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Blueprint for healthcare security in Nigeria by 2050: ensuring access, promoting adherence and safe use of medicines

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Abstract

Introduction: Access to drugs and their safe use are essential to delivery of healthcare. At the present, the healthcare delivery in Nigeria requires a considerable attention as access to quality care remains poor. Population explosion will likely worsen the already challenged situation except proper planning is instituted, and followed through.

Aim and objectives: The overall goal of this article is to develop a blueprint for the healthcare security in Nigeria by 2050 by improving access to quality drugs and management of drug-related diseases. The specific objectives include: establishment of facility for serum/plasma assay for therapeutic and non-therapeutic drugs: establishment of poison information and management centre(s) in all the geo-political zones of Nigeria within the next 12 years; development of human and infrastructural capacity to handle drug analyses in, at least, one centre in the six geopolitical zones of Nigeria

Methodology: This proposal is a thematic area and part of the National Universities Commission-sponsored blueprint for healthcare security of Nigeria by 2050. Relevant articles and documents relating drug adherence, clinical trial and clinical toxicology were sourced and synthesized as appropriate. Inferences were drawn based on available human and material resources and, in turn projected accordingly.

Conclusion: There is a dearth of relevant professionals and infrastructural facility to ensure adequate access and safe use of drugs in Nigeria, even at the present. There is need for strategic planning to overcome the present challenges in the healthcare system, and a phased-approach to capacity development has been proposed.

Keywords: *Health security, clinical trials, clinical, clinical toxicology, strategic plans, Nigeria*

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Abstrait

Contexte : L'accès aux médicaments et leur utilisation sans danger sont essentiels à la provision des soins de santé. À l'heure actuelle, la prestation de soins de santé au Nigéria requiert une attention considérable puisque l'accès aux soins de qualité demeure médiocre. L'explosion démographique aggravera probablement la situation déjà difficile, à moins qu'une planification appropriée soit mise en place et suivie.

But et objectifs : L'objectif général de cet article est de développer un schéma directeur pour la sécurité des soins de santé au Nigéria d'ici 2050, en améliorant l'accès aux médicaments de qualité et la gestion des maladies associées aux médicaments. Les objectifs spécifiques comprennent : mise en place d'un centre de dosage du sérum / plasma pour les médicaments thérapeutiques et non thérapeutiques : création d'un ou plusieurs centres d'information et de gestion des poisons dans toutes les zones géopolitiques du Nigéria au cours des 12 prochaines années ; développement des capacités humaines et infrastructurelles pour gérer les analyses de médicaments dans au moins un centre dans les six zones géopolitiques du Nigéria.

Méthodologie : Cette proposition est un domaine thématique et fait partie du projet de loi sur la sécurité des soins de santé du Nigéria parrainé par la Commission Nationale des Universités d'ici 2050. Des articles et des documents pertinents concernant l'adhérence aux médicaments, les essais cliniques et la toxicologie clinique ont été extraits et synthétisés comme approprié. Des déductions ont été établies sur la base des ressources humaines et matérielles disponibles et, à leur tour, projetées en conséquence.

Conclusion : Il existe une pénurie de professionnels et de commodités infrastructurelles relevant pour assurer un accès adéquat et une utilisation sans danger des médicaments, même à l'heure actuelle, au Nigéria. Une planification stratégique est nécessaire pour surmonter les défis actuels du système de santé et une approche progressive du développement des capacités a été proposée.

Mots-clés : *sécurité sanitaire, essais cliniques, clinique, toxicologie clinique, plans stratégiques, Nigéria*

Introduction

This section attempts to explore health security in the areas of drug adherence, clinical trials, and clinical toxicology. A drug is a (chemical) substance that is used (or intended to be used) for modifying pathological state or physiological state for the benefit of the recipient. The goal of therapy for any condition is usually set from its commencement, cure, control, or palliative, achievement of which depends substantially on compliance with the recommended regimen.

Adherence to medication or drug compliance is an aspect of pharmionics concerned with use and misuse of medicines in clinical trials or practice [1]. Determinants of adherence to medication may include mental state, access, poverty, education, drug-related disorder, etc. The success or otherwise of any therapeutic exercise largely depends on such factors being well-managed. Several methods are available to monitor drug compliance; ultimately correlate the drug levels with effect. Adherence may be affected by, among other factors, adverse drug effect, a key reason for drug (or medical devices) clinical trial in the effort to ensure the safety of the end-users.

Clinical Trials provide initial data that establish safety and efficacy of pharmaceuticals (or medical devices) in humans. Clinical trials are mandatory as they afford humanity the opportunity of reducing or eliminating the introduction of unsafe and/or ineffective medication to the general population. Clinical trials of drugs (or medical devices) usually involve four phases (I-IV), phase IV being also known as post-marketing surveillance, essentially providing a means of monitoring end-users responses, particularly adverse, when in use in the general population. In the main, clinical toxicology is an area of toxicology concerned with the toxic effects of agents, whose intent is to treat, ameliorate, modify, or prevent disease states, or, the effects of drugs which, at one time, were intended to be used as such [2]. Clinical toxicology also encompasses effects (and management) of various non-therapeutic agents that may adversely affect humans; these include: alcohol, gases, hydrocarbons, pesticides, etc.

Drug adherence, clinical trial and clinical toxicology are interwoven, for example, adherence may be inhibited by inadequacy of drug clinical trial and/or toxicity of same in susceptible individuals even when the drug is taken at the standard recommended dose. Optimal pharmacotherapeutic experience, therefore, depends on maintaining reasonable balance among the respective variables. Nigeria, at the present, is faced with substantial unmet needs in the aspect of her healthcare services, for example, clinical toxicology services are almost non-existent. Further, there is a dearth of relevant data. Ensuring health security of Nigerians in 2050 requires that due attention be paid to human and material capacity development.

Situation analysis and forecast for 2050

Nigeria with an estimated population of over 190 million people ranks as the 7th largest country in the world and largest black nation in the world [3]. It has been projected that the country's population will double by 2050, making it the 3rd largest country after China and India. The country has a very high proportion of young people as the population is made up of about 60% below the age of 30 years, whereas an estimated 5% are above age 60 years. The 2050 population projection and demographics suggest that people above the age of 60 years will contribute about 9% of the population while proportion of productive age group is expected to remain largely the same.

Drug adherence data are scanty but available information depicts a worrisome picture. In a study of adherence among patients on treatment for type 2 diabetes mellitus, drug compliance was 56-60% [4,5]. Adedapo, *et al*, documented about 75% compliance rate and marked improvement in blood pressure control rate among hypertensive patients [6]. It is noteworthy that since the above studies were questionnaire-based, the rates of drug compliance in such populations may not be accurate. . Determination of drugs and relevant metabolites in biological fluids provides a means of affirming relevant information obtained through interview, and it is an essential toxicological tool. Facility for drug assay currently is largely lacking in Nigeria today. The country is also underserved by the relevant professionals, such as medical laboratory scientists, physicians, and pharmacists. For instance, the doctor-patient ratio in Nigeria is 1: 5000 instead of 1:600, and given that about 3,000 doctors are produced yearly; the country may only be able to marginally improve on the ratio to 1:4000. A further confounder is the mal-distribution imposed by geographic regions and social-economic factors. It is trite that as 2050 draws near, a larger population of humans will require drug treatment, as well as toxicological services.

There are reports of high rates of concomitant use of complementary or alternative medicines particularly, herbal preparations, in addition to conventional drugs among Nigerians [7,8]. Unless access to conventional or orthodox

medicines improve use or misuse of alternative medicine may increase or worsen, and further compel the need for clinical toxicological services that are currently lacking. For emphasis, there is urgent need for relevant studies and documentation on drug adherence, drug-drug, drug-herbals interaction, and the establishment of appropriate facilities for clinical trials and, clinical toxicology in order to secure the health of Nigerians as 2050 approaches.

In addition to the above challenges, there is scarcity of training centres, infrastructural facility for adequate training of clinical pharmacologists and other relevant professionals to facilitate capacity development in this aspect of healthcare system.

SWOT analysis

A well-manged large population provides potential pharmacists, medical laboratory scientists and physicians who could be further trained as clinical trialists and clinical toxicologist hence large population could be a source of strength. In addition, the relatively high proportion of young adults could be prepared for training in other aspects of drug management such as technicians/technologists and middle-level educators for deployment to rural areas. A large population also offers opportunity of a large market that could attract foreign investment in the pharmaceutical industry. Further opportunity and why foreign investment may be attracted is availability of labour at a relatively low cost which will in turn reduce the cost of production. Nigeria is also currently blessed with generations of well-trained pharmacists and clinical pharmacologists who are prepared to contribute in ensuring healthcare security in Nigeria. Residency training in the subspecialty of clinical pharmacology and therapeutics is currently undertaken in few of the country's teaching hospitals, there is urgent need to escalate capacity development in all of these centres with a view to ensuring adequate human and material resources that huge population imposes/may impose.

The weaknesses and threats are also real and may overwhelm the strengths and opportunities if not properly managed. Of the weaknesses, improperly managed population explosion may inundate facilities that are currently inadequate for half of the projected 2050 population with grave consequences. For example, inadequately engaged youths result in increasing involvement in vices including drug use and abuse, and ultimately requiring among others, toxicological services, which is currently virtually non-existent. In the event that population outstrips available facilities, even the inadequate relatively well-trained physicians and pharmacists may emigrate, brain-drain, a situation that already subsists.

Strategic plan

This section explores effectively planning premised on achievable (SMART) objectives, and the overall goal of ensuring health security in Nigeria by 2050 and beyond. It is opined that the planning be phased, such that short term be designed to tackle achievable milestones within the next 7 years (2018-2025); medium term (2026-2037); and long term to address 2038 and beyond. The short term aim should be to establish one centre, for example, University College Hospital, Ibadan. In the medium to long term (10-12 years), similar resources, human and material, should be extended to the other five geopolitical zones of the country, and a separate one in the Federal Capital territory. Beyond 2030, facility for clinical trials, and toxicology should be extended beyond the initial six centres such that every state or, at least, every two adjoining states in the country should be adequately resourced to handle such services. The following few paragraphs attempt to further describe the above summary.

Specific objectives

1. Establishment of facility for serum/plasma assay for therapeutic and non-therapeutic drugs
2. Establishment of (national& regional) poison information and management centre(s) – starting with UCH (Southwest zone), to be extended to all other geo-political zones of Nigeria within the next 12 years.
3. Development of human and infrastructural capacity to handle drug analyses in, at least, one centre in the six geopolitical zones of Nigeria
4. Provision of standardized training for clinical trialist, drug analysts, and other relevant staff at the established centers in the geopolitical zones of Nigeria
5. Provision of technical support to relevant regulatory (security) agencies
6. Provision of requisite short term trainings such as Good Clinical Practice (GCP), Good Laboratory Practice (GLP), etc

Short term plans

The short term aim should be to strengthen and equip one centre for adequate delivery of drug compliance-related services, clinical trials, and clinical toxicology. The University College Hospital, Ibadan has an autonomous Department of Clinical Pharmacology with five consultants, and the department is developing a clinical pharmacology

laboratory. The Department has all the components including (international) collaboration, required for the purpose of pursuing the objectives listed above. It is thought that (additional) essential equipment be procured, and few additional personnel could be in place and operations commence in 2-3 years, thus a short term. The Department of Pharmacy of the Hospital is also well positioned to meet the objectives stated above.

Medium to long term plan

In the medium to long term (10-12 years), similar resources, human and material, should be extended to the other five geo-political zones of the country, and a separate one in the Federal Capital territory. Each of these centres will require at least two trained Clinical Pharmacologists, two drug and toxins analysts, as well as the listed items of equipment. Once these centres are established, they will provide the needed facility for training of generations of requisite Experts, for example, Drug Analysts, Clinical Pharmacologist in a sustainable manner.

Funding

Bench fees payable by relevant trainees, including residents, postgraduate students, and other users to use the facility

Monitoring and evaluation

Each centre would be expected to collate data relevant to drug compliance, and profile of toxicants in its respective environs. The coordinating centre will be at the University College Hospital, Ibadan, which will be responsible for collating, analysing and publication of an annual report. Such data will also assist in determining the viability, and review of the needed resources (human and material) that may be required for efficient service and projections.

Conclusion

It is imperative that the largest black nation in the world improves on its healthcare delivery including increased access to the underserved majority of its citizenry, and expand the scope to include poison information and management services. This has further become necessary in view of projected population explosion in the face of the already overstretched fragile healthcare system. This proposed incremental capacity development should provide the needed template for the establishment of a sustainable access and management of drug-related challenges by year 2050 and beyond.

Table 1: Proposed Institutions to be strengthened for adequate delivery of services in Drug compliance, Clinical Trials, and Clinical Toxicology by 2030*

Geo-political Region	Proposed Health Facility
Southwest	University College Hospital, Ibadan
South-south	University of Benin Teaching Hospital, Benin
Southeast	University of Nigeria Teaching Hospital, Enugu
Northwest	Ahamadu Bello University Teaching Hospital, Zaria
Northeast	University of Maiduguri Teaching Hospital, Maiduguri
North central	Jos University Teaching Hospital, Jos

**The National Hospital, Abuja for the Federal Capital Territory*

The initial funds for establishing all the identified centres (in the 6 geopolitical zones) should be provided by the Federal Government of Nigeria (appropriate estimates can be provided). It is believed that the first Centre, the University College Hospital, Ibadan will only require material resources such as equipment, furniture, and therefore can be concluded in short term of 2 years from the present. Sources of fund necessary for the 'upgrade' and sustainable operations of the University College Hospital, Ibadan sentinel centre will include:

- Grants, subvention, and contracts from government and non-governmental organizations
- Tokens received from services offered to other hospitals and agencies like The Police and Federal Road Safety Corps, etc

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