Disease Diagnostic Techniques Of Contemporary Times In Nigeria

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Abstract: Diagnosis of parasitic diseases are globally important requisite to realization of wholesome treatment of ailment and reduction in resultant morbidities and mortalities. Parasitic diseases are however hyper- and hypo-prevalent in Nigerian populace often due to socio-economics factors and ranges of little or no sequels. Low mortality from parasitic infection is due to alternative medication other than successful diagnosis as observed. Subsiding cost of affording diagnosis, erection of government owned diagnostic facilities or mobile diagnostic facilities and enlightening the general public on needs of diagnosis are key factors to adequate treatment, disease deterrence and control of parasitic diseases. This review presents the qualities and drawbacks in parasitic disease diagnosis in Nigeria, pointing out major disease occurrences and diagnosis techniques used in medical facilities as related globally. Thus, contemporary diagnostic techniques available for prompt, accurate and easy presentation of results on pathobiology of disease patterns including immunoassays, conservative and molecular techniques for different biopsy from zoonotic and human parasitic infections. However psychological limitation in Nigeria such as affordability, variability in confirming results from other diagnostic areas, and adequate staffing, can be conquered by training personnel annually on the use of the available tools.

Keywords: diagnosis techniques, contemporary times, and Nigeria

1. Introduction

Parasitosis also referred to as parasitic disease is an infectious ailment transmitted by a parasite to a host from important mechanical vector agents. Several vector agents that act as parasites live in association with the host particularly thriving in warm and moist climates. Diseases caused by parasites are a deal of the world but most commonly endemic in areas of sub-Saharan Africa, Indian subcontinent, southeastern Asia, and Central and South America. Insects for example act as a major blood-borne vector which houses mutualistic parasites in the alimentary canal that cause diseases to hosts and the insect themselves. Several disease exists such as elephantiasis caused by a nematode-based filarial worm for instance Brugia malayi, Brugia timori, Wuchereria bancrofti and transmitted by the female mosquito in the process of blood feeding from an infected human, river blindness caused by Onchocerca volvulus and transmitted by blackflies, Drancunculusia, a guinea worm infection is caused by Dracunculus medinensis which results in sensational itching in infected persons, visceral leishmaniasis caused by Leishmania tropica is mechanically transmitted by the sand fly and an enlarged splenomegaly is a chronic stage of this infection. Contemporary techniques in disease diagnosis involves the incorporation of modern laboratory procedures in the diagnosis of zoonotic diseases and those affecting man. These diseases exhibit life-threatening sequels ranging from acute signs to chronic symptoms which plays a part in reported clinical manifestations and histories resulting to various degree of re-occurring morbidity and debilitation with resultant death if left untreated. Fever, digestive disorders, aches, allergens or nervousness, persistent skin disorders, anemia and sleeplessness are primary sequels and consequences of parasitic ailments. It is a serious hurdle to determine the mechanism of vector capacity to infecting host but hypo-prevalence or hyper-prevalence, vector range, disease endemics, identification of vector salivary proteins, amongst many others are scholarly reiterations in various studies. Present also in studies are methodology to realization of parasitic infections but a concise review of diagnosing techniques to better the masses are lacking in Nigeria. A number of the Nigerian population are parasite infected with Plasmodium species ranking the highest; as about 300 million clinical cases are reported at cross-intervals (Bogitsh and Chang, 1998). Malaria is reported as the master minder of prevalent death cases in 2million persons yearly in Africa (WHO, 2003). Factors such as clime, living ethics, hygiene, housing and related factors may contribute to the increase in disease infections and environment optimal for development in Nigeria. Although, about 370 parasite species infect man (Cox, 2002). Today, the diagnostics of parasitic diseases is dependent on several procedures reported for laboratory use and chronic of clinical sequels, pathobiology, reports of visits to endemic areas, and prevalence reports. In the past, diagnosis of many parasitic ailments was majored on visible sequels but a little drift occurred with the development of microscope for staining and magnification of cyst on slides. Painfully, current techniques for disease diagnosis cannot differentiate between historical, embryonic, severe, and reoccurring infections and its usefulness as a follow up response for prophylaxis or for disease prospects is not justifiable (Ndao, 2009). In Nigeria, medical and science laboratory technologists have put up energies to develop new diagnostic techniques, however, their laboratories are ever opened for diagnosis of various ailments ranging from malaria parasites, HIV/AIDS and many more for improved health. Diagnosis technics still on record includes numerous serology-based

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assays such as ELISA (Falcon assay screening test and the Dot-kinds), rapid antigen detection system (Shokoples et al., 2009), and luciferase immune-precipitation system (LIIPS) (Burbelo et al., 2005). However, molecular diagnostic methods including loop-mediated isothermal amplification, real-time polymerase chain reaction (Parida et al., 2008; Muldrew, 2009), and the use of tissue biopsy in molecular biomarkers (Tait et al., 2009) are uncommon in Nigeria laboratories but where they exist are not prevalent. This review presents the qualities and drawbacks in parasitic disease diagnosis in Nigeria, pointing out major disease occurrences and diagnosis techniques used in medical facilities as related globally in the quest to create awareness in Nigerian laboratories.

2. Global disease burdens with some pictographs
All of these diseases are hyper- and hypo-prevalent in Nigeria. They include elephantiasis, dracunculiasis, river blindness and leishmaniasis. The World Health Organization has estimated that 489 million humans are infected and 1 to 2 million die annually of malaria infection, 200 million are infected and 0.5 to 1 million die yearly of Schistosoma infections, 900 million and 50-60 million die of hookworm infection, 750 million persons are infected and 20-50+ thousands die of Filarial worms, 1.0 billion are infected and 20 thousand die annually while an aggregate of 4.5 billion persons are infected with worms with variable death occurring.

3. Contemporary techniques types
The below contemporary techniques are utilized in the world for diagnosis of parasitic infections. They include the use of simple and compound microscope as conservative techniques, non-conventional immunoassays such as Enzyme Linked Immunosorbent Assay (ELISA) of different kinds including falcon assay screening test, dot, and radio immunoprecipitation assay kinds, direct or indirect hemagglutination assay, direct or indirect immunofluorescence assay, luciferase immunoprecipitation assay and rapid Antigen diagnostic test, molecular and proteomic techniques such as polymerase chain reaction of two kinds including the general-PCR and real time-PCR, amplification such as nucleic acid sequenced-based amplification involving the general and the real-time kind, loop-mediated isothermal amplification, luminex, and mass spectrometry including the matrix-assisted laser desorption and surface-enhanced laser desorption. In Nigeria, Microscopy as conservative method is common to view stool, blood slide stains, and many cyst prepared slides to a designated magnification. Other methods utilized in Nigeria diagnostic facilities include immunoassays and to a less
extent molecular techniques commonly the general typed PCR. Proteomic techniques are uncommon. Even Molecular techniques are only sorted when critical accident occurs and diagnosis is needed urgently. Many Nigerians prepare a trial and error method of treatment of infection with reported sequels as a blueprint guide to treating ailments instead of spending money for diagnosis. The conservative method is suitable for protozoan and helminth infections through blood smearing, tissue specimen, lymph node, faeces preparations, bone marrow and even cerebrospinal fluid (Cobo et al., 2007; Chappuis et al., 2006; Croft et al., 2006; Healy and Ruebush, 1980; Tanowitz et al., 1992). Within immunoassay, the serology-based assays is precise in diagnosis for example difficulty in distinguishing between plasmodium caused and babesia infections (Carter et al., 2003). In some cases low parasite load exists or asymptomatic individuals e.g. Chagas disease infected are difficult to detect using this method (Diez et al., 2007). In the past, the falcon assay screening test ELISA was applied in determining malaria, schistosomial, fasciola, taenial infections (Campbell et al., 1987; Ko and Ng, 1998) but with same specificity issues. The Dot-ELISA has extensively been applied in the diagnosing zoonotic and human parasitic infections such as amoeba infections, babesiosis, fascioliasis, leishmaniasis, cysticeriosis, echinococcosis, plasmodium infections, schistosomiasis, toxocariasis, toxoplasmosis, trichinosis, and Trypanosoma diseases (Pappas et al., 1988; Kumar et al., 2008; Courtioux et al., 2005). Rapid antigen detection tests (RDTs) have been reported to be successful for use in detecting Plasmodium falciparum and P. vivax infections only and being not useful for diagnosing very low parasite load infections (Shokoples et al., 2009). The advances in molecular approach has stepped diagnosis of disease to the next level with the use of the polymerase chain reaction (PCR) and proteomic techniques to conquer specificity tools in diagnosis. But this is not widespread in local diagnosis centres and are not accessed by infected Nigerians. How many Nigerians can afford high quality diagnosis? as pre-requisite to curing parasitic infections? Most preferred is using the monies to get an affordable alternative or self-medications.
4. Impacts of contemporary laboratory techniques in Nigeria

Since the discovery of contemporary laboratory techniques, parasites difficult to be cured by herbal-traditional means have been effectively diagnosed as a major role to understanding the morpho-pathology and pathobiology of the parasitic diseases in Nigeria. Sensorial perception and religious beliefs which are among the failings eating into the comparative efficacy of these contemporary techniques and diagnostic approach are being corrected. Herbal medicine although is a cultural gem and has it sting severe in various communities around the world with Nigeria inclusive. This well-known medical area encompasses all kinds of folk medicine, unconventional medicine and indeed any kind of pharmaceutical method that existed by the tradition of a community or ethnic group (WHO 1993). In spite of the effectiveness of contemporary techniques for infectious disease diagnosis, herbal medicine has penetrated deep in the vein of individual inhabitants of various communities in Nigeria hampering with the health facilities provided by government and effective drugs to better the health needs of the people.

5. Qualities and drawbacks in modern laboratories in Nigeria

Medical scientist and science laboratory technologies often have less opportunities to diagnose diseases in Nigeria. The tools available are most times not up to standards to provide evidences needed to interact directly with the world in real data sense. In reality, only a few documented case of diagnosis exist for Nigeria medical centres where the use of the available tools, data collection procedures, models, and theories exist. The major setbacks facing the diagnostic area for disease is the cost of carrying a diagnosis, ignorance, and fear of the unknown. Since the discovery of contemporary laboratory procedures for medical diagnosis in Nigeria, medical centres have witness a huge turnout of commonly only infected persons with various ailments that can afford the diagnosis. Many Nigerians sign in for self-medication when disease symptoms are reported and most often do not go for diagnosis in these accredited centres across the countries. Truthfully, contemporary laboratory technique has come with fulfilled promises and has reduced to minimal medical coincidence through awareness created by successful diagnosis in various labs across the country. The awareness creation by successful diagnosis has indeed helped in avoidance mechanism for diseases. The better way already proposed to helping out in realizing a successful diagnosis is erecting facilities for diagnosis other than in clinics and the best approach is erecting a health institute and getting medical and research scientist to access the facility to properly diagnose and study the disease. Some qualities of contemporary techniques in medical diagnosis include the Increased the desire for medical studies and parasitological research in Nigeria, the increase in the number of person non-resident to the medical facilities, high thoughtfulness along with quality of the detected ailment is guaranteed, novelty in disease diagnoses is attained an the reduction of death due to the unknown disease pathology. In Nigeria, infected persons go through stress of traveling in order to access medical facilities since they are lacking in their local communities. The distance travel could be a barrier to significant diagnosis in rural settings in Nigeria where westernized medical facilities is reportedly low and also limited transportation due to poor road networks influences poor diagnosis. Infected persons have to journey as pedestrians in order to access medical facilities and through the process dead may occur or alternative such as herbal medicine is sorted. The poor technical know-how in most medical centres is another demerit to proper diagnosis as operation of available laboratory tool is not guaranteed, particularly the primary health care centres which is an important factor that discourages infected persons from accessing these facilities. Due to the sophistication of equipment, most of the diagnostic centres for disease in developing countries, particularly in Nigeria, have recently introduced a payment-on-delivery scheme for local infected persons who in most cases have no money to fit the bill of diets than to talk of medical diagnosis. This has been the major drive to seeking the alternative source which in most cases just give treatment without diagnosis and full knowledge of disease infections. When diagnostic facilities are not available or are not in order, faulty results as positive is obtained sometimes, contamination is a frequent occurrence, as an expert is required and also capital intensity is a flaw.

6. Major flaws in the Nigerian health care system

Notwithstanding the private medical laboratories and government owned laboratories in medical centers for various disease diagnosis, the number of Nigerian personnel accessing is only but 43.3% (Onwujekwe et al., 2010). This inadequacy in visits to medical facilities in Nigeria is attributed to socio-economic factors and social trust on medical personnel in carrying out the diagnosis. It is estimated that 55% of Nigeria populace inhabit rural regions with only 45% living in the urban regions (Steinberger et al., 2008). This inhabitation is a function of finance. Most (about 70%) medical diagnostic laboratories are owned by private suppliers as compared to 30% owned by the government (Omorun et al., 2009). When drugs are administered in faulty diagnosis, it targets viable organs instead of shooting the ailment at which it is meant to cure and in most case, drugs administered are second-rated. Hence, the National Bureau of statistics has in 2011 proposed that the...
ineffectiveness in Nigeria Health care System (NHIS) had led to the low number of persons (40%) accommodated for diagnosis while a greater percentage (52-60%) is been manipulated by informal sector. Akande recently reiterated that the flaws is due to poor referral system between the various tiers of medical facilities which points out the poor managerial roles of medical diagnostic facilities (Akande et al., 2004). Another major flaw facing diagnosis of diseases include adequate funding scheme to subsidize health bills and quality assurance for the diagnosed (Onwujekwe et al., 2010).

Conclusion
It is identified that many Nigerians do not gain access to medical diagnosis of disease due to socio-economics and other related outlined factors. Making readily available at subsidized rate mobile or erect diagnostic facilities at proximal site for inhabitant would divert risky alternative or self-medication and even death that may result from delayed diagnosis.

References


