THE APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN HOSPITALS AND CLINICS IN THE ACCRA METROPOLIS

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Abstract

Ghana has witnessed a proliferation of Information and Communication Technologies (ICT) since 1990. There is now mounting evidence that ICT can be used to facilitate various aspects of socio-economic development process in the world. Ghana adopted an ICT policy in 2003 that acknowledges the social and economic issues affecting the various sectors of the country.

The study covered both public and quasi-government facilities in the 13 sub-metropolitan areas of the Accra Metropolitan area in the Greater Accra Region of Ghana. Data was collected mainly through the use of questionnaires (Questionnaire of Dakubu, and Adomako-Owusu (2002) were modified) which elicited from the Hospital Managers, Administrators and Medical Officers-in-Charge of the selected hospitals and clinics the state, use and application of ICT in their various facilities. The questionnaires were pre-tested before administration. The data was analyzed using SPSS Ver. 11. The study revealed that the Health facilities are not yet completely committed to the deployment of ICT.

There are no strategic plans in place in most of the facilities for the deployment of ICT; even those facilities that have deployed ICT have not aligned it with their business strategies.

The study also revealed that budgetary allocation for ICT in most facilities is below 10% of their total expenditure. ICT has made some impact in the facilities in which it has been deployed. Some recommendations were given.

Keywords: Hospitals, ICT, Accra Metropolis, Computers, Strategic plan, Clinics, Assessment

INTRODUCTION

Information and Communication Technology (ICT) involves the use of diverse set of technological tools and resources, to create, disseminate, store, and manage information and to communicate. The computers, software, networks, satellite links and related systems that allow us to access, create, analyze, exchange/communicate and use data, information and knowledge, all together form what can be described as ICT.

ICT is now ubiquitous and not the monopoly of any specific organization. In recent times the health sector has seen an increasing use of

ICT in almost all facets of health service delivery. This development is taking place largely in an environment in which the infrastructure for the deployment and use of information technologies remain either weak or uncertain. Among the many weaknesses in ICT infrastructure development is the unreliable domestic electrical power supply, lack of well developed national infrastructure, inadequate level of computer literacy, computer density, and an underdeveloped telecommunication infrastructure. These limitations are especially pronounced in the rural areas where the need for health services is strongest. (Ghana Health Policy Document, 2000).

This situation was emphasized by Hersh (2003) that, "we are in the era of uncontrolled health care cost, compromised patient safety, and a lack of utilization of information technology applications that have the potential to improve the situation".

The role of ICT in Health Delivery

ICT is increasingly being deployed to facilitate the delivery of health services in a number of countries. These technologies are providing a number of opportunities to facilitate the modernization and operations of the health delivery system in Ghana, to improve access to the nation's limited health facilities and resources and to provide access to health information and other services to a wider section of the community. In health, ICT can play a significant role generally by providing opportunities for individuals, medical professionals and healthcare providers, to among others obtain information, carry-out research, communicate with - colleagues/professionals, deliver first-line support, especially where distance is a -critical factor, administration and management, and promote preventive medicine programmes. According to WHO, the use of ICT in health is not merely about technology (Dzenowagis, 2005), but a means to reach a series of desired outcomes: health workers making better treatment decisions ,hospitals providing higher quality and safer care , people making informed choices about their own health , governments becoming more responsive to health needs ,national and local information systems supporting the development of effective, efficient and equitable health systems, policy makers and the public aware of health risks , and people having better access to the information and knowledge they need for better health.

The use of information and communication technology in health institutions and hospitals in Ghana is growing steadily, due to the increasing awareness of ICT benefits to healthcare. A majority of these ICT interventions are used for hospital administration and to mitigate the perennial revenue leakages. The distribution of ICT usage in health institutions is skewed towards the urban centres, where there is constant and reliable electricity. Internet connectivity is readily available in most hospitals in the urban centres, due to the increasing level of internet penetration in Ghana which was estimated to be about 4.2% as of 2009[1]. Telemedicine projects are being undertaken in some hospitals in Ghana such as the Komfo Anokye Teaching Hospital in the Ashanti Region. The

[1]Internet Usage Statistics for Africa, http://www.internetworldstats.com/stats1.htm#africa

National Health Insurance Scheme is currently connecting hospitals nationwide to its network to facilitate the sharing of information between the secretariat and the hospitals. The country is yet to implement a national health information system as pertains in other countries; however there is a District Health Information System in place. The system has been deployed to capture information on Tuberculosis (TB) at the district level. Though the use of information and communication technology is fragmented and there is no national policy on e- Health, the government and the Ministry of Health are actively undertaking measures to ensure the healthcare system benefits from e-health. The government is working on a number of policies and strategies to support e-Health, through the development of infrastructure for the health sector which is being supported through intersectoral and non-governmental assistance. In the area of knowledge and information acquisition, health professionals have had access to online international journals since 1998, while work is underway to provide access to national electronic journal and bibliographies of health[2]. Ghana's Information and Communication Technology for Accelerated Development (ICT4AD) policy, has about fourteen pillars of which the Promotion of Health using ICT is one. The broad goals of the policy in relation to health, is promoting telemedicine and integration of ICT within health programmes with special emphasis on education, training and preventive detection (Kirigia et al ,2005). The Ministry of Health has also put in place a Health Sector ICT Policy and Strategy which stipulates a set of actions which have to be undertaken within a period of 5 years. The policy document sought to leverage on the benefits of ICT to influence health outcomes, put in place structures for a national health information network which the country lacked and to achieve health sector objectives (Kirigia et al ,2005).. The commitment of the government and the Ministry of Health to e-health is encouraging; however the adoption rate has been low. In July, 2010, the Government of Ghana also launched the national e-health strategy (ECOSOC, 2009). The key strategies under the national e-health strategy are Streamlining the regulatory framework for health data and information management, Building sector capacity for wider application of e-health solutions in the health sector, Increasing access and bridging equity gap in the health sector through the use of Information and Communication Technology, and keeping paperless records and reporting systems. To that effect this research hopes to interrogate the issues confronting e-health implementation in Ghana.

In the words of the Secretary General of United Nations Economic Commission for Africa (UNECA) at the Bamako Conference of the African Information Society Initiative (AISI), Africa is at an early stage of using ICT to improve the delivery of health care. According to him, the investments in the health sector could complement basic health services through enhancement of administration, access to information and decision-support systems for curative and preventive health and improved distribution of medical supplies.

[2] Global Observatory For eHealth, WHO African region,www.who.int/entity/goe/data/country_report/gha.pdf

Key areas of possible applications of ICT in health delivery include; the implementation of telemedicine systems; the development of health information and management systems Afari-Kumah (2005); the deployment of ICT to facilitate the spread of health and medical services to rural and under-served areas; the use of ICT to support medical education and training, among others. Other possible areas of application of ICT in health care delivery identified by Chetley (2006), included : telemedicine providing benefits of resource coordination, urban/rural linkages and connecting remote health staff to centralised health expertise and resources, Incorporating already existing technology – such as phone or email – into medical practice and routine consultancies can make a difference. there is strong potential for e-learning in health as demonstrated by a variety of successful small projects around the world, and multiple ICT routes can, and are, being used for e-learning in a mixed toolbox approach (for example: Internet, radio, SMS, PDAs and combining with print).

E-health is the new "kid on the block". According to Yamuah (2005a), it is the application of the Internet and other related technologies in the health industry to improve access, efficiency, effectiveness and quality of clinical and business processes utilized by healthcare organizations, and practitioners, to improve the health status of patients. Yun et al , (2010) identified four critical pre-requisites for any successful e-health initiative and these are ICT architecture/infrastructure, standardized policies, protocols and procedures, user access and accessibility policies and infrastructure, and finally government regulation and control.

In the area of public health information, it is acknowledged that ICT can be used to facilitate the collection, analysis and the dissemination of information to support health education and awareness creation, communicate with professionals, deliver first-line support, especially where distance is a critical factor as well as for supporting decision making related to heath and population-wide issues. For these reasons, Ghana would benefit a lot from using ICT to improve healthcare.

First and Clinton (2004) noted that by using advances in technology, we can put the right information in the hands of doctors and patients at the right time. We can empower patients, health care providers and health care purchases to make better choices.

Purpose of this Study

The main objective of the study was to assess the state of use and application of ICT in hospitals and clinics in Ghana. Specifically, the study aimed at:

- Identifying the various information systems in the Clinics/Hospitals;
- Finding out to what extent ICT has been introduced and used in healthcare delivery;
- Identifying priority areas that have benefited from the deployment of ICT;
- Evaluating the appropriateness of the existing ICT applications in clinics/hospitals based on impact and effectiveness on the delivery of health services delivery; and

- Determining the facilities which have done better in the use of ICT for health delivery.

Significance of the Study

- The results of the study would be useful to Health Managers (public/private), Non governmental organisations involved in healthcare delivery, and policy makers in health and related sectors of the economy. It would be of immense benefit to ICT specialists, health education and research institutes, development partners and the donor community.

- In addition, the results from the study would greatly enhance the implementation of the policy objectives and strategies outlined in both the Ghana's ICT for Accelerated Development (ICT4D) policy document for the promotion of ICTs in national health and the Ministry of Health's ICT Policy document as well as the Millennium Development Goals: 3 - promote gender equality and empower women; 4 - Reduce child mortality; 5- Improve maternal health; and 6 - Combat HIV/AIDS, Malaria and other diseases; The study would also contribute to the knowledge base on Health Informatics in Ghana.

Methodology and Scope of Study

The study was carried out in hospitals/ clinics (public, quasi-government) in the 11 Sub-Metros of the Accra Metropolitan Assembly[3] in the Greater Accra Region of Ghana. The sub-metros are La, Ayawaso East, Ayawaso West, Ayawaso Central, Osu Klottey, Okaikoi North, Okaikoi South, Ablekuma North, Ablekuma South, Ablekuma Central, and Ashiedu Keteke. The study population was all public and quasi-government health facilities in the Accra Metropolis. All the facilities (25 public/quasi-government) in the Metropolis were stratified according to the 11 Sub--Metros into public facilities. Twelve (12) public hospitals and polyclinics were further purposely selected because this stratum comprises teaching/tertiary, regional, district, military, police and children's hospitals, which are one of a kind in the metropolis. The public clinics health centres were selected as follows; the first sample in these strata was obtained by simple random sampling and the subsequent samples through systematic random sampling method.

Data were collected mainly through the use of questionnaires from the Hospital Managers, Administrators and Medical Officers-in-Charge of the selected hospitals and clinics. The questionnaires were pre-tested before administration. The data was analyzed using SPSS Ver. 11.

Problem Statement

It is an acknowledged fact that ICT can provide a direct benefit to health delivery primarily by increasing access to medical and health care. This role of technology in health has been summed up in the Alma-Ata Declaration of 1978 which states that: "Primary health care is an essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible and at a cost that

[3]http://www.ama.gov.gh/ama/page/5052/sub-metro

the community and the country can afford to maintain". Fortunately, ICTs is evolving rapidly and the cost of both equipment and use is falling.

The growth in use of the Internet continues to be exponential and many countries now recognize the importance of telecommunication for social and economic development. Consequently, significant investments have been and are being made in telecommunications to extend and improve networks at both local and international level.

The lack of a clear ICT policy and strategy in health delivery has created a situation where past initiatives have either failed to meet their objectives and did not address priorities in the health sector or were incompatible to systems and management culture of the sector. In other instances, there were duplication of efforts and inefficient use of scarce resources in procurement and deployment of ICT in the health sector.

The demand for improved use of technology will continue to increase from both user and supplier perspective. But more importantly, the performance of the health sector will depend on the extent to which these resources are effectively deployed in the face of limiting resources and the pursuit of greater decentralized decision making in the sector. There is therefore the need for the Ministry of Health to provide a policy framework to guide the acquisition and use of ICT to support the realization of health sector goals and objectives. (Ghana Health Policy Document, 2000).

Pastore (1999) reveals that a study by VHA, Inc., shows that the use of Internet by clinical and support staff in US hospitals increased dramatically in 1998. On-line access has more than doubled in the past year among 16 hospital employees groups included in the survey, VHA, Inc. found. The greatest increase was among staff physicians, where Internet Access jumped from 28% to 82% in the last 12 months. The majority of hospital staff members and physicians, 80 percent or more in most cases, are now connected to the Internet, according to the survey. How do these results compare with their counterparts in developing countries such as Ghana?

In addition, there is a general lack of adequate research to assess the use and application of ICTs in health delivery in Ghana. This study is therefore critical to the successful implementation of the National Health Insurance, which is being implemented across the country and the effective adoption of e-health in Ghana. There is no robust and reliable statistics confirming the computer usage in the health delivery. This study will provide this statistics.

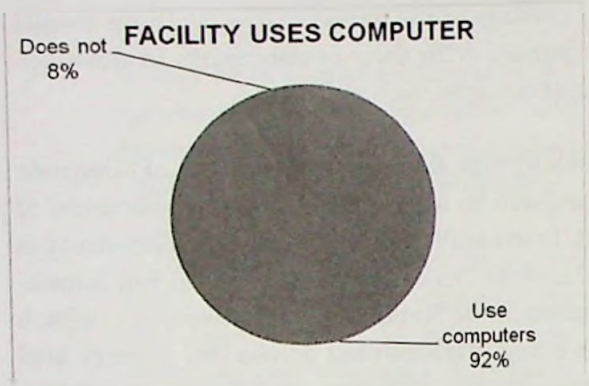
Findings

Data were collected from the following hospitals/Clinics: 37 Military Hospital, Accra Psychiatric Hospital, Achimota Hospital, Ghana Police Hospital, La General Hospital, Maamobi Polyclinic, Mallam Atta Market Government Clinic, Nima Government Clinic, Parliament Clinic, Princess Marie Louise Children Hospital, Ridge Hospital, and the University Hospital, Legon.

A high proportion, 58.3% of the Health facilities had staff above 200 personnel, while 25% had below 50, and 8.3% each had staff between 50 and 100, and 101 and 200 personnel respectively

With regard to the use of computers, majority of the health facilities, 92% used computers to support their activities, but only 8% did not use computers to support their activities (Fig. 1).

Fig. 1: Facility uses computers to support its activities and operations



Source: Field Survey

In a follow up visit recently to some of the facilities interviewed earlier, it was observed that while some of them, have their share of computers, they are primarily used for accounting and administration. Some Doctors however have access to computers.

Twenty five percent each *of* the facilities visited indicated that ICT was first deployed in the years 2000, 2001 and 2003 respectively. Whereas 16.7% claimed it was first deployed in 1999, only 80.3% indicated that it was first deployed in 2002. Of the Health Institutions which had computers, the majority (58.3% *or* 7) indicated that their computer system was made up *of* stand-alone computers; while (47.1% or 4) reported that they had a local area network (LAN) computer system. One or 8.3% had no computer.

Of the Health Institutions involved in the study, majority *of* them (58.3%) reported as having below 10% *of* their staff that use computers to support their work. Twenty-five percent indicated that 0% *or* none *of* their staff used computers, while only 16.7% reported that about 25% *of* their staff used computers. The results showed that whereas 58.3% *of* the respondents indicated that they use. ICT *for* Communication, most *of* the respondents, 25% use ICT *for* evidence based medical information, while 16.7% use it *for* all three i.e. consumer health information, evidence based medical information and communication. According to Chetley (2006), ICT have potential roles to play in improving communication around health. They point out that as there is growing evidence that ICT aid health information dissemination, particularly via online routes, there is growing evidence that ICT increase the effectiveness of some communication systems, through the provision of increased communication access, more people are 'linked in' to communication opportunities, mass media ICT, such as radio, remain key aspects in communicating about health, there are demonstrable benefits in combining technologies, particularly older with newer ICT, health information via the media should not be rushed, as it is still constrained by traditional restricted of communication strategies. Only 8.3% .*of* the respondents use ICT *for* diagnostic expert systems. On Information Management, 58.4% *of* the respondents indicated that they used ICT *for* Electronic Medical Records Management, while 33.3% used it *for* General Administrative work.

Current data reveals that, in a few hospitals, implementation of electronic medical records is underway, starting with the billing process.

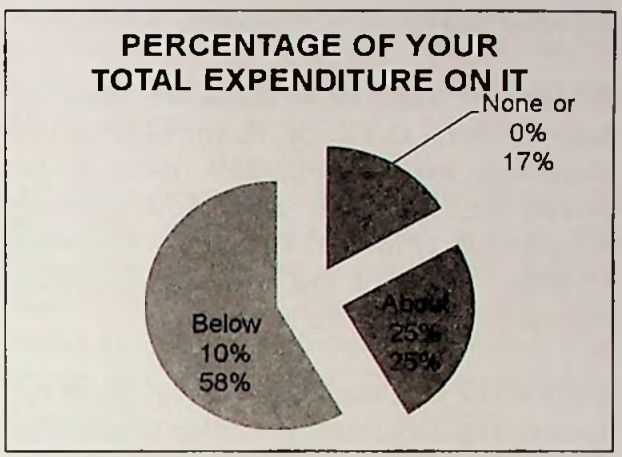
But medical records are mostly stored as paper medical cards, sorted by date of last visit. Records are often lost, and rarely referred to on a later visit.

Seventy-five percent (75%) indicated that they used the Microsoft Office Suite, while 8.3% each *of* them also indicated that they had been using Health ware, and Kpeshie Metro software, respectively.

Majority of the respondents (83.3%) indicated that they did not have IT Units. However (16.7%) stated that they had IT unit. Of the Number who indicated that they had IT unit, 8.3% each of them indicated that they had a support staff of below 10% and about 50%, respectively. They also indicated that about 25% of the staff of the entire hospital was computer personnel/staff. Some of the professionals mentioned included Programmer/software developers and system administrators.

Expenditure on information technology resources including training and maintenance of IT equipment and system did not constitute a major component of the total expenditure of health institutions. The study revealed that, as high as 58.3% of them spent less than 10% of their total annual budget on IT, while 25% indicated spending close to about 25% of their annual budget. This corroborates the findings of INIIT (2000). However, (16.7%) did not make any budget for IT (Fig. 2).

Fig. 2: Percentage of your total expenditure on IT



Source: Field Survey

Of the health facilities surveyed, only 41.7% had Internet access whereas 58.3% did not have access (Fig. 5). According to 16.7%, of the respondents, it was only one computer in the facility which is connected to the Internet. 8.3% each mentioned two, five and eight computers respectively. 58.3% was recorded in those facilities that did not have computers at all. Africa online is the Internet Service Provider for 25% of the facilities while Third rail and the Parliament of Ghana provides Internet access for 8.3% each of them respectively.

33.3 % of the respondents claimed they had one server but 8.3% claimed -they had two. Majority of them, (58.3%) did not have a server. Most of them, (25%) had dial-up access via local ISP. Only 16.7% have access via Radio/Wireless. The bandwidth of their Internet connection for 33.3% was less -than 40kbps while that for 8.3% was 64kbps.

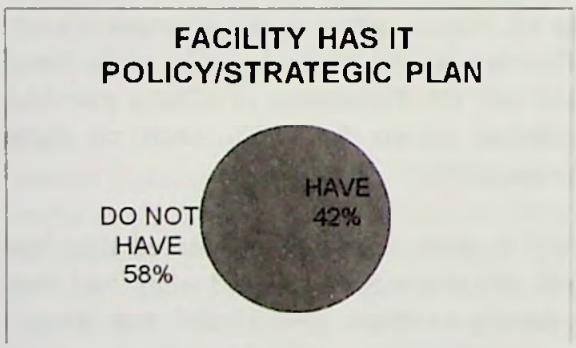
On the whole, Internet usage within the health facilities is not wide spread among their staff.

Of the facilities which participated in the study, about 58.3% indicated that 0% or none of their staff used the Internet. Only 41.7% reported that below 10% used the Internet.

Relating to what the facilities are using the Internet for, 41.7% of them used it for electronic mail, while 25% used it for Accessing the web and downloading information. However, 33.3% do not have the Internet. None of the facilities surveyed owned a web site on the Internet.

Most of the facilities, 58.3% surveyed do not have an IT policy, strategy or plan to guide the deployment and exploitation of ICT to support their activities and operations. Only 41.7% claimed they have one in place (Fig. 3). 16.7% each of those who have a policy stated that the horizon for the ICT strategy was two years and three years respectively. Only 8.3% indicated that it was five years.

Fig. 3: Facility has an IT policy / strategic plan



Source: Field Survey

8.3% each of them indicated that Project Management Team was taken into consideration minimally, extensively and importantly before the implementation of the ICT project. 75% of them did not respond to these questions.

Whereas 16.7% greatly considered resource planning before the implementation of the ICT project, 8.3% claimed they considered it extensively. A quarter of them, 25% also reported that they greatly considered Staff Training before the implementation of the ICT project whilst 8.3% only considered it minimally. Two percent each of them reported that they respectively considered the benefits to realize from implementation the ICT project, greatly and extensively. 66.7% however did not consider this before implementing the project.

Similarly, two percent each of them reported that they respectively considered the Organizational Impact of ICT before implementing the ICT project, greatly and extensively. Almost 66.7% of them did not answer the question. On Post Implementation Review Process, 16.7% claimed they greatly considered it .before implementing the ICT project but 8.3% considered it minimally. However, -75% however did not consider it.

According to half of them, 6 or 50%, they developed the ICT infrastructure from their Internally Generated Funds (IGF) whereas a quarter or 3 indicated that it was from Government of Ghana Sources. Only 8.3% or 1 claimed it was from Donor- 8' Funded projects. 16.7% or 2 have not developed an ICT infrastructure. Half of them, 50%, their major expectation for implementing the ICT projects were to shorten response time to customers (patients) whilst 33.3% indicated that their intension was to improve quality of service.

Whereas majority 58.4%, claimed ICT had not facilitated organizational flattening in their facility. 41.7% indicated that it had facilitated it. When asked further to indicate the extent to

which it had been facilitated, they indicated that it had facilitated appreciably.

Similarly, majority 83.3%, claim ICT has not facilitated the significant use of self- directed teams in their facility, but 16.7% indicated that it has facilitated it. When asked further to indicate the extent to which it facilitated the significant use of self- directed teams in their facility, all the 16.7% said it has minimally.

Another observation was that majority 83.3%, claimed that ICT has not facilitated the span of control in their facility but 16.7% indicated that it has facilitated it. When asked further to indicate the extent to which it facilitated the span of control in their facility, all the 16.7% said it has appreciably.

Majority 58.3%, of the facilities indicated that ICT has not facilitated decentralization of decision making, but 41.7% claimed it has facilitated it. Only 25% or 3 of the number, who owns ICT systems and answered yes, indicated that it has facilitated decentralization minimally. According to 58.4% of the respondents, performance measures have changed in the facility as a result of the introduction of ICT. The rest do not have ICT systems in place.

On management of the facilities, 66.7% of the respondents indicated that ICT has helped them immensely but 33.3% indicated that it has not. Of the number who answered yes, 25% or 3 indicated that the extent was minimal whilst 41.6% or 4 claimed it was appreciable. Seventy- five percent of the facilities have identified their major area of investment in ICT as Computer Hardware and Software. A quarter of them have not invested in either of these.

When asked to rate the level of computer resource utilisation in their facility, half of them, 50% indicated that it was below 10% whilst 16.7% each them rated it was about 50% and about 25% respectively. Another 16.7% could not rate their utilisation since they do not own them.

On the percentage of the operations, or activities of their facilities which are supported by the use of computers, half of them, 50% indicated that it was below 10% whilst 16.7% each of them stated that it was about 50% and about 25% respectively. Another 16.7% do not own computers.
Some of the IT related problem areas which apply to their facilities included Problems relating to after sales (41.7%), and High cost of computer products and services (8.3%). Half of them do not encounter any problems which are IT related.

Some of the reasons given for investing in ICT included to facilitate their work and its necessity in certain areas such as National Immunisation Delivery (NID), and National Health Insurance Scheme (NHIS) which require specific software, speed of work, ease of work, ease of sourcing information, to facilitate administration, management and improve clinical care, to improve on the quality of health care delivery, to improve the capture of patient health records, link various services to treatment and streamline the manual capture of health statistics for planning and billing of clients after the provision of services, to improve upon efficiency and effectiveness of operations and consequently quality of health services, to improve upon patients care and also as a result of the University's ICT Policy, and to make their workload lighter.

Conclusion

Results reveal that the Health facilities are not yet completely committed to the revolution of the ICT and remain until now anchored in the old ways of doing work manually. This lack of initiative is primarily explained by the fact that the introduction of these new technologies requires investments including development of human resources which the facilities do not feel yet ready to provide. Therefore, the facilities are to improve their informational capacities.

Benefits of ICT to health care delivery cannot be overemphasised. The main conclusion of these studies (OECD (2003), DFID (Marker, et al, 2002), the World Bank (2003), and SIDA (Greenberg, 2005) is that ICT, when incorporated effectively into development programmes can be useful tools in efforts to reach the MDGs. Thus, the challenge of meeting the targets of the MDGs requires ICT support in health.

Recommendations

The challenge of the 21st century for developing countries cannot be overemphasized. There is the need to catch up with the western world in all areas of technological advancement. The following recommendations are therefore suggested:

- All facilities should put in place the necessary mechanism to develop an IS Strategic plan which should be aligned with their strategic plan.
- Steps should be taken by the facilities to acquire computers through their Internally Generated Funds (IGF)
- The Ministry of Health/Ghana Health Service policy for ICT deployment in the Health Sector should be adhered to
- Adequate training should be given to Officers handling computers in the facilities.
- Information Technology Support units should be established in the facilities to attend to technical problems.
- Decision and management support systems should be developed.
- Facilities should be encouraged to develop web site and have electronic mails for information dissemination and communications purposes.
- Use of ICT is at rudimentary level in some of the facilities surveyed. There is the need to plan and grow the use of ICT in the Hospital. Integrated information system should be deployed to allow efficient management of the NHIS including uniform bill system, portability and claims management.
- ICT projects implemented in the Health sector should be implemented
- ICT should be aligned with Health care delivery in Ghana

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