Drug Information Management System for Sustainable Child and Maternal Health

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Abstract

For many years now, there has been proliferation of fake drugs that are produced and sent into the market for the consumers. Instead of consumers taking original or genuine drugs to get well, most times what they see are fake ones which are produced by some high-minded profit conscious individuals who go back to reduce the quality and standard with which a particular drug was produced. And the rate at which these fake drugs are pushed to the market by these impersonators has to be checkmated if we must protect maternal and child health as one of the millennium development goals. Drug Information Management system for sustainable Child and Maternal Health is a web-based system for tracking these fake products and determining the originality of a drug. The essence is to provide the general public, especially women of child bearing ages, with immediate access to information about drugs, the distributors and manufacturers, give reports/comments on consumed drugs as well as confirm the authenticity of drugs circulated within the country. This will, hence, reduce the high mortality rate in Nigeria that results from the consumption of substandard and fake drugs by the people. In achieving this, we employed the waterfall design methodology. Adobe Dreamweaver was used for the front end designs, while the database was handled using MySQL and PHP was the server side programming language used. The result is a simple application that has the capability to register names of drugs, distributors and manufacturers, verify registered drugs by consumers, view banned or unbanned drugs and finally give feedback reports on circulated drugs. With this application, the rate of proliferation of fake drugs can be controlled and child and maternal health can be safeguarded for national development.

Keywords: drugs, fake, substandard, control, consumer, protection.

Introduction

Drug can be defined as any substance which has a marked physiological effect when taken into the body. Drug control refers to all the measures used to prevent and minimize the use and prevalence of fake or counterfeit drugs. World Health Organization defines a "counterfeit" drug as a medicine, which is deliberately and fraudulently mislabelled with respect to identity and/or source, (WHO, 2006). Counterfeiting can apply to both branded and generic drugs and counterfeit drugs include drugs with the incorrect ingredients or with the wrong ingredients, or drugs without active ingredients, or drugs with insufficient active ingredients or drugs with fake packaging". Drug Counterfeiting poses a great danger to every society, and the less the awareness, the more it gains root into the system. The first step towards combating counterfeiting is getting people to know that it exists with all its consequent deleterious effects (Akunyili 2005). Drug Information Management System is a simple application that ensures that the citizens are well informed about legal and genuine drugs in circulation. Drug control should be a basic concern of any nation clamouring for national

development because the effect is not only felt by women and children but the entire citizens, and the quest for national development cannot be realized when the health of the entire citizenry is at stake due to the prevalence of counterfeit drugs. Hence, the need for Drug Information Management System that has the capability to register names of drugs, distributors and manufacturers, verify registered drugs by consumers, view banned or unbanned drugs and finally gives feedback reports on circulated drugs so that the rate of proliferation of fake drugs can be controlled and child and maternal health safeguarded for national development.

Although a lot of attempts have been made before now to control the distribution of fake drugs in Nigeria which led to the establishment of drug control polices as well as drug regulatory agencies such as NAFDAC (National Agency for Food and Drug Administration and Control), NDLEA (National Drug Law Enforcement Agency), SON (Standards Organization of Nigeria), etc. Unfortunately, despite the establishment of the above agencies, there are still many unregistered "pharmacies" thriving, and from such premises, counterfeit drugs are produced and purchased with their attendant danger to the health of the public (Erhun & Adeola, 1995). It is the inefficient monitoring of drug distributors and manufacturers and the inability to verify the authenticity of purchased drugs by consumers themselves that led to the high rate of proliferation of fake drugs in Nigeria. This circulation of fake drugs has equally become a pervasive threat even to the medical care system (Ohuabunwa, 2002). For instance, in Nigeria today, there are a lot of sicknesses and sick people around. The irony is that these sick people see their doctors or at least take drugs on regular basis. The question here is why do people not get well even after taking drugs? The reason is that even when patients are treated with genuine drugs, there is no response due to resistance caused by previous intake of fake drugs (Akunyili, 2005). Ordinary malaria that was being treated with only Chloroquine many years ago, is now treated with a combination of many drugs – the so called ACTs (combination therapy) before a patient gets well. Out of disappointment from drugs and desperation for healing, people now resort to prayer houses where they are subjected to rigorous praying and fasting programmes by some pastors who are equally fake and at the end of the day the sick people are also disappointed and /or even duped.

It has, therefore, become imperative that a computerized information system that will meet urgent information needs of the masses be developed so as to safeguard not only child and maternal health but the entire citizenry. It will equally enable medical practitioners to give feedback on the efficacy of a particular drug(s) in circulation so that decisions on which drugs to be produced, imported more or banned can be made. The significance of this computerized drug information and management system cannot be overemphasized as it is set to bring to the barest minimum the consumption of fake drugs within the country which has led to the death of millions of Nigerians.

Related Literatures

Drug faking is a global public health problem because the effects can be felt from both the countries of manufacture to the recipient countries (WHO, 2006). Drug control movement emanated from the desire to save human being from effects of harmful drugs, (Awan, 2009). Basically, drug control involves the regulation and control of importation and exportation of drugs, sale and distribution of drugs, use of drugs and much more. The NAFDAC was established in 1993 to regulate and control imported drugs by having inspectors at the various airports and seaports. However, in April 1996, the task force on the decongestion of ports directed that NAFDAC and SON officials would only be invited when necessary and this contributed greatly to the influx of fake and

adulterated products in Nigeria. Also the various regulatory bodies on their part could not function well due to the high level of official corruption and manipulation in the Nigeria healthcare system. Some of the efforts from NAFDAC, such as various raids and seizures of fake drugs and closure of existing chaotic drug markets which created an orderly drug distribution system suffered a setback due to its unacceptability by some pharmacists and politicians that are key stakeholders in drug matters (Akunyili, 2004). The issue of fake or counterfeit products, especially drugs, is assuming new dimensions and this runs counter to sustainable development. In the 67th session (2012-2013) of the UN General Assembly, member-states adopted two resolutions related to the issue of illicit drugs. Of these, Resolution 67/193, International Cooperation against the World Drug Problem, not only contains specific references to increasing efforts to address the supply, demand, and trafficking of fake drugs (also known as illicit drugs), but calls for states to consider illegal drugs' effects on development and take action to implement alternative development, as well as broader development measures to stem the production and use of fake (illicit) drugs, (Amadi & Amadi 2014).

Examples of Fake /Counterfeit Drugs

There are various examples of counterfeit drugs in Nigeria as identified by NAFDAC and they include but not limited to the following;

- Drugs with no active ingredient(s) e.g. having only lactose or even chalk in capsules and tablets, olive oil in Supradyn capsules.
- Drugs with insufficient active ingredients e.g. 41mg Chloroquine instead of 200mg, 50mg Ampicillin as against 250mg.
- Drugs with active ingredient(s) different from what is stated on the packages e.g. Paracetamol tablets packaged and labelled as Fansidar (Sulphadoxine + Pyrimethamine).
- Clones of fast moving drugs - these are drugs with the same quantity of active ingredients as the genuine brand, but may not have the same efficacy.
- Drugs without full name and address of the manufacturer.
- Herbal Preparations that are toxic, harmful, ineffective or deceitfully mixed with orthodox medicine.
- Expired drugs or drugs without expiry date, or expired and re-labelled with the intention of extending their shelf-life.
- Drugs not certified and registered by NAFDAC.

Implications of Fake Drugs

Drug faking or counterfeiting is the greatest evil of our time and the highest weapon of terrorism against public health, as well as an act of economic sabotage. The evil of fake drugs is worse than the combined scourge of malaria, HIV/AIDS and armed robbery put together. This is because malaria can be prevented, HIV/AIDS can be avoided and armed robbery may kill a few at a time, but counterfeit/fake drugs kill in mass, (Akunyili, 2005). The social problem posed by hard drugs like cocaine, heroine etc. cannot also be compared with the damage done by fake drugs, because these drugs are taken out of choice, and by those that can afford them, but fake drugs are taken by all and anybody can be a victim. Fake drugs have embarrassed our healthcare providers and eroded the confidence of the public on our healthcare delivery system. This developmenthas led to treatment failures, organ dysfunction or damage, worsening of chronic disease conditions and the death of many Nigerians. Local drug manufacturing became unattractive due to unfair competition. Many multinational companies were divested and left Nigeria out of frustration e.g. Boehringer, ICI, Sandoz, Merck, Boots etc. Made in Nigeria drugs were officially unaccepted in

other West African countries, e.g. Ghana, Sierra Leone etc.

Some Attempts to Combat Fake Drugs in Nigeria

There are various agencies and systems put in place by the government of Nigeria as a means to combat the issue of fake drugs in the country as well as other systems designed to control the circulation of fake drugs. These agencies include Standards Organization of Nigeria (SON), NAFDAC (National Agency for Food and Drug Administration and Control), and NDLEA (National Drug Law Enforcement Agency) etc. But out these, the one directly involved in drug control is NAFDAC.

The Nigerian Agency for Food and Drug Administration and Control

The Nigerian Agency for Food and Drug Administration and Control (NAFDAC) is a Nigerian government agency established in 1993 to checkmate illicit and counterfeit or fake products in Nigeria. NAFDAC replaced the earlier Federal Ministry of Health body, the Directorate of Food and Drug Administration and Control, which had been deemed ineffective, partially because of lack of laws concerning fake drugs (NAFDAC, 2005). The NAFDAC has the following functions:

- Regulate and control the importation, exportation, manufacture, advertisement, distribution, sale and use of drugs, cosmetics, medical devices, bottled water and chemicals.
- Conduct appropriate tests and ensure compliance with standard designation conducted and approved by the council for the effective control of quality of food, drugs, cosmetics, medical devices, bottled water and chemicals.
- Undertake appropriate investigation into the production premises and raw materials for food, drugs, cosmetics, medical devices, bottled water and chemicals and establish a relevant quality assurance system including certification of the production sets of the regulated products.
- Undertake inspection of imported food, drugs, cosmetics, medical devices, bottled water and chemicals and establish a relevant quality assurance system.
- Conduct standard specifications, regulations and guidelines for the production, importation, exportation, sales and distribution of food, drugs, cosmetics, medical devices, bottled water and chemicals.
- Control the exportation and issue quality certification of food, drugs, cosmetics, medical devices, bottled water and chemicals intended for export.
- Establish and maintain relevant laboratories or other institutions in strategic areas of Nigeria as may be necessary for the performance of its functions.

Efforts by NAFDAC to Combat Counterfeiting of Drugs in Nigeria

A lot of frantic efforts were made by NAFDAC to combat the incidence of counterfeit drugs and such efforts include .but not limited to the following:

- Staff re-orientation and motivation
- Restructuring & modernization of our regulatory processes.
- Public enlightenment campaigns.
- Stopping the importation of fake drugs to Nigeria at source.
- Beefing up of surveillance at all ports of entry.
- Mopping up what is already in circulation.
- Regular monitoring of Good Manufacturing Practice (GMP) of local manufacturers, and streamlining strict enforcement of our registration guidelines

Problems of the Regulatory Agencies: The agency encountered a number of problems that militated against its success in combating fake drugs in Nigeria. Some of such problems

are (i) Loose system of control (ii) Logistic problems, (iii) corruption, and (iv) lack of functional drug information management system, and that is the problem that this paper seeks to address.

Lack of a Functional Drug Information Management System. There is lack of adequate and functional Drug Information Management System that is capable of registering names of drugs, distributors and manufacturers verify registered drugs by consumers, view banned or unbanned drugs and finally give feedback reports on circulated drugs. Though there is an existing information system developed to provide communication between field monitoring, the general public and the NAFDAC database server, but the system is not adequate. The system was implemented as an experimental set up in the laboratory and its major challenge was to determine the appropriate technique suitable for NAFDAC and how to use such technique securely, with good performance. But its information processing procedure is a relatively slow process and posed a lot of problems. In summary, the existing system of drug information in Nigeria is characterized by the following: (i) Low information processing speed, (ii) Inconsistencies/duplications as a result of decentralization of the information unit, (iii) Lacks real time reporting mechanism, (iv) Consumes more physical space due to over dependence on manual paper work (v) Loose database system.

Hence this paper proposes a new and enhanced drug information management system for sustainable child and maternal health. It is an information system that comprises a web-based application with two distinct views, administrators and public user views. The system intends to help decision makers (government and drug regulatory agencies) compile useful information from feedback reports to identify and solve problems and make proper decisions on drugs in circulation, as well as provide relevant information to the general public. The new system intends to improve on the functions of the already existing drug control system in Nigeria.

System's Architecture and Methodology

In achieving this, we employed the waterfall design methodology. Adobe Dreamweaver was used for the front end designs, while the database was handled using MySQL and PHP was the server side programming language used. The figure below shows the architecture of the developed system.

Model of the System

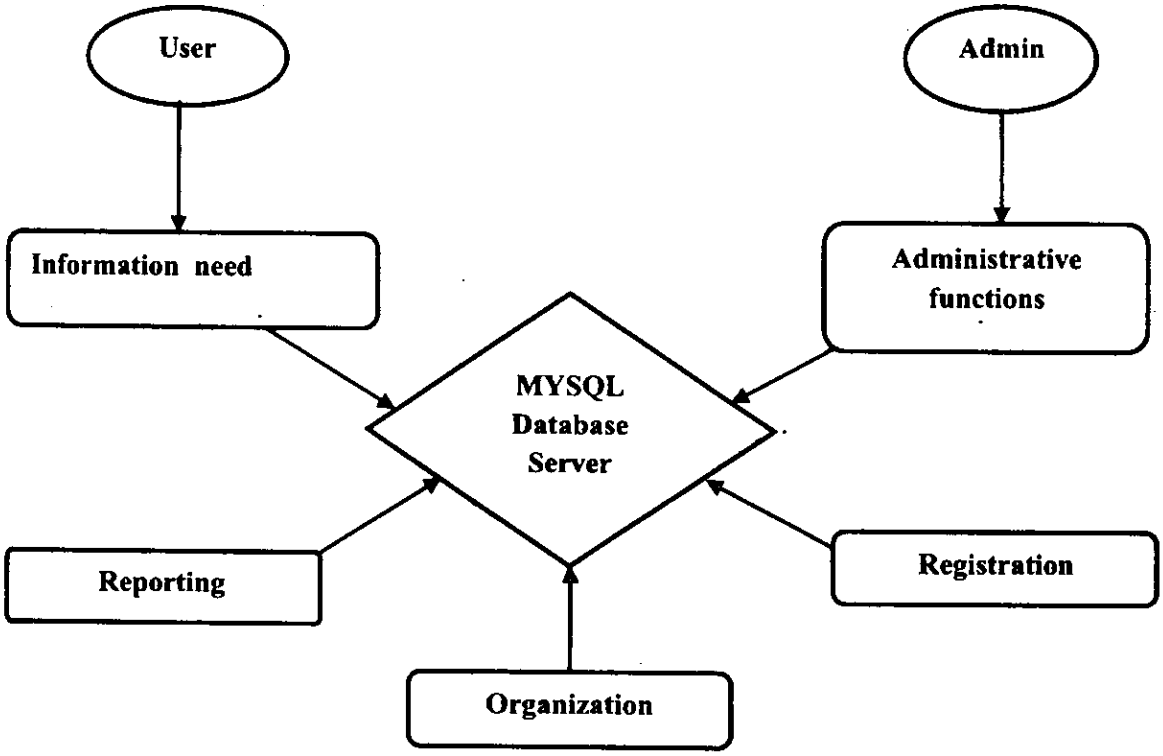


Figure.1: A Model of the Drug Control System

The model diagram above shows the flow of information in the drug control system for NAFDAC. Information are stored in and retrieved from the same database. A user can access the system from the web application through a web browser. Administrative functions and registrations are carried out at the admin's view while reporting and information retrieval is done at the public user's view.

Features of the Model for Sustainable Child and Maternal Health

Registration: Drugs, distributors, manufacturers and administrators can be registered and information safely stored in the database.

Real Time Services: Users should be able to get instant responses to any services required.

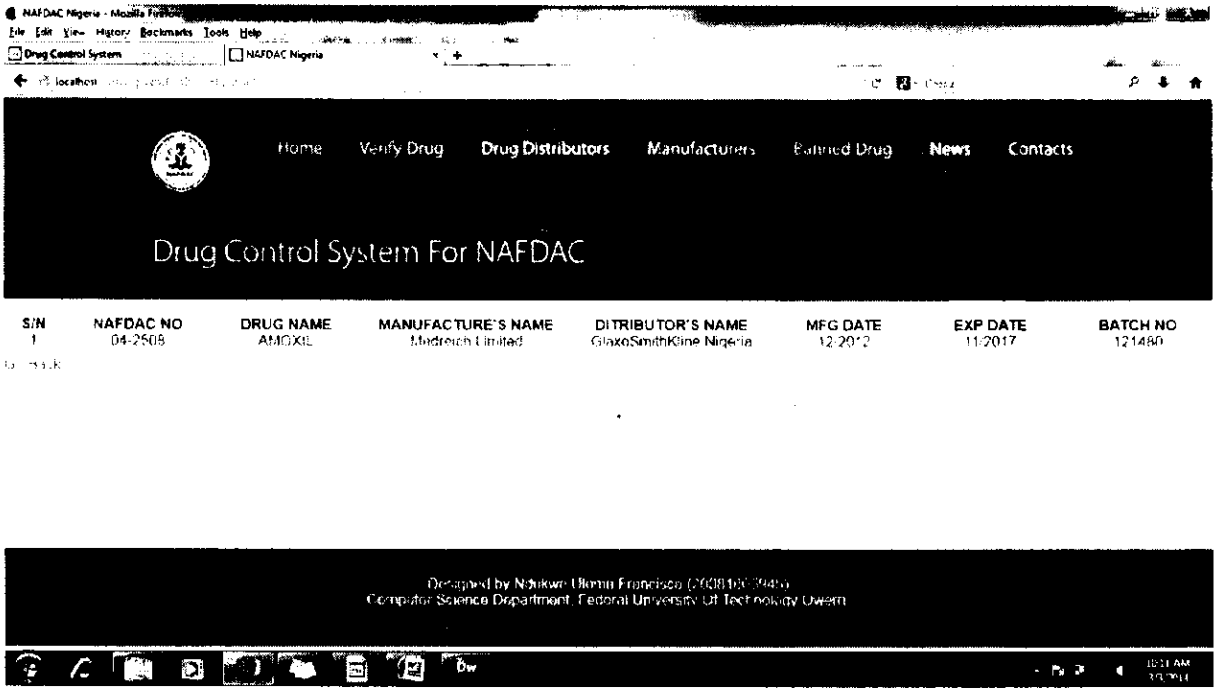
Product Verification: Users should be able to get information about registered drugs.

Feedback reporting: Users are able to give reports about certain drugs in circulation.

Information Retrieval: Information about registered distributors and manufacturers, banned drugs as well as NAFDAC news can be accessed by users.

Results

A user can access the system from the web application through a web browser. Administrative functions and registrations are carried out at the admin's view while reporting and information retrieval are done at the public user's view.



Conclusion

The drug information and management system for sustainable child and maternal health has been developed in this paper and is a necessity in this country, Nigeria since it will help to bring to the barest minimum the circulation and consumption of fake drugs in our society. Drugs, distributors and manufacturers are registered and information properly stored in the database. The system will not only be used by regulatory agencies, it can also be used in the health sector and by the general public to get information about drugs in circulation, distributors and manufacturers.

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