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## Constraints in the Application of Information Communication and Technologies (ICTs) on Health Information Management in General Hospitals in the Niger Delta

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### **Abstract:**

*Background: A number of factors can inhibit the introduction and successful application of ICTs in the health sector especially health information management in developing countries.*

*Aim: This study is aimed at investigating the constraints in the application of ICT in health information management of General Hospitals in Bayelsa State, Nigeria.*

*Methodology: A descriptive survey research design was employed in this study and a total enumeration procedure was used in selecting 200 health information personnel from the various General Hospitals. A questionnaire was used for data collection from respondents. Percentages, as well as statistical tool, and cross tabulation were employed to analyse data. Four research questions were used to guide this study.*

*Results: Of the 188 respondents, 81.4% were without computer skills. Majority of the respondents (78.7%) agree that computer is an important device of ICT on health information management. 79.8% of respondents do not have stable electricity. 82.4% of respondents do not have access to internet facility. Finally, it was discovered from the study that there were an association between some of these constraints and the usage of ICT in General Hospitals.*

*Conclusion: There is still a global digital divide in developing countries with lack of access to internet facilities and stable electricity, largely untrained Health information management personnel and insufficient infrastructure amongst others. Provision of enabling environment and adequate training on ICT are crucial for effective Health information management.*

**Keywords:** Information Communication Technology, Health Information Management, Health personnel, Information system, Developing countries

### **1. Introduction**

Developments in information and communication technologies (ICTs) during the last quarter of the 20<sup>th</sup> century, herald in information age in which economic and social activity has been widened, deepened and transformed. The more optimistic projections suggest that a computerized network would not only ensure a more widespread and rapid growth of employment, productivity and output, but would also improve access to facilities that enhance the quality of life. In this study we consider some of the constraints which could affect the application of ICTs in health information management in developing countries like Nigeria.

A number of factors can inhibit the introduction and successful application of ICTs in the health sector especially health information management in developing countries. Satellife in 2005 identified three main factors: connectivity, content and capacity.<sup>1</sup> other factors include Human and social constraints, political and legal constraints and financial constraints.

## 2. Connectivity

Connectivity access measures in terms of telephone access, personal computer ownership, and internet connectivity varies widely around the world. Within the developing countries, segments of the population have been by-passed by products of information revolution. This is complicated by fast-changing deployment of new technologies and accompanying standards that constantly raise the level of advancement that must be met by anyone who wants to remain current.<sup>2&3</sup> This is part of a set of much broader constraints that include insufficient telecommunications infrastructure, high telecommunication tariffs, inappropriate or weak policies, organizational inefficiency, lack of locally created content, and uneven ability to derive economic and social benefits from information-intensive activities.<sup>4,5&6</sup>

Dependable connectivity is needed for reliable transactions. In developing countries reliable broadband connectivity is still limited, and usually only dial-up access is available. Poor telecommunications infrastructure, limited number of Internet Service Providers (ISP), lack of access to international bandwidth, and high internet access costs continue to be barriers to widespread use of ICTs.

## 3. Content

Content factors include the lack of local content creation, the language used and the relevance of content to the local situation. Appropriate language is frequently neglected in ICTs programs and little content is available in local language in the healthcare system.

Another major content issue is the quality and reliability of health information. The internet can provide a wide range of user with timely, accurate, diverse, and detailed health information. However, its decentralized structure, global reach, leveling of access to the tools of publication, immediacy of response, and ability to facilitate free-ranging interchange also make the internet a channel for potential misinformation, concealed bias, cover self-dealing, and evasion of legitimate regulation.

Many health public-oriented websites are profit-driven, other promote unproven and even dangerous forms of treatment or products, while others may have good intentions, but contain misleading or false information.<sup>7,8,9&10</sup>

Given the sensitive nature of health care information, and the high degree of dependence of health professionals on trustworthy records, the issues of reliability (assuring that data residing in the electronic health records are accurate and remain accurate), security (owner and user of electronic health records can control data transmission and storage), and privacy (subject of data can control their use and dissemination) are of particular significance and must be clearly and effectively addressed by health and health-related organizations and professionals.

## 4. Capacity

While capacity to adapt information to ensure that it is culturally appropriate and relevant is a major challenge, so too is the capacity to apply ICTs effectively in the different sections in health information management like in the registration and billing of patients, compilation of monthly statistics, in the coding and indexing section and general administration of health activities in the health sector which maintain and services patients.

A skilled ICT work force is an essential ingredient for effective use of ICTs in the health care delivery system. Systems professionals and technology products and services providers and project team leaders with high skill levels and experience in working in the health sector introducing the ICTs are important components of success.

Capacity also refers to inequities in societies and sharing of resources within the community. For example, due to lower rates of literacy, women (marginalized groups in general) are not given equal access to the benefits of ICTs.<sup>12,13&14</sup>

This study is aimed at investigating the constraints in the application of ICT in Health information management of General Hospitals in Bayelsa State, Nigeria.

## 5. Methodology

### 5.1. Study Area

Bayelsa State is a state in southern Nigeria in the core of the Niger Delta region, between Delta State and Rivers State. Administratively, it is divided into eight Local Government Areas: Brass, Ekeremor, Kolokuma/Opokuma, Nembe, Ogbia, Sagbama, Southern Ijaw and Yenagoa.

### 5.2. Research Design

A descriptive survey Research design was employed in this study. This study is aimed at investigating the constraints in the application of ICT in health information management, General Hospitals in Bayelsa State. Descriptive survey design was used because the study is aimed at collecting detailed data that describe and interpret an existing phenomenon.

### 5.3. Population of the Study

The target population of the study comprises all the health information personnel in all the general hospitals in Bayelsa State. The study comprised of 200 subjects of health information personnel which is the total health information personnel strength in General Hospitals in Bayelsa State.

S/NO	Names of General Hospitals	Number of Health Information Personnel
1	General Hospital Brass	20
2	General Hospital Nembe	20
3	General Hospital Kolo	28
4	General Hospital Agudama	31
5	General Hospital Amassoma	30
6	General Hospital Odi	26
7	General Hospital Sagbama	23
8	General Hospital Peremabiri	22
Total		200

Table 1: Names of General Hospitals and health information personnel in Bayelsa State.

## 6. Sampling Procedure and Sample Size

A sample size of 200 was used in this study. A total enumeration procedure was employed because the sample is small and whole population was used.

## 7. Research Instrument

A questionnaire on the Application of ICT in Health Information Management was used for the study.

## 8. Data Collection Procedure

A questionnaire on the Application of ICT in health information management in General Hospital was used for the collection of data from the target population and total of 200 copies of the questionnaire were self-administered to the subjects who were Health information personnel in Bayelsa State.

## 9. Method of Data Analysis

Out of the 200 copies of questionnaire administered, 188 copies were successfully retrieved, edited and found valid for analysis: Percentages and Cross Tabulation were employed to analyze collected data.

## 10. Results

### 10.1. Introduction

Out of the 200 copies of questionnaire administered, 188 copies were successfully retrieved and found valid for analysis. Hence, the response rate was 94% and the attrition was 6% (12 unretrieved copies).

Sex	Responses	Percentage
Female	112	59.6
Male	76	40.4
Total	188	100%

Table 2: Sex Distribution of respondent

The table above shows that, of the total responses, 112 respondents were female representing 59.6% of the respondents while 76 of the respondents were male representing 40.4% of the respondents.

Age	Responses	Percentage
15-19	2	1.1
20-24	42	22.3
25-29	53	28.2
30-34	43	22.9
35-39	13	6.9
40-44	18	9.6
45-49	6	3.2
50+	11	5.8
Total	188	100%

Table 3; Age distribution of the respondents

From the table above, 2 of the respondents are between the age range of 15-19 representing 1.1% of the respondents, 42 of the respondents are between the age range of 20-24 representing 22.3% of the respondents, 53 of the respondents are between the age range of 25-29 representing 28.2% of the respondents, 43 of the respondents are between the age range of 30-34 representing 22.9% of the respondents, 13 of the respondents are between the age range of 35-39 representing 6.9% of the respondents, 18 of the respondents are between the age range of 40-44 representing 9.6% of the respondents, 6 of the respondents are between the age range of 45-49 representing 3.2% of the respondents, and 11 of the respondents are between the age range of 50 and above representing 5.9% of the respondents.

Qualification	Responses	Percentage
WASC	25	15.7
Higher National Diploma(HND)	48	30.2
Ordinary National Diploma(OND)	23	14.5
Health Information Technician	43	27.0
Health Information Assistant	14	8.8
Others	6	3.8
Total	188	100%

*Table 4: Level of Education of the respondents*

From the above table, 25 of the respondents have West Africa School Certificate (WASC) representing 15.7% of the respondents, 48 of the respondents has Higher National Diploma(HND) representing 30.2% of the respondents, 23 of the respondents have Ordinary National Diploma(OND) representing 14.4% of the respondents, 43 of the respondents are Technician representing 27.0% of the respondents, 14 of the respondents are Health Information assistant representing 8.8% of the respondents, and 6 of the respondents are between non- professionals representing 3.8% of the respondents.

Job Experience	Responses	Percentage
Less than 2 years	32	17.0
2-5 years	47	25.0
6-10 years	31	16.5
11-15 years	10	5.3
16-20 years	21	11.2
20+	47	25.0
Total	188	100%

*Table 5: Job experience of the respondents*

The above table states that 32 of the respondents have worked for less than 2 years representing 17.0% of the respondents, 47 of the respondents have job experience between 2-5 years representing 25.0% of the respondents, 31 of the respondents have a job experience between 6-10 years representing 16.5% of the respondents, 10 of the respondents have job experience between 11-15 years representing 5.3% of the respondents, 21 of the respondents have job experience between 16-20 years representing 11.2% of the respondents, also 47 of the respondents have worked for more over 20 years representing 25.0% of the respondents.

	Responses	Percentage
Yes	34	18.1
No	153	81.4
Undecided	1	0.5
Total	188	100%

*Table 6: Are you certified computer personnel?*

This table shows that 153 (81.4) respondents are non-certified computer personnel, while 34 respondents are certified computer personnel, representing 18.1% of the respondent.

	Responses	Percentage
Yes	148	78.7
No	38	20.2
Undecided	2	1
Total	188	100%

*Table 7: Do you think computer is an important device to be used in the hospital?*

From the table above, 148 respondents agree that computer is very useful in general hospitals representing 78.7% of the respondents, also 38 respondents believe that computer is not an important device in the hospital representing 20.2% of the respondents, while 2 respondents do not know whether computer is important to the hospital or not representing 1% of the respondents.

	Responses	Percentage
Yes	35	18.6
No	150	79.8
Undecided	3	1.6
Total	188	100%

Table 8: Do you have access to stable electricity?

The table above shows that 79.8% (150 respondents) do not have access to stable electricity, 35 respondents have access to stable electricity, representing 18.6% of the respondents. 1.6% (3 respondents) was undecided.

	Responses	Percentage
Yes	27	14.4
No	155	82.4
Undecided	6	3.2
Total	188	100%

Table 9: Do you have access to the internet?

Table 9 shows that 82.4% (155 respondents) said they do not have access to internet, while 27 respondents said they have access to internet, representing 14.4% of the respondents. 3.2% (6 respondents) were undecided

			Do you have access to the internet			Total
			Yes	No	Undecided	Yes
Do you think computer is an important device to be used in the hospital	Yes	Count	35	113	2	148
		% within Do you think computer is an important device to be used in the hospital	17.8%	80.8%	1.4%	100.0%
		% within Do you have access to the internet	100.0%	76.1%	66.7%	79.3%
		% of Total	14.1%	64.1%	1.1%	79.3%
Do you think computer is an important device to be used in the hospital	No	Count	0	37	0	37
		% within Do you think computer is an important device to be used in the hospital	0%	100.0%	0%	100.0%
		% within Do you have access to the internet	0%	23.9%	0%	20.1%
		% of Total	0%	20.1%	0%	20.1%
Do you think computer is an important device to be used in the hospital	Undecided	Count	0	0	1	1
		% within Do you think computer is an important device to be used in the hospital	0%	0%	100.0%	100.0%
		% within Do you have access to the internet	0%	0%	33.3%	0%
		% of Total	0%	0%	0%	0%
Total		Count	35	153	3	184
		% within Do you think computer is an important device to be used in the hospital	14.1%	84.2%	1.6%	100.0%
		% within Do you have access to the internet	100.0%	100.0%	100.0%	100.0%
		% of Total	14.1%	84.2%	1.6%	100.0%

Table 10: Relationship between ICT appliance like computer and access to the internet

From the table 10 we observe that majority (79.3%) of the respondent acknowledged the fact that ICT usage is important; however There is a lack of internet facility. The statements showed that there exists a relationship between the two variables.

**11. Discussion**

Many developing countries have embarked on strategies to utilize Information Communication and Technology (ICT) in generating and communication of data from one level to another. However, many of these countries have tried to modernize the Health management Information System (HMIS) only at the higher levels (national and provincial) because they do not possess technological, political, and legal infrastructure to adequately respond to and manage ICT revolution for their benefit.<sup>15&16</sup> This is still obtainable in Nigeria where this study was carried out.

The socio-demographic data showed that of the 188 respondents, 59.65% were females while 40.4% of the respondents were males. 1.1% of the respondents were between 15-19 years, 22.3% were between 20-24 years, 28.2% were between 25-29 years, 22.9% were between 30-34 years, 6.9% were between 35-39 years, 9.6% were between 40-44 years, 3.2% were between 45-49 years and 5.9% were 50 years and above.

30.2% of the respondents have Higher National Diploma as compared to 27%, 15.7%, 14.5%, 8.8% and 3.8% who are Ordinary National Diploma holders, West Africa School Certificate holders, Health information technicians, Health information assistants and others respectively.

In addition, 83% of the respondents have job experience of at least 2 years as compared to 17% of less than 2 years. Out of the 83% of the respondents, 25% have over 20 years of job experience. Despite these, only 18% of the total respondents are certified computer personnel. However, majority of the respondents (78.7%) agree that computer is an important device of ICT on health information management. Majority of the respondents travel to Yenagoa, where computer is available for public use when the need arises. The older respondents with enough job experience seem not to be interested in computer because they do not know what to do with the information (also supported by Millward 2003)<sup>17</sup>

B, Sakhakhane and S. Lubbe<sup>18</sup> in 2005 conducted a study in Melmoth, South Africa and randomly selected 200 people. They discovered that about 70% of the respondents did not have computer skills. This is because there was no infrastructure and nobody in the community could teach them. This is similar to 81.4% of respondents without computer skills in our study.

Gennaio<sup>19</sup> in 2002 stated that in third-world countries there are debts to be paid and people do not have funds available for training (e.g. schools write tests on the blackboard because they do not have the infrastructure or resources).

Apart from the largely untrained manpower in ICT, they are faced with challenges of access to stable electricity and internet facilities. 79.8% of respondents do not have stable electricity. 82.4% of respondents do not have access to internet facility. These in addition to trained manpower are major factors in ICT

The South African government is trying to bring services to the people as a way of combating the digital divide by installing MPCCs (Multipurpose Community Centres) throughout the country that can be used to access information (Annual report 2002).<sup>20</sup>

In Soweto, the Ekurhuleni Metro Municipality is fighting the lack of access by participating in the Mindset Network Schools Mayoral Project by providing a programme that delivers courses in, for example, mathematics, physical science and English. It includes TV sets, video recorders, satellite dishes and smart cards.<sup>21</sup>

This study was supported by Ishaq, 2001; Berland, 2001 and Alcantara, 2001 that there are issues such as the lack of an enabling telecom policy and regulatory environment; lack of access to electricity, solar power options, and power supply back-ups; insufficient infrastructure and connectivity access; and high costs. Connectivity access measures in terms of telephone access, personal computer ownership, and internet connectivity varies widely around the world. Another major content issue is the quality and reliability of health information. The internet can provide a wide range of user with timely, accurate, diverse, and detailed health information.<sup>2,3&9</sup>

Finally, it was discovered from the study that there were an association between some of these constraints and the usage of ICT in General Hospitals.

## 12. Recommendations

Based on the findings of this study, it is recommended that;

Government should provide stable electricity and access to internet facilities in all the General Hospitals of Bayelsa State to obtain adequate statistics for better decision making.

Health Information management personnel should be adequately trained on how to use computer or ICT tools to provide efficient health care services in general hospitals. This initiative can be extended to other states in the country including other developing countries.

## 13. Conclusion

There is still a global digital divide in developing countries with lack of access to internet facilities and stable electricity, largely untrained Health information management personnel and insufficient infrastructure amongst others. Provision of enabling environment and adequate training on ICT are crucial for effective Health information management.

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