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EFFECTIVE PRIMARY HEALTH CARE IN NIGERIA: THE ROLE OF RADIOGRAPHY AND MEDICAL IMAGING

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ABSTRACT

Introduction: The Primary Health Care (PHC) center is the first level of contact of individuals with the national health system. A Radiographer is a Medical professional trained to diagnose and treat diseases using various imaging modalities. It is quite unusual to find a radiology or medical imaging department within a PHC facility in Nigeria.

Objective: To discuss and buttress the imperativeness of community and public health Radiography and Medical imaging Career at Primary health care level in Nigeria.

Methodology: A systematic review of research works conducted by field researchers who analyzed trends in the establishment and implementation of the Primary Health Care approach to healthcare delivery in Nigeria was done. Relevant and related literature in reputable indexed journals and good impact factor journals were appraised and analyzed. Search terms were Primary health care in Nigeria, workforce in Primary health care, and radiography in emergency settings. Findings were synthesized from appraisal and analysis of literature.

Result: The role of Radiography in quality healthcare delivery at PHC level is immense. Vast opportunities for career advancement of Radiographers exist in PHC Centers which have not been harnessed. Poor national health coordination, inappropriate political interference, sentimental preferences in the hiring of health workforce and inconducive working environment hinder the realization of the goals of the PHC system.

Conclusion: The PHC system is vital for achieving equitable and quality health care for all Nigerians. Radiographers should patronize the PHC centers for their career and professional practice. Increased stakeholders' commitment, enhanced role definitions, Policy restructuring and adequate budgetary allocations are just a number of factors that will help to attract quality workforce to provide quality services in the PHC facilities in Nigeria.

INTRODUCTION

Excellent Healthcare delivery is a very crucial and important component of a thriving society. Basically, in Nigeria, healthcare is provided on three major levels: Tertiary, Secondary, and Primary levels of care [1]. Each of these levels is related to the complexity of the medical cases being handled as well as the skills and specialties of care providers [2]. The secondary and tertiary level health facilities are mostly found in urban areas, whereas rural areas are predominantly served by primary health care (PHC) facilities [3].

The Primary Health Care (PHC) serves as a grass-root management approach to providing health care services to communities [4]. It is the first level of health service contact for individuals, families, communities, and the nation at large [5]. As defined in the Alma-Ata declaration of 1978**,** Primary health care is the "essential care based on practical, scientifically sound and socially acceptable methods and technology, made universally accessible to individuals and families in the community through their full participation, and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination" [6]. The Alma Ata declaration of 1978 evolved as result of challenges facing health care especially at PHC level which if not addressed will hamper the realization of the goal 'Health for All'. It aims at addressing the main health problems in the communities by providing promotional, preventive, curative, and rehabilitative services. This triggered the restructuring of the Nigerian health system to align with the Alma-Ata declaration - being one of the 134 signatories to this idea. Eight services were identified as the main focus of PHC as follows: Promotion of nutrition, Provision of adequate supply of safe water, Provision of basic sanitation, Maternal and child care including family planning, Immunization against the major infectious diseases, Prevention and control of locally endemic diseases, Education concerning the prevalent health problems and the methods of their prevention and control and, approximate treatment for common diseases and injuries [7].

The implementation of these PHC services can be realized by the human force (Human Resources for health [HRH]) at the PHC centers. The nature and type of PHC facility determines the number and type of human resources that may be required [9]. The main categories of human resources for health (HRH) are doctors, Radiographers, nurses, midwives, medical laboratory scientist, physiotherapy, public health nurses, public health nutritionists, and community health and nutrition workers, including community health officers, community health extension workers and community health assistants [9]. The majority of health workers in PHC facilities across all the states are CHEWs. Doctors, nurses and midwives are more available in non-PHC health care centers [10]. A typical PHC facility has an Antenatal clinic, immunization clinics, consulting rooms for the physicians, labour wards and wards for inpatient services. Others include a dispensary and laboratory room. Primary Health Care centers refer complicated cases to secondary general hospitals [11]. General hospitals have provisions for accident and emergency unit and diagnostic unit [including X-ray, scan machine and other pathological services] along other services [12]. It is quite unusual to find a radiology department or skeleton service of a Radiographer within a PHC facility in Nigeria. This can be as a result of the policies guiding their establishment and functions [11].

Medical radiography is a broad term that covers several types of studies that require the visualization of the internal parts of the body using various imaging modalities. It is used to diagnose or treat patients by recording images of the internal structure of the body to assess the presence or absence of disease, foreign objects, and structural damage or anomaly [13]. "A Radiographer is a person who is professionally trained and qualified to apply various forms of radiant energies and wave-forms on human beings in order to promote health, treat diseases and produce diagnostic images. There can be Diagnostic or Therapeutic Radiographers. Diagnostic Radiographers produce images of the internal organs of the body so that injury or disease can be identified. They use the following imaging modalities to practice: Conventional x-ray, Fluoroscopy, Computed Tomography, Magnetic Resonance Imaging, Ultrasound Imaging and Angiography [14]. Locally endemic diseases (such as Tuberculosis), bony fractures, antenatal care, and most gynecological conditions can be diagnosed radiographically in addition to laboratory tests. The obvious absence of the Radiographer and his services in the PHC system in Nigeria introduces a lag in the adequate implementation of its goal of meeting the needs of acutely ill patients. For most acute and emergency cases, radiological tests such

as Ultrasonography and chest x-ray are first line in the diagnostic process to aid proper treatment. Without this, the patients are either treated based on guesswork or they have to pay more for these services when they patronize private radiology establishments. Establishing a radiography department may be capital intensive but the provision of the ultrasound machine and mobile radiography machine will suffice for the basic diagnostic needs of a PHC center.

STATISTICS AND SITUATION OF PRIMARY HEALTH CARE IN NIGERIA

The tenet of universal health coverage PHC in the post-2015 development agendas reemphasizes distributional equity and efficiency in healthcare service delivery, through provision of technical and financial supports to healthcare facilities at all the tiers of administering services [15]. This is related directly to realization of several health-related targets in the Sustainable Development Goals (SDGs) [16,17]. Although PHC has been globally embraced as a precursor for significant economic development, the state of healthcare facilities in some developing countries like Nigeria contradicts their support to some global health development agendas [18]. This is a serious matter given that the relevance of readily available and quality healthcare services for responding to emergencies in healthcare service demand cannot be overemphasized. Though PHC centers were established in both rural and urban areas in Nigeria with the intention of equity and easy access, regrettably, the rural populations in Nigeria are seriously underserved when compared with their urban counterparts. About two-thirds of Nigerians reside in rural areas therefore they deserve to be served with all the components of PHC [19]. This is often aggravated by existence of conflicting political ideologies on what is considered to be the best option in healthcare management [20,21], budget constraints and persistence of some covariate and idiosyncratic economic shocks [22]. It is imperative to reexamine the preparedness of the healthcare facilities for service delivery in the spirit of working towards achieving health-related SDGs. This is very critical for Nigeria given its present poor performance in some health indicators. Specifically, the WHO, stated that although Nigeria constituted less than 1% of the total world's population, she accounts for about 19% of the global maternal deaths, with a maternal mortality ratio of 814 per 100,000 live births [24].

In addition, although access to good quality obstetric care is critical for reducing maternal mortality, National Population Commission (NPC, 2013) posited that in Nigeria, utilization of maternity care in 2013 was low and only about 36% of births occurred in health facilities with 38% being assisted by skilled personnel [23].

In Nigeria, differences exist between quality of healthcare services provided by private and public service providers, while some regional differences also exist. Specifically, Obi et al., (2016), concluded that privately owned health facilities have better service readiness than public facilities [25]. There exist some marked regional differences between socioeconomic

Currently, the state of the PHC system in Nigeria is shocking with only about 20% of the 30,000 PHC facilities across Nigeria working. The rest of the PHC facilities lack the capacity to provide essential health-care services. Also, these centers are faced with the problem of poor staffing, inadequate equipment, poor distribution of health workers, poor quality of health-care services, poor condition of infrastructure, and lack of essential drug supply. The inability of PHC centers to provide basic medical services to the Nigerian population has increased the influx of patients to the secondary and tertiary health-care facilities which has led to long queues in these hospitals.

Also, the increasing brain drain and the deficiency in the health workforce has put a major strain on the primary health care system with the existing workforce finding employment in the secondary and tertiary healthcare system and leaving the PHC systems underequipped.

In 2011, the PHC under one roof (PHCUOR) policy was formulated to address the problem of fragmentation in PHC and ensure the integration of PHC services under one authority. But its impact is yet to be felt on the health status and utilization of PHC in the country.

The 2018 budget allocated 64 percent to primary health care. This is expected to improve the overall level of health care services throughout the country because primary health care is not only curative but also preventive.

Primary Health Care is the backbone of a health system. Furthermore, quality PHC initiatives have been recognized as fundamental to improving health outcomes.

SITUATION OF HEALTH WORKFORCE

The health workforce is concentrated in urban

tertiary health care services delivery (Human Resource for Health (HRH) Country Profile: Nigeria, WHO GHWA, 2008) [24]. This inequity has been attributed to:

Lack of public and private sectors coordination: This situation occurs when there is a poor national health sector institutionalization, a lacking or poorly serving government medical and health regulating agency which was supposed to harmonize the operations and services of the private and public health sub sectors. In the absence of this provision by the government, there is sure to be division in the sectors' workings.

Favoring indigenous hires;
In this scenario, tribal preferences are put above work standards and ethics. Segregation and discrimination become the order of the day and criteria for employment and job offers. This which is not healthy especially when workers of lower qualifications are hired at the cost of more qualified ones, it becomes a detriment on the health sector generally and an issue of national concern.

Commercial pressures in the private sector that lead to poor quality work;
Such pressurizing conditions are expected in the private sector due to its relative efficiency in satisfying consumers when compared with the public sector. But when the influx of patients becomes overwhelming for its capacity, it breaks down the system of this sector leading to subsequent poor delivery of services. This can occur in different ways; it could be from low carrying capacity of admission wards, low number of attending staff members etc. But the problem with the private sector majorly, is in it not acknowledging its limits. They can sacrifice comfort and quality health delivery on the altar of high charges from willing patients as the case may be, and capitalize on the weaknesses of the public health sector for their own material interests.

Work environments that contribute to low motivation, less-than-optimal productivity, and high attrition - especially from rural areas;
As known, work environment is an important variable factor to consider in the performance output of a worker. The motivation of workers varies from place to place over time. The urban area when compared with the rural has proven often to be favored by health workers; with reasons ranging from salaries to comfort of surroundings as motivation. With better pay as observed in the urban areas, these health workers are determined to keep their jobs by putting in more productive efforts.
Lack of planning based on staffing projection needs results in an overproduction of some categories of health workers and a lack of others (Federal Republic of Nigeria HRH Strategic Plan 2008-2012) [26].
There is a lack of strong collaboration between the federal government and institutions where health workers are trained. Incessant strikes, poor funding, non-adherence to appropriate policies guiding the admission of students to higher institutions of learning are common trends. Some categories of Healthcare courses are seen to be more professional and lucrative than others; thereby making acceptance of students to study such courses more difficult. These challenges are further compounded by the fact that the federal government accepts and regulates 3 systems of health care delivery: orthodox, alternative, and traditional.
The Human Resources for Health Strategic Plan examines critical challenges in health workforce planning, management and development in the Nigerian context and their effects on health service delivery in the country. It describes and analyses each of the priority areas outlined in the HRH policy document and proffers solutions as to how these will be addressed.

IMPLEMENTING PRIMARY HEALTH CARE IN NIGERIA

The great idea of grass-root health care delivery as encapsulated in the principles of PHC requires the strong commitment of all stakeholders to make it work. Stakeholders are those persons or groups that have vested interest in the delivery of PHC services and in healthcare decisions [26]. The key PHC stakeholders include the people, the government, and the healthcare workers. The people need to own PHC through adequate community mobilization. Community mobilization is the process of arousing the interest of the people and encouraging them to participate actively in finding solutions to their problems [27]. When the communities are involved in the planning, implementation and evaluation of PHC services, they will not perceive them as being dumped on them. Community mobilization is a veritable tool for engendering support for PHC especially in the rural areas where over 66% of the Nigerian population live and the worst health indices are found [10,28]. Aspects of community mobilization include community entry, community

dialogue, and operation of development and health committees. Government at all levels must express, in practical terms, political commitment through funding, capacity building and system support. The role of government is critical in promoting access to essential and quality health services [28]. This can be channeled through the building and maintenance of infrastructure, training and retraining of the workforce, and provision of materials and equipment for effective health care. Healthcare workers involved in PHC delivery in Nigeria include doctors, radiographers, nurses/midwives, community health workers, laboratory scientists/technicians, and health assistants among others [10]. To make PHC work, workers need to contribute their quota to improving quality service delivery and achieving clients' satisfaction. This they can do through innovative utilization of available resources, encouraging patient participation in their care, and promoting healthcare worker-patient communication [29]. The disposition of healthcare workers is very important in enhancing public perception and utilization of PHC services. Commitment to duty, empathy, and a listening ear are desirable traits in PHC workers that can enhance service delivery.

In a study by Oyekale, (2017) on "Assessment of primary health care facilities' service readiness in Nigeria" he observed that effective delivery of healthcare services requires availability of adequate infrastructure, diagnostic medical equipment, drugs and well-trained medical personnel [30]. In Nigeria, poor funding and mismanagement often characterize healthcare service delivery thereby affecting coverage and quality of healthcare services. Therefore, the state of service delivery in Nigeria's health sector has come under some persistent criticisms. This paper analyzed service readiness of PHC facilities in Nigeria with focus on availability of some essential drugs and medical equipment using Service Delivery Indicator (SDI) data for PHC in Nigeria. The data were collected from 2480 healthcare facilities from 12 states in the Nigeria's 6 geopolitical zones between 2013 and 2014. Data were analyzed with descriptive statistics, Principal Component Analysis (PCA), and Ordinary Least Square regression. The findings showed that Medical disposables such as hand gloves and male condoms were reported to be available in 77.18 and 44.03% of all the healthcare facilities respectively, while immunization services were provided by 86.57%. Functional stethoscopes were reported by 77.22% of the healthcare facilities, while only 68.10% had sphygmomanometers. In the combined healthcare facilities, availability of some basic drugs such as Azithromycin, Nifedipine, Dexamethasone and Misoprostol was low with 10.48, 25.20, 21.94 and 17.06%, respectively, while paracetamol and folic acid both had high availability with 74.31%. Regression results showed that indices of drug and medical equipment availability increased significantly ($p < 0.05$) among states in southern Nigeria and with presence of some power sources (electricity, generators, batteries and solar), but decreased among dispensaries/health posts. Travel time to headquarters and rural facilities significantly reduced indices of equipment availability ($p < 0.05$). It was concluded that for Nigeria to ensure better equity in access to healthcare facilities, which would facilitate achievement of some health-related sustainable development goals (SDGs), quality of services at its healthcare facilities should be improved. Given some differences between availability of basic medical equipment and their functionality, and lack of some basic drugs, proper inventory of medical services should be taken with effort put in place to increase funding and ensure proper management of healthcare resources.

Abdulraheem *et al*., (2012), mentioned in "Primary health care services in Nigeria: Critical issues and strategies for enhancing the use by the rural communities", that quality health is a fundamental right of all Nigerian citizens [19]. While PHC centers are relatively uniformly distributed throughout local government areas (LGAs) in Nigeria, the rural people tend to underuse the basic health services. This article examines some cross-cutting issues in PHC and outlines strategies to enhance the utilization of health services by rural people. The responsibility for perpetuating the existing low use of PHC services should be held by PHC policy makers and LGA. Responsible health personnel can build a new social order, based on greater equity and human dignity, in which health for all by the year 2015, including that of rural populations, will no more be a dream but a reality. Capacity building and empowerment of communities through orientation, mobilization and community organization as regards training, information sharing and continuous dialogue, could further enhance the utilization of PHC services by rural populations [19].

In a study on "Community-Based Strategies to Improve Primary Health Care (PHC) Services in Developing Countries :Case Study of Nigeria", it

was postulated that Primary Health Care (PHC) still remains the minimum package of healthcare that should be provided to every individual and community across Nigeria Health System [31]. The aim is to improve relatively the health status of the nation ensuring provision of healthcare services to people in the rural area which is indicated by reduced mortality and morbidity and improved survival rates in such communities. However, the situation of health status in Nigeria has not yet attained the desired level. Data shows that as at 2015, the country recorded 814 maternal deaths / 100,000 live births which put her in the same category with the poorest countries in the world such as Chad, Niger and Somalia among others. Furthermore, Nigeria's health profile reveals that 2,300 under-five children and 145 women of childbearing age die every single day. Moreover, malaria, pneumonia, diarrhea and other preventable infectious diseases still remain the major causes of under-five deaths in Nigeria. In view of these problems faced by PHC in the country, there is an urgent need for "one health" approach integrating the principal stakeholders. Promoting health and prolonging life requires prompt detection and effective management of common communicable and non-communicable diseases cases which can only be achieved through a robust PHC facility. A national health insurance system that provides cover for the vulnerable special groups, aged, the young adolescents, school children, as well as pregnant mothers is a necessity towards reducing inequality in access to basic primary healthcare. This will reduce dependence on out of pocket spending and improve access to healthcare services.

ROLE OF RADIOGRAPHERS IN PRIMARY HEALTH CARE

Radiographers work closely with medical doctors, nurses and other health professions to diagnose and treat injuries and illnesses. Specially performing their duties as diagnostic and therapeutic radiographers, they hold important place in the sphere of the PHC. It is intuitive for one to think about a radiographer in a case of bone fracture, fetal imaging and other related cases of special laboratory attention or diagnosis. It becomes a common place to affiliate partly an effective delivery of the PHC to the availability and efficiency of the radiological services.

In South Africa, the increase in the workload of all medical specialists including that of Radiographers (Brandt 2009), has led to an increased strain on the health care professionals and the quality of services they provide. This study seeks to highlight some imperative roles and duties of Radiographers in PHC.

1. **Radiography (x-rays) and emergency or casualty cases**

Well-defined diagnostic strategies are of primordial importance in order to ensure fast and optimal care of the acutely ill patients. A medical emergency is an injury or illness that is acute and poses an immediate risk to a person's life or long-term health. Emergency conditions can be classified into the following two major groups: trauma and non-trauma cases. With plain radiography, most trauma and non-trauma cases can be diagnosed. Conventional x-ray examination is still the primary imaging modality in cases of traumas where clinical symptoms suggest that the damage is mostly affecting the vertebrae, skull & facial bones, chest structures and radio-opaque foreign objects in the extremities [32]. The most basic equipment required for conventional radiography is a well-constructed/designed lead-lined room with mobile X-ray machine. It's accompanying couch, chest stand, films, cassettes, processor, side markers, aprons, grid, digital radiography facilities, conducive working environment, adequate lightening and other accessories are needed also.

2. Chest and Cardiac imaging

This is a non-invasive procedure that seeks to evaluate the structure and function of the chest and heart. For the purpose of this work, it can primarily be carried out by the use of Ultrasound in a special procedure known as echocardiography. Cardiac diseases, valvular/vascular disorders and defects in the size and shape of the heart can be diagnosed. Classical echocardiographic equipment has been large and confined to special rooms dedicated to performing tests. Over the last several years, smaller portable ultrasound equipment has become available to be used at the bedside and can even be carried during medical rounds. Although most handheld devices lack all the functionality of their larger counterparts, they are often able to provide crucial information rapidly and efficiently [32].

3. Ultrasonography

This is the use of sound waves to produce images of the internal body for diagnostic purposes. Unlike X-ray, it can be safely used in pregnant women and in babies. Ultrasound imaging is cost effective and a valuable tool in the hands of sonographers for Obstetrics, Gynecological and Abdominal scans; which are the most common scans done at the primary health care level. Recently, portable

handheld ultrasound machines are widely available and inexpensive due to technological advancements in their designs. Ultrasonography helps in timely diagnosis and reduces the burden of referrals [34]. In the long run, maternal and infant mortality rates can be brought to very low numbers.

- Sonographers have a close interaction with the patient during an ultrasound examination and will recognize that they often have the opportunity to promote good health and wellbeing. This may be particularly relevant during obstetric ultrasound examinations where the patient may, for example, ask about drinking alcohol during pregnancy. The sonographer has the opportunity here to provide information and support.
- Sonographers can link with physiotherapists in giving good advice to pregnant women as to how best to move from sitting or lying down without putting a strain on their backs. This can be very practical advice given at the time the woman lies down on, or gets up from, the ultrasound couch.
- Sonographers may have the opportunity to draw the attention of male patients and their relatives to the availability of local screening services for Abdominal Aortic Aneurysm
- Other examples of possible health promotion opportunities for the sonographer may be healthy eating, weight loss and smoking. The sonographer should equip themselves with the knowledge to be able to direct the patient towards good and accurate sources of information and support.

4. Health education and promotion through community awareness on breast cancer and educating the public on the risks and benefits of an examination or treatment involving ionizing radiation so that patients and clients can make informed judgements about, and give consent for, their examinations. Justification of the use of ionizing radiation, optimization of the procedure and minimization of the radiation dose received by the patient are all part of health promotion and maintaining wellbeing.

RECCOMENDATIONS

1. Radiographers are critical stakeholders in PHC and there are vast opportunities for the radiography work force in the PHC. The Radiography curriculum should include community and public health radiography and medical imaging.
2. Policy makers need to strengthen and revitalize primary health care (PHC) in Nigeria to include radiography and imaging units for universal health coverage and health strengthening. This opinion aims to inform policy decisions and actions by examining the evolution of PHC in Nigeria.
3. The role of the people, government, and health workers as critical stakeholders needs to be well defined and pursued in order to maximize the benefits of primary health care.
4. Radiographers most especially those on national youth service should explore employment opportunities in Primary health care centers to utilize their potentials and affect their community to reduce the health burdens on our teeming population
5. Primary health care services are not third-class services meant for third-class citizens. Therefore, adequate provision must be made in national, state and local budgets for quality healthcare delivery using the primary healthcare system.
6. Rural areas lack other health care facilities that the urban areas benefit from like medical centres and the teaching hospitals. Therefore, it essential that the government considers the PHC in the rural areas first when implementing the equipment and services of the Radiographers. This would make life easier and more cost effective for the rural dwellers to access quality health care.

CONCLUSION

The concept of primary health care is still relevant to achieving equitable and quality health care for all Nigerians. However, a persistent effort at implementation at all levels is necessary to maximize the benefits of this people-oriented approach to health care. Providing a framework for objective analysis through Implementing and monitoring measures; Aligning health worker supply with health sector needs; Applying best practices to HRH management and development to promote equitable distribution and retention of the quality and quantity of HRH to ensure universal access to quality health services; Institutionalizing performance incentives and management systems that recognize hard work and service in deprived and unpopular locations;

Fostering collaboration among public sector, private providers of health services and other HRH stakeholders; and Strengthening the institutional framework for HRH management practices should be the way to go. Radiographers should also be encouraged to patronize the PHC centres for their career and professional practice.

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