, and one hundred and eight two (182) females. In 2005, two hundred and ninety nine (299) were screened, made up of one hundred and forty two males (142) and one hundred and fifty seven (157) females.

In 2006; four hundred and twenty three (423) were screened comprising two hundred and fourteen males (214) and two hundred and nine females (209). In 2007, one hundred and forty four (144) were screened made up of seventy seven (77) males and sixty seven (67) females.

Other information about age, height, body weight occupation, duration of disease as well as drugs administered were obtained from the hospital records.

Screening of subjects were based on their clinical presentations, hospital records oral interviews and relevant laboratory Investigations. Haematological variables determined were haemoglobin level, packed cell volume, total and differential white cell count, platelet count, and erythrocyte sedimentation rate and blood picture.

Ethical consideration:

Consent were obtained from the research and ethic committee of the health institution used for the study who gave approval for the research work and informal consent obtained from patients or their relations as well as nurses and physicians in charge of the wards.

Specimen collection

Blood - The subjects were made to sit comfortably. The articubital vein of the upper arm where the blood was to be collected was sterilized with 70% alcohol soaked on a cotton wool. A rubber tourniquet was applied around the upper arm, 5.5 milliliter of blood was drawn from the vein and distributed as follows:- l.mls of blood was delivered into a uoride oxalate bottle, 2.5mls into ethylene diamine tetracetic acid (EDTA) bottle, 1ml into a bottle with paper clips where necessary and O.Smls was put in a dry tube and allowed to clot.

Urine - urine samples were collected on clean containers and used for urinalysis

Screening tests:

Sugar estimation

Principle: Glucose has the ability of reducing copper II to copper I oxide in the presence of an alkaline medium at the temperature of 100°c, when incubated for 10 minutes. The Cu+SO4- formed reacts with arsenomolybdate to form arsenmolybdenum blue which is read in the colorimeter at a wavelength of 680nm. The procedure is divided into two stages and these include:

Stage 1

3.7mls of isotonic solution (sodium sulphate and copper sulphate mixture) was pipetted into each tube.
0.1mls of well mixed fluoride oxalate blood was added to the solution in the tubes above using clean O.lml micropipette.
0.2ml of sodium tungstate was added to the mixture in the above tubes.
The contents were mixed properly and centrifuged at 3000 revolution per minutes for 10 minutes.

Stage 2

1ml of supernatant from each tube above were added to another clean dry test tubes.

1ml of standard solutions from 3 standard bottles were added to test tubes.

1ml of distilled water was added to one test tube and taken as blank.

1ml of-freshly prepared solution A and B (solution A is copper sulphate while solution solution B is alkaline tartarate) was added to the test tubes containing the supernatant standards, III and III and blank.

All the tubes were plugged with cotton wool to avoid oxidation by atmospheric oxygen which re-oxidizes copper I oxide back to copper II oxide.

They were placed in a boiling water bath and allowed to boil for 10 minutes. This is to induce reaction.
They were then allowed to cool.

One in three dilutions of arsenomolybdenum reagent in water was prepared and 3mls of this reagent were added to each of me tubes above.

They were then read colorimetrically on transfer to cuvette.

Sugar concentration

Optical density of test x Concentration of standard
Optical density of standard

Urinaysis

Glucose is oxidized by atmospheric oxygen in the presence of glucose oxidase to gluconic acid and hydrogen peroxide. Hydrogen peroxide in the presence of peroxidase oxidises the chromogen to shades of purple.

Procedure: The end of the regent test strip was dipped in fresh urine and removed immediately or passed briefly through urine stream.

10 seconds after wetting, the colour of test area was compared with colour chart. And the result read carefully, in good light and with strip near to colour chart. Any colour developing after 10 seconds was ignored. Test end turns purple within 10 second glucose present. Test end remains cream after 10 seconds glucose absent.

Demonstration of le cells:

When whole blood is mixed with paper clips and shaken properly, the cells would fracture, providing nucleoprotein for phagocytosis by the LE factor.

1ml of venous blood were put in a bottle with few paper clips, the blood was mixed by giving it a hard shake until fibrin clot were formed. This took 10 minutes. The mixture was incubated for 15 minutes at 37°c.

The mixture was then transferred into a centrifuge tube and spun for 20 minutes at 1000 (rpm) to obtain a buffy coat layer. The buffy coat layer which lies between the plasma and red cells were obtained using Pasteur pipette. Thin films were made from the buffy coat, allowed to dry and stained using Leishman stain and examined as for thin blood film.

LE cells appeared as a neutrophil which has ingested nuclear material got deformed and appeared homogenous with the lobes pushed aside and surrounded the neutrophil. It stains pale mauve colour.

Detection of rheumatoid factor:

Tie latex slide of costa was used. The antigen, a particulate latex suspension coated with human gamma globulin, agglutinates in Rheumatoid factors in the patients serum, Procedure: The test reagents and sample was brought to room temperature. A drop of the sample and 1 drop of control were placed on the circled test card. The rheumatoid factor latex reagent was added to the circle on the card where the sample to be tested was put. The two mixtures were mixed with a disposable stirrer and spread over the entire area enclosed by the ring.

The card was rotated at 100 rpm for 2 minutes. The presence or absence of visible clumps determined whether the test were positive or negative. The presence of visible agglutination indicates a content of rheumatoid factor 30 /u/mz.

Data analysis

The data generated were analyzed statistically, using a prevalence rate and student t-test to ascertain prevalence of each of the diseases and the interaction of sex and age as well as level of significant between the sufferers and non sufferers.

Results

The prevalence of rheumatoid arthritis (RA), systemic lupus erythematosus (SLE) and insulin dependent diabetes mellitus (IDDm) were determined following the screening of 1493 subjects as follows:- 612 for RA, 70 for SLE and 811 for IDDm. The following results were obtained as shown on the tables and figures below: Table 4.1 and figures 4.1 and 4.2 show the prevalence, sex and age distribution of RA among the subjects screened between 2003 and 2007.

RA had 156 (25.5%) prevalence, 140 (89.7%) female and 16 (10.3%) male. The age groups mostly affected were those of 41 and 50 years (38.9%).

Table 4.1: prevalence of Rheumatoid arthritis between January 2OO3 and March 2OO7

YEAR	NO. OF SUBJECTS	NO. POSITIVE
2003	50	9(18)
2004	102	25(24.5)
2005	170	47(27.6)
2006	253	71(28.1)
2007	37	4(10.8)
TOTAL	612	156(25.5)

Values in parenthesis indicate percentage prevalence rate.

The prevalence of SLE and its distribution among age brackets are shown in table 4.2 and figure 4.3 respectively. SLE had a prevalence of 5 (7.1%) all were females. The age groups mostly affected were those of 31 and 40 years 40%.

Table 4.2: prevalence of systemic lupus erythematosus between .January 2OO3 and March 2O07.

YEAR	NO. OF SUBJECTS	NO. POSITIVE
2003	12	0(0)
2004	14	1(7.1)
2005	17	1(5.9)
2006	20	3(15)
2007	7	0(0)
TOTAL	7O	5(7.1)

Values in parenthesis indicate prevalence rate.

Table 4.3 and figures 4.4 and 4.5 respectively show the prevalence, sex distribution of IDDm amongst different age groups IDDm had prevalence of 15 (1.8%.) and females had the highest prevalence of 8(53.3%) and males (46.7%). The age groups mostly affected were those of 20-30 years 26.6%. The overall prevalence of each of the disease is shown in figure 4.6 where RA had the highest prevalence of 88.6% IDDm 8.5% and SLE 2.8%.

Table 4.3: Prevalence of insulin dependent diabetes mellitus between January 2003 and March 2OO7

YEAR	NO. OF SAMPLES	NO. P.QSITIVE
2003	164	3(1.8)
2004	285	8(2.8)
2005	112	1(0.9)
2006	150	2(1.3)
2007	100	1(1.)
TOTAL	811	15

Values in parenthesis indicate prevalence rate.

t - test analysis and a graph showing haematological variables female arthritics as shown in table 4.4. Significant statistical difference was observed in all the parameters determined ($P< 0.05$).

Discussion

In this study aimed at determining the prevalence of rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), insulin dependent diabetes mellitus (IDDM) and their effects on some haematologic variables among patients in public and private health institutions in Imo state, the following observations were made:

Out of 612 persons clinically presenting with RA who were screened, only 156 had RA giving a prevalence of 25.5% as shown in table 4.2. This result could not be compared with any in Imo state since there is no documented report on such study. The prevalence is high when compared with 0.31% obtained in Ibadan by Macgregor et al.. (1994), and 0.0% obtained by Silman et al.. (1993) in a rural Northern Nigeria where the study was carried out. The prevalence is equally high when compared with results obtained from other countries of the world such as:- France (0.31%) and Sweden (0.51%) as documented by Guileman et al.(2005). Symmons et al.(2003) recorded 1.46% for United Kingdom. The differences could be as a result of population studied, study design, demorgraphic variable and differences in socio-economic status of the population studied.

Among the three diseases studied, RA had the highest prevalence of 88.6% when compared with 8.5% for IDDM and 2.90/0 for SLE. The reason could be attributed to aetiological factors such as genetic makeup of the people in Imo State since genetic makeup of an individual plays important role in the development of rheumatoid arthritis Kathleen et al..(2004).Another reason for this higher prevalence could be exposure to environmental trigger such as early prenatal exposure to infectious agents (Jacobson and Jacobson, '2003), and viral pathogens Charles (2005). Another reason may be socio economic factor such as low formal education, occupation which has been associated with increased risk of arthritis. The age groups mostly affected by RA were those of 41 and 50 years 38.9% and it had female gender preponderance of 89.7°/0 as against 10.3% for male. This is in conformity with results documented by Fleischman et al. (2005) and Papadopoulos et al.(2003) on their epidemiological studies on age and gender prevalence in RA. Their reports indicated that the incidence of rheumatoid arthritis increases with age and recorded age of onset as 35-55 years,had female gender preponderance of 3 female to one male. The reason for the female gender preponderance could be hormonal, occupation and stressful activities as recorded by Bengtesson et al.(2005) and Krishman et al.(2003) in their respective researches. It may equally be argued that Among the three diseases studied, RA had the highest prevalence of 88.6% when compared with 8.5% for IDDM and 2.90/0 for SLE. The reason could be attributed to aetiological factors such as genetic makeup of the people in Imo State since genetic makeup of an individual plays important role in the development of rheumatoid arthritis Kathleen et al.(2004). Another reason for this higher prevalence could be exposure to environmental trigger such as early prenatal exposure to infectious agents (Jacobson and Jacobson, '2003), and viral pathogens Charles 2005). Another reason may be socio economic factor such as low formal education, occupation which has been associated with increased risk of arthritis.The age groups mostly affected by RA were those of 41 and 50 years 38.9% and it had female gender preponderance of 89.7°/0 as against 10.3% for male. This is in conformity with results documented by Fleischman et al.(2005) and Papadopoulos et al.(2003) on their epidemiological studies on age and gender prevalence in RA. Their reports indicated that the incidence of rheumatoid arthritis increases with age and recorded age of onset as 35-55 years,had female gender preponderance of 3 female to one male. The reason for the female gender preponderance could be hormonal, occupation and stressful activities as recorded by Bengtesson et al. (2005) and Krishman et al. (2003) in their respective researches. It may equally be argued that resistance to infection decreases with age and infection is one of the risk factors in RA and ages 41 and 50 is the most stressful age in the life of women, some still bear children and are involved in bringing up their children.

Based on the diagnostic criteria for SLE, 70 persons were screened and only 5 were positive for SLE giving a prevalence rate of 7.1%. This value is high and had high female gender preponderance considering the fact that SLE is not much talked about in Imo State and not many people are familiar with its clinical presentations which may be confused with some other ailments. One would still infer a low prevalence when compared with results obtained in Ogun study, 73% for females and 5.2% for males (Oduala et al.,2005) United Kingdom 20.2% Asian study 69.7% for females and 31. 7% for males in a population study Cooper and Strohla (2003).

The reasons for these variations could be multifactoral: the gene predisposing one to SLE may not be common in Imo state as it is in these other places where higher prevalence were obtained. People may not be exposed to environmental trigger like UV rays, and the awareness may be lacking and symptoms may be confused with other ailments.

The age groups mostly affected by SLE were those of 31 and 40 years. SLE can occur at any age but results obtained from this study agrees with what was obtained by Schur (2001), 73% prevalence for female at their reproduction age.

The reasons for this is not known but could be hormonal difference and stress in the part of women.

The present study also showed that out of 811 persons who had overnight fasting sugar levels greater than 7.8mmo/L who were confirmed as diabetic patients, only 1.8% were confirmed as having type 1 diabetes.

It goes well to prove that type 1 diabetes is not as Nwafor and recorded higher prevalence in Port Harcourt and attributed it to high consumption of roasted meat by pregnant women which may result in high level of dimethyl nitrosonamine which has been postulated to cause damage • to pancreatic beta cells and induce IDDM in the off springs. The reasons for the low prevalence recorded in this study may be lack of the gene DR4 and DR3 in Imo state, which predisposes one to IDDM. IDDM requires experienced physician to distinguish it from type 2, and most times sufferers go for self medication and would not visit the hospitals for proper diagnosis and management.

Conclusion

The results obtained from this study have provided information on the public health burden of the three autoimmune diseases studied. These estimates had limitation by paucity of information on the previous prevalence, to ascertain whether they are increasing or decreasing in the state, and not all the people who had these diseases were able to visit the hospitals at the period of study. The actual prevalence in the state would have been established if all those outside the hospitals have been investigated. This work however is limited to health institutions and with the results so far obtained, one can infer a high prevalence of rheumatoid arthritis as this was the highest amongst the diseases studied.

It was quite different from other rheumatic diseases observed during screening by its unique diagnostic criteria. It was observed more in women a little above childbearing age and in elderly men. The reason for this female gender preponderance could be attributed to stress due to farming, childbirth and hormonal. Low resistance to infection at this age could be a contributing factor.

Insulin dependent diabetes mellitus and systemic lupus erythematosus seemed low in prevalence, but their presence in the state has been established. It was equally observed at the time of screening the high level of people suffering from type diabetes. This calls for urgent intervention. With the establishment of these diseases in the state, they, inevitably result in increasing disability^p>rbidity and mortality due to complications. A concerted initiative should be made to address the problem and enlighten ignorant victims who may not be familiar with the diagnostic criteria or visit the hospitals for adequate diagnosis and management. Systemic lupus erythematosus were found in women of child bearing age while insulin dependent diabetes mellitus were found amongst young adults and little more in women. These goes on to confirm that women are more disposed to autoimmune diseases.

References

Alamany, M.l., Aladro, Y., Amela Peris, R. & Perez-Vibitez Me.(2005).Autoimmune diseases and multiple sclerosis. Revlsitated Neurologia. 4: 594-7.

Bengetson, C., Nordmark, B., Wareskog, L., Lunbery, L.& ffredsson, D.C.(2005). socio economic status and the risk of developing rheumatoid arthritis. Annual journal of Rheumatology. 65: 1588 - 1594.

Charles,M.S.(2005).History of arthritis research. Clinical and experimental rheumatology 3:183-187.

Cooper, G.S., Dooley, M.A. & Treadwell, E.L.(1998). Hormonal, environmental, and infectious risk factors for developing systemic lupus erythematosus. Arthritis Rheumatology. 10:1714-24.

Cooper,G.S. and Strophia,B.C.(2003).Epidemiology, autoimmune diseases. Autoimmune Revasted.3:119 - 25.

Fleishmann R-, Boumagartner MH., Inhite B., Peloso P. (2005). Epidemiology of rheumatoid arthritis in United States. journal of rheumatatogy 63:379-384.

Graninger, W., Fisher, I., Smolen, J..A (1995).Autoimmune response to the splicosome. An Immunologic link between rheuma toid arthritis, mixed connective tissue disease- and systemic Erythematosus. Arthritis Rheumatologu 38: 777- 85.

Guileman , F., Saraux, A.,& Guggenbuhip Ronx, C.H. (2005).Prevalence of rheumatoid arthritis in France. Annual Journal of Rheumatology. 64: 1451-1453.

Jacobson, L.T. and Jacobson, M.C. (2003).Prenatal Characteristics and risk of rheumatoid arthritis. British Medical Journal. 326:1068-9.

Kathleen,Maksimowiez, Mckinnon, Williams DO.(2004).Rheumatoid arthritis. Medicine Index Clinic Foundation 1:3-5.

Krishman,E.,Sokka,J. & Honnonen,P.(2003). Smoking, gender interaction and risk for rheumatoid arthritis. Arthritis. 5:
158-62.

Macgregor, A.J., Snieder, H. & Rigbu AS., (2004). Genetic contribution to rheumatoid arthritis using data from twins. Arthritis Rheumatology. 43:30-7.

Macgregor, A.J., Riste, L.K., Hazes Silmsn, A.J.(1994).Low prevalence of RA in black caribbeans compared with whites in Manchester. Annual Rheumatology. 53:293-297.

Nigeria Institute of health (1999). Understanding autoimmune diseases.10B-115.

Oduala, T., Uchegbu, G.O., Aogundade, F.A. Bello,I.S. & Akinjole, O.O(2005) .Prevalence of systemic lupus erythematosus in lle-Ife. African Journal of Biomedical Research 8: 135-137.

Onkamo,P.,Vaananen,S.,Karvonen,M.,&Juomilehte,J.(1999). Worldwide increase in incidence of type I diabetes - the analysis of the data on published incidence of trends Diabetologia. 42: 1395-1403.

Papadopoulos,A.,Katsimbri,P.& Alamanosy.,(2003). Early rheumatoid arthritis patients in relationship with age. Rheumatology. 23:70-4.

Rose A., and Bona., (2005). Definition of autoimmune diseases. Immunology Today. 14:426 - 430.

Stites, D.P., Terr, A.L.,& Parslow, T.G.(1997). Medical Immunology tfh edition, Appleton and Lange, Stamford, CT, USA 231-234.

Symmons, D. (2003).The prevalence of rheumatoid arthritis in the United Kingdom. Rheumatology. 5:696-697.

Tomas, M.C., Maclsaac, R.J., Tsalamandis, C., Power, D.& Jerums, G. (2004). Unrecognized anaemia in patients with diabetes, a cross - sectional survey. Diabetes Care. 26: 1164-1169.

Vered and Michael M. (2005) .Environmental factors in autoimmune diseases. National Institute of Environmental Health Science Archived Report. 12-19.

Access this Article in Online	
	Website: www.ijarm.com
	Subject: Health Sciences
Quick Response Code	

How to cite this article:
Okoroiwu, I.L. Obeagu, E.I., Obeagu, G.U., Chikezie, C.C. and Ezema, G.O. (2016). The prevalence of selected autoimmune diseases. Int. J. Adv. Multidiscip. Res. 3(3): 9-14.