THE CHEMIST IN HEALTHCARE DELIVERY AND SUSTAINABLE DEVELOPMENT IN NIGERIA

Isife, Chima Theresa (Mrs.)
Institute for Development Studies, Enugu Campus, University of Nigeria, Nsukka; Phone: *+234-806-798-5288*; E-mail: *chimatheresa@yahoo.com*

Abstract

Healthcare delivery requires some roles of the chemist to achieve. These roles, which also enhance sustainable development, are hardly captured in literature in harmonized form. This review paper captures these roles, including vaccines production; drugs isolation and extraction; phytochemical screening, separation, purification and analysis; chemotherapy; incubation and other live-saving techniques, and medical devices, such as pacemakers. Fertilizers and pesticides as well as sports materials for healthy living are also formulated by the chemist. It recommends encouragement for chemists and chemical researches, as well as recognition of chemical research outputs by policymakers and the regulatory bodies. It also recommends enhancement of enabling environment for improved teaching and practice of chemistry.

Introduction

Chemistry plays key roles in helping to keep and improve the healthcare delivery in Nigeria. The future holds new breakthroughs, through the advancement of chemistry in health.

The Brundtland Commission of 1987 introduced the concept of sustainable development to replace the economic development paradigm, which is based on the conquest and wrecking of the worl for increased economic productivity. Depleting the planet for economic production, only to deny the future generations the resources bequeathed to the present generation as well as the future generations of the earth's inhabitants, is unacceptable (Nigel, 2002). Sustainable development is a mainstream recognition of a link between development and environment. It advocates meeting the health, economic, environmental, political, social and cultural needs of the present generation without compromising the ability of the future generations to meet their own needs (Eneh and Owoh, 2008). It seeks to minimize the incidence of ill health by provision of high quality healthcare delivery system which makes use of the chemist.

All people have certain basic needs without which life would be impossible. These lives- sustaining basic human needs include food, shelter, health, and protection (World Bank, 2007). When any of these is absent or in critical short supply, a condition of "absolute underdevelopment" exists. A basic function of all economic activity, therefore, is to provide as many people as possible with the means of overcoming the helplessness and misery arising from a lack of food, shelter, health, and protection. To this extent, economic development

is a necessary condition for the improvement in the quality of life, i.e. development. Without sustained and continuous economic progress at the individual as well as the societal levels, the realization of human potential would not be possible.

This paper reviews the relevance of the chemists in healthcare delivery and sustainable development. Healthcare delivery cannot be properly harnessed without the input of chemist. The vaccines, drugs, medical devices, pacemakers, chemotherapy and other life-saving techniques need the role of chemist.

The health status of a people in any geographical setting is so important that if the leaders of that nation fold their arms and do nothing to improve citizens' health conditions, it will only be a matter of time before plagues or diseases will ravage such people. It is for this reason that health care delivery forms a very important aspect of any nation's policy. When individuals are in good health, they can engage fully in their daily social, economic and religious activities. For this reason, countries place great premium on health to enjoy the fruit of their labour.

In realization of the importance of health, all tiers of Government in Nigeria devote large sums of money in their annual budgets to health care. For instance, in 2009, a total sum of =N=103.46 billion was earmarked for the health sectors (Nigerian Village Square, 2008). For the 2011 budget, the Federal Government of Nigeria proposed to spend a total amount of =N=235,866,438,244 for the health sector. Out of this amount, the total personnel cost was put at

=N=192,885,136,258; total overhead cost =N=9,453,716,258; total recurrent =N=202,338,852,916; total capital cost =N=33,527,630,328 (Federal Ministry of Finance, 2011). These yearly expenditures show that enormous budgetary resources were allocated to the health sector due to its importance to the nation.

The World Health Organization (WHO), the key United Nations agency concerned with global health matters, defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity" (World Health Organization, 1999). In September 2000, the 189 member countries of the United Nations adopted eight Millennium Development Goals (MDGs), committing themselves to making substantial progress towards the eradication of poverty and achieving other human development goals by 2015. The MDGs are the strongest statement of the international commitment to ending global poverty. They acknowledge the multidimensional nature of development and poverty alleviation, and that an end to poverty requires more than just increasing incomes of the poor.

The eight goals are ambitious: to eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases; ensure environmental sustainability and development of a global partnership for development. The goals are then assigned specific targets deemed achievable by 2015 based on the pace of past international development achievements (Eneh, 2009; Todora

and Smith, 2011). The 4th, 5th and 6th MDGs are all about health (reduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases). The chemist is indispensable in combating health problems ravaging the world today.

The creator has been recognized as the great Chemist. He performed the first chemical reaction in the creation of light. He then created man and empowered chemists with skills and knowledge for the production of new substances. Chemistry has been defined as a branch of science that studies the properties, composition and structure of matter, which comprises all things that have mass and occupy space, along with the associated chemical and/or physical changes, as well as how such changes impact on the welfare of man and the society. Chemistry is the centre of sciences. It is with it that technology is built for national and international development. Remove science and technology, mankind will revert to the Stone Age (Okieimen, 2007).

Basic scientific research and technological development have played a crucial role in the modern economic growth and experience of contemporary developed countries, including the area of health care delivery. A chemist is a graduate of chemistry or chemistry-related discipline from a recognized university or polytechnic. He was trained to be able to handle chemicals, use and manage them. He can practice in industries, government ministries, agencies, schools and other areas (Okolo, 2007).

The chemist is actively involved at every stage of the search for drugs - biologically active substances of known or unknown

structure, compounds which affect life processes. Both pharmacokinetics (absorption, distribution, biological transformation and excretion) and pharmacodynamics (biochemical and physiological effects and their mechanism of action) of drugs are directly related to the chemistry of the drugs. Chemistry is deployed in isolation (extraction, phytochemical screening, separation, purification and analysis) of drugs.

In the agricultural sector, chemist plays important role to produce and preserve food for a healthy living. He determines the soil nutrients and formulates appropriate fertilizers to suit the soil for effective production and high yield, pesticides and other chemicals to prevent weeds and other farmer's enemies. Chemical compounds are used to eradicate a plethora of disease-carrying pests that compete for food supply (Eneh, 2010).

Chemotherapy and other drugs are delivered more accurately on plastic patches and dissolving disc. Nanotechnology can deliver drugs to specific cells. Premature babies are kept safe and warm in plastic incubators. Vaccines have eradicated crippling diseases. Medical devices, such as pacemakers and blood bags, save lives every day. Life-saving medicines help to combat diseases, thereby enlongating lives. Diabetics readily test their blood sugar levels by a simple chemical test. These biomedical tests and techniques are prepared by chemist.

The World Health Organization (1999) estimates that diseases associated with dirty water kill at least 6,000 people every day. Chlorine chemistry is the most effective weapon against water-borne bacteria and viruses. Water treatment facilities across the world rely on chlorine treatment.

The gear and equipment used in gym, playing field and on the trail are predominantly products of chemistry. Football, baseball, hockey, lacrosse, skateboarding and nearly every popular sport, relies on plastic pads, helmets and other protection equipment made by chemist. Plastic fibers make wornout clothing breathe and

wick away sweat. Modern swimsuits help athletes glide through the water. Cyclists, skiers, hikers, mountain climbers and other outdoor enthusiasts all rely on carbon fiber-reinforced plastic gear, safety equipment and clothing, from skis to helmets to goggles to ropes to insulating fibers that are made by chemist.

Policies implications and Recommendations

The promotion of safe use of the essential products of chemistry is a shared responsibility of manufacturers, the government and those who use or sell chemical products. Manufacturers and government must work together to:

- Develop, implement and comply with sound regulations on safe use of chemicals;
- Enhance scientific understanding of chemical safety applications; and
- Produce publicly accessible safety information.

National primary chemicals management law must be updated to adapt to scientific advancements and to promote safe chemical product use. Incentive packages and encouragement for chemists and chemical researches, as well as recognition of chemical research outputs by policymakers and the regulatory bodies are areas calling for urgent policy attention. Enabling environment for improved teaching and practice of chemistry has become imperative.

Conclusion

The roles of chemist in healthcare delivery and sustainable development are as crucial as they are diverse. This paper has attempted to review them. It is worth noting that new areas are being exploited day by day.

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