Need for an Automated Hospital Information System to Improve the Efficiency and Quality of Health Service Delivery in Esan-West L. G. A., Edo State, Nigeria

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Abstract

The manual or paper-based hospital information system used by hospitals / health centers for storing information about their in-patient and out-patient details, staff records, doctors and nurses on duty, diagnostic results, clinical trials, dispensing of drugs, and so on, has created an inefficiency and poor health service delivery in health sector. This paper examines the need for the use automated hospital information system in order to improve the efficiency and quality of health service delivery for hospitals/health centers in Esan-West L.G.A, Edo State. Observations, oral interviews and questionnaire administration were used to gather data. The study has shown that all the hospitals/health centers in the local government area use paper-based information system for their storage, retrieval, making decisions, and so on about their in-patients/out-patients profile/health history and staff records. The study also revealed that the current paper-based information system used by most hospitals and health centers in the Local Government Area, shows a lot of weaknesses in its internal operations, and therefore acknowledges the need for an Automated Hospital Information System (AHIS) because of its numerous benefits in order to improve the efficiency and quality of health service delivery of the hospitals and health centers. Recommendations were given that both government and private owned health facilities i.e. hospitals and health centers should be motivated by the government to see the need to convert their operations to an AHIS, the change to the AHIS should follow the level of priority and government policy makers should be made to enact a policy to ensure that the system conversion is achieved.

Keywords: Esan-West L. G. A., Hospitals, Automation, Hospital Information System, Efficiency, Health Facilities, Quality of Health Service.

1.0 Introduction

Automation plays an important role in the global economy and in daily experience. According to (wikipedia, 2013) automation has been achieved by various means including mechanical, hydraulic, pneumatic, electrical, electronics and computers. Engineers strive to combine automated devices with mathematical and organizational tools to create complex systems for a rapidly expanding range of applications. An Automated Hospital Information System (AHIS) is a computer based hospital information system used to store and manages patient information and its

administration. It is meant to provide management and staff, with information in real-time to make their work more interesting and less stressful in order to improve the efficiency and quality of health service delivery in the health sector.

The best introduction for hospital information systems has been made in 2011 International Conference on Social Science and Humanity, which defines Hospital Information Systems as massive, integrated systems that support the comprehensive information requirements of hospitals, including patient, clinical, ancillary and financial management. Hospitals are extremely complex institutions with large departments and units coordinate care for patients. Hospitals are becoming more reliant on the ability of hospital information system (HIS) to assist in the diagnosis, management and education for better and improved services and practices. In health organization such as hospitals, implementation of HIS inevitable due to many mediating and dominating factors such as organization, people and technology. Hospitals offer 24 hours services to its staff and the general public. The records of patients in hospitals have over time been run down due to large numbers of patients; this led to poor record keeping since it is a paper based system. Paper processing has led to a variety of problems which includes; duplication of data for in-patients and out-patients, data inconsistency, slow data storage

and retrieval, poor report generation, and so on. According to Jantz (2001) the emergence of computer based information system has changed the world a great deal, both large and small system have adopted the new methodology by the use of personal computers; to fulfill several roles in the production of information therefore computerizing the documentation of patient record to enable easy manipulation of the input process and output will bring us to this existing new world of information system. Patients records and disease pattern documentation is concerned with documentation of information obtained from patients and their particular health system in order to function properly. If this information is not documented perfectly, it may cause some data to get lost, and hence, the health system will not be efficient.

Tang (2001) examines the document system that exist in hospitals to be mostly manual, much importance has been placed on creating a system that document the in-patient record using a computerized database system with a secure procedure for accessing it. Patient information past and present is extremely vital in the provision of patient's care which guides the physician in the making of right decision about their diagnosis.

Objectives

The overall objective of this study is to find out the need for an Automated Hospital Information System to Improve the Efficiency

and Quality of Health Service Delivery in Esan-West L.G.A., Edo State. The specific objectives are as follows:

1. To ascertain the number of wards in Esan-West L.G.A., and the number of hospitals/health facilities per ward.

2. To ascertain the current information system used by hospitals and health centers in Esan-West L.G.A.

3. To ascertain, if the health facilities, that is, hospitals and health centers in Esan-West L.G.A. are contented with the current information system in order to determine the need for an automated hospital information system (AHIS).

2.0 Literature Review

Hospitals are the main healthcare providers in developing countries (Clifford, Blaya et al. 2008). For this reason hospitals ought to be the primary target institutions when aiming to improve health information systems in developing countries. Hospitals differ in numerous ways. An increasingly important characteristic for distinguishing hospitals is their generic strategy types. Eastaugh (1992a,b), Ginn and Young (1992), Zajac and Shortell (1989), and Shortel, Morrison, and Friedman (1990), among others, have used the Miles and Snow (1978) typology to categorize hospital as Prospectors, Analyzers, and Defenders, based on their strategic characteristics.

However, electronic information systems in hospitals in developing countries are "rare to nonexistent" (Rotich, Hannan et al. 2003). In an environment where the awareness and appreciation of electronic hospital information systems (HIS) does not exist, implementing an HIS would be a serious challenge (Idowu, Cornford et al. 2008). Against all odds, if a hospital in a developing country did decide to transform its information system and implement an HIS, there would be surprisingly sparse literature on useful experiences to guide that hospital through the transformation. This is because literature on "implementation" of hospital information systems is extremely limited (Ovretveit, Scott et al. 2007), and whatever literature is available is predominantly from developed countries where the circumstances, systems, processes, and cultures are different from that of developing countries.

3.0 Study Area

Esan West is a Local Government Area of Edo State, Nigeria, created in 1991. Its headquarters is in the town of Ekpoma. It has an area of 502 km² and a population of 125,842 at the 2006 census. The postal code of the area is 310. Esan-West L.G.A., has the following towns and villages: Ekpoma (Eguare, Ikhirolo, Ukpenu, Ujoelen, Eguare, Emaudo, Ebhuakhuala, Ujemen, Idemebo, Ihumudumu, Iruekpen, Emuhi, Illeh, Uke), Egoro (Eguare-

Egoro, Egoro Amede, Egoro Naoka, Egoro-Ikhideu), Idoa, Urohi, Ujogba. Ukhun,Ogwa, but these towns and villages are grouped into 10 wards for political administration. The wards are Ogwa (ward 1), Ujogba (ward 2), Egoros (ward 3), Eguare (ward 4), Ihunmudumu (ward 5), Iruekpen (ward 6), Emuhi (ward 7), Urohi (ward 8), Uhiele (ward 9), Illeh (ward 10).

4.0   Methodology

This study is based largely on primary data. Data were collected through questionnaire administration, observation and oral interview. Some basic questions were asked to the target audience i.e. both health and non-health workers in government and privately owned hospitals / health centers in the study survey area about the existing health information system. Questions pertaining the workers classification in the hospital system, the type of information system currently in use, if the information system is secured or not, how fast in terms of speed is the information system, how contented are they with the use of the existing hospital information system. Key questions about the weaknesses in the existing information system were also asked; such as the system security, speed, retrieval rate, storage capacity, flexibility, standard report formats, the structure of their workflow processes, the error rate obtained, etc. The questionnaire administration covered the 10 wards in the local government area. We administered 20 copies of a questionnaire per hospital / health center in the entire wards, which sum up to a total of 560 copies of the questionnaire. 500 copies of the questionnaire were returned. The data got were analyzed using descriptive statistics. See table 1 and 2 for the detailed breakdown of the number of wards and health facilities in the local government area, and the numbers of questionnaire administered and the numbers returned.

5.0   Results and Discussion

In presenting the data, the analysis was done with qualitative analysis to know the number of wards and health facilities i.e. hospitals / health centers per ward in the Esan-West Local Government Area of Edo State.

Table 1: No of Ward and Health Facilities per Ward in Esan-West L.G.A.

Name of Town	Wards	No of Health Facilities
Ogwa	1	3
Ujogba	2	1
Egoros	3	5
Eguare-Ekpoma	4	5
Ihunmudumu	5	4
Iruekpen	6	4

Emuhi	7	2
Urohi	8	2
Uhiele	9	1
Illeh	10	1
Total	10 Wards	28

Source: Health Department Records, 2013, Esan-West L. G. A. Secretariat, Ekpoma

The result shown in Table 1 reveals that the total number of wards in Esan-West L.G.A is 10, and the total number of health facilities, that is, hospitals and health centers in the entire Esan-West L.G.A is 28. Ogwa (Ward 1) has 3 health facilities, Ujogba (Ward 2) has 1, Egoro (Ward 3) has 5, Eguare-Ekpoma (Ward 4) has 5, Ihunmudumu (Ward 5) has 4, Iruekpen (Ward 6) has 4, Emuhi (Ward 7) has 2, Urohi (Ward 8) has 2, Uhiele (Ward 9) has 1, and Illeh (Ward 10) has 1 health facility. This shows that there are health facilities in the 10 wards in Esan-West L.G.A., though not evenly distributed. This result agrees with that of (Clifford et al, 2008) that the hospitals ought to be the primary target institutions when aiming to improve health information systems in developing countries

Table 2: Number of questionnaires administered and numbers returned per ward

Name of Town/Ward	No of Questionnaire administered per Ward	No of Questionnaires returned per Ward
Ogwa (Ward 1)	60	50
Ujogba (Ward 2)	20	20
Egoros (Ward 3)	100	95
Eguare-Ekpoma (Ward 4)	100	85
Ihunmudumu (Ward 5)	80	70
Iruekpen (Ward 6)	80	75
Emuhi (Ward 7)	40	40
Urohi (Ward 8)	40	35
Uhiele (Ward 9)	20	18
Illeh (Ward 10)	20	12
Total	560	500

Source: (Field survey 2013)

Table 2 reveals the total number of questionnaires administered to be 560 copies, i.e. 20 questionnaires were administered per health facility i.e. (hospital/health center) in a ward; 500 copies where returned. Ujogba (ward 2) and Emuhi (ward 7) returned exactly the number of questionnaires administered, i.e. 20 and 40 respectively, while others returned less.

Table 3: Type of information system in use

Name of Town/Ward	Paper-based	Automated
Ogwa (Ward 1)	50	-
Ujogba (Ward 2)	20	-
Egoros (Ward 3)	95	-
Eguare-Ekpoma (Ward 4)	85	-
Ihunmudumu (Ward 5)	70	-
Iruekpen (Ward 6)	75	-
Emuhi (Ward 7)	40	-
Urohi (Ward 8)	35	-
Uhiele (Ward 9)	18	-
Illeh (Ward 10)	12	-
Total	500	0
Percentage	100%	0%

Source: (Field survey 2013)

Table 3 also reveals the response on the type of information system currently being used or in operation by the hospitals/health centers in each ward. The table shows that a total of 500 people i.e. (both health and non-health workers) in the 10 wards responded to manual or paper-based information system which makes the total response to be 100% paper-based. None responded to automated hospital information system; which makes AHIS total percentage value to be 0%. This result shows the need for a change to an automated hospital information system. This result also agrees with that of Tang (2001) that examines the document system that exist in hospitals to be mostly manual

Table 4: Weakness in the current information system in use

Name of Town/Ward	Strongly Agree	Undecided	Disagree	TOTAL
Ogwa (Ward 1)	40	8	2	50
Ujogba (Ward 2)	17	1	2	20
Egoros (Ward 3)	80	8	7	95
Eguare-Ekpoma (Ward 4)	84	1	0	85
Ihunmudumu (Ward 5)	68	2	0	70
Iruekpen (Ward 6)	71	1	3	75
Emuhi (Ward 7)	25	10	5	40
Urohi (Ward 8)	35	0	0	35
Uhiele (Ward 9)	10	2	6	18
Illeh (Ward 10)	12	0	0	12
Total	442	33	25	500
Percentage	88.4	6.6	5	100

Source: (Field survey 2013)

Table 4 shows the statistics of the weakness in the current manual information system in use at the hospitals / health centers in each of the wards in Esan-West Local Government Area. The weakness is seen as the various loop holes associated with the current information system which makes it not to be very effective and efficient to the in-patient and out-patient. The weakness of the system features is rated in terms of strong security access to files, speed of storage / retrieval of information, flexibility of the system, system standard record formats, structured and automated information flow processes, error rates, and so on. In Ogwa (ward 1), 40 persons out of the 50 people that responded, strongly agrees that the current information system is weak. In Ujogba (ward 2), 17 persons out of the 20 people that responded, strongly agrees also that the current information system is weak. In Egoros (ward 3), 80 persons out of the 100 people that responded, strongly agree that the current information system is weak. In Eguare-Ekpoma (ward 4), 84 persons out of the 100 people that responded, strongly agrees that the current information system is weak. In Ihumudumu (ward 5), 68 persons out of the 70 people that responded, were strongly in agreement also that the current information system is weak. In Iruekpen (ward 6), 71 persons out of the 75 people that responded, strongly agrees that the current information system is weak. In Emuhi (ward 7), 25 persons out of the 40 people that responded, were strongly in agreement that the current information system is weak. In Urohi (ward 8), 35 persons out of the 35 people that responded, were of totally in agreement that the current information system is weak. In Uhiele (ward 9), 10 persons out of the 18 people that responded, strongly agrees that the current information system is weak. Finally, In Illeh (ward 10), 12 persons out of the 12 people that responded, strongly agrees that the current information system is weak. A total of 442 people with a percentage of 88.4% out of 500 people strongly agrees that the current information system is weak, while 58 people (11.6%) had different views. This result also reveals the need for an automated hospital information system. This result also agrees with the findings of (Rotich et al, 2003) that the electronic information systems in hospitals in developing countries are "rare to non-existence".

Table 5:   Contentment with the current information system

Name of Town/Ward	NO	YES	NOT CERTAIN	TOTAL
Ogwa (Ward 1)	43	6	1	50
Ujogba (Ward 2)	16	3	1	20
Egoros (Ward 3)	91	4	0	95
Eguare-Ekpoma (Ward 4)	85	0	0	85

Ihunmudumu (Ward 5)	65	1	4	70
Iruekpen (Ward 6)	73	2	0	75
Emuhi (Ward 7)	28	10	2	40
Urohi (Ward 8)	35	0	0	35
Uhiele (Ward 9)	16	2	0	18
Illeh (Ward 10)	10	2	0	12
Total	462	30	8	500
Percentage	92.4	6	1.6	100

Source: (Field survey 2013)

In Table 5, when asked the people working in the hospitals/health centers in each of the wards of their contentment with the current paper-based information system being used. In Ogwa (ward 1), 43 persons out of the 50 people that responded are not contented. In Ujogba (ward 2), 16 persons out of the 20 people that responded are not contented. In Egoros (ward 3), 91 persons out of the 100 people that responded are not contented. In Eguare-Ekpoma (ward 4), 85 persons out of the 100 people that responded are not contented. In Ihunmundumu (ward 5), 65 persons out of the 70 people that responded are not contented. In Iruekpen (ward 6), 73 persons out of the 75 people that responded are not contented. In Emuhi (ward 7), 28 persons out of the 40 people that responded are not contended. In

Urohi (ward 8), 35 persons out of the 35 people that responded are not contented. In Uhiele (ward 9), 16 persons out of the 18 people that responded are not contented. Finally, In Illeh (ward 10), 10 persons out of the 12 people that responded are not contented. This result reveals a total number of 462 people with a percentage of 92.4% out of 500 people that are not contented with the current paper-based information system, thereby showing the need for an automated hospital information system. The result in table 5 also agrees with the view of (Cornford et al, 2008) that in an environment where the awareness and appreciation of electronic hospital information system (EHIS) does not exist, implementing and ((EHIS) would be a serious challenge.
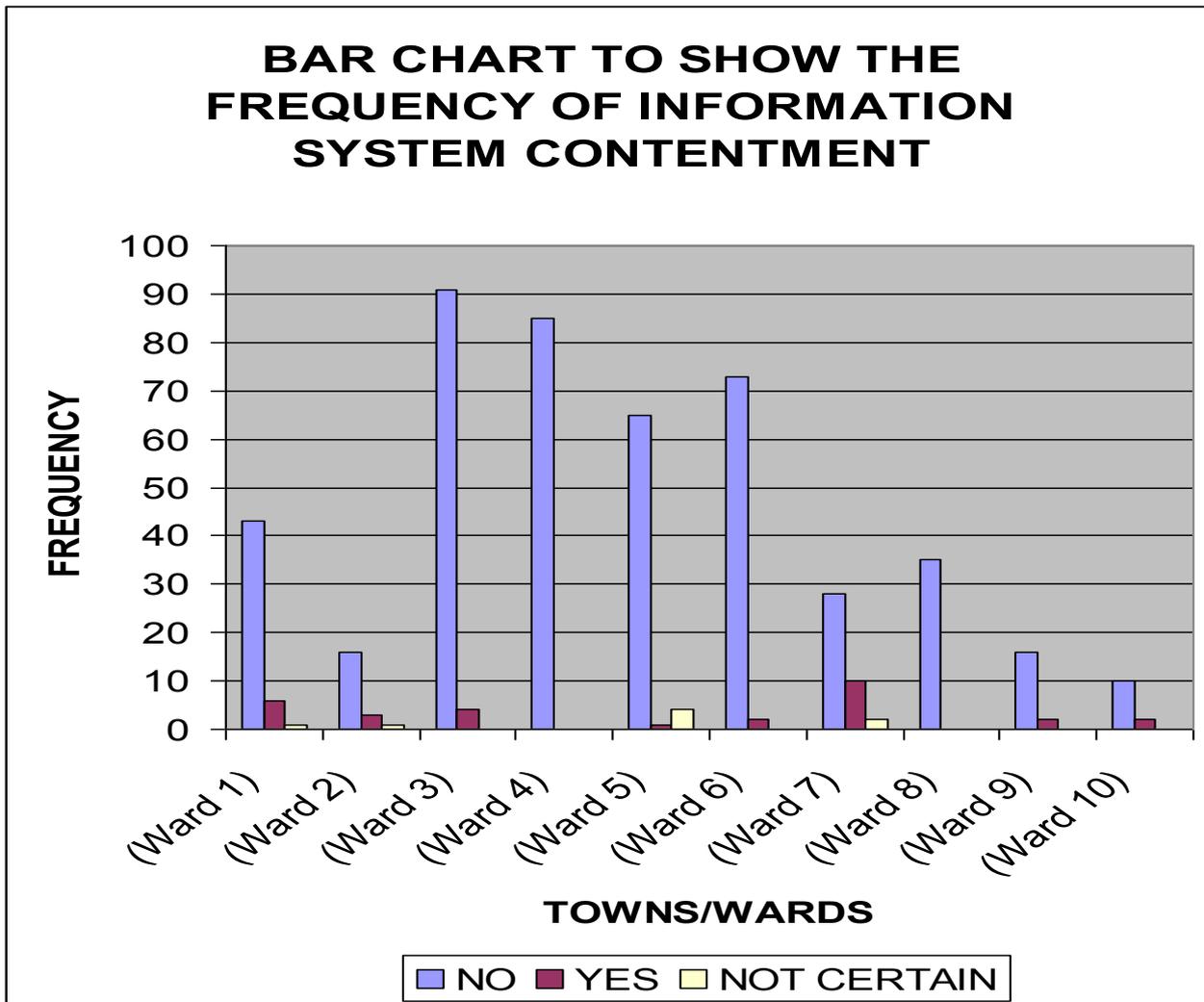
Figure 1: Bar chart showing the frequency of the current information system contentment per ward

Figure 1 is a bar chart showing that Egoros (ward 3) is the ward with the highest number of people with (91 responses) that are not contented with the current paper-based information system. This is followed by Eguare-Ekpoma (ward 4) with (85), Iruekpen (ward 6) with (73), Ihunmudumu (ward 5) with (65), Ogwa (ward 1) with (43), Urohi (ward 8) with (35), Emuhi (ward 7) with (28), Ujogba (ward 2) and Uhiele (ward 9) with (16 responses each), and finally Illeh (ward 10) with (10 responses).

6.0   Conclusion

This research work provides a survey for the need of an automated hospital information system to improve the efficiency and quality of health service delivery in Esan-West Local Government Area of Edo State, Nigeria. The outcome of the survey has shown that there are 10 wards in Esan-West L.G.A., and a total of 28 health facilities put together are present in the 10 wards of the local government area, though unevenly distributed.

The study revealed that the 28 health facilities are currently operating on a paper-based information system, and about 88.4% of the entire respondents confirmed that there are weaknesses in the current paper-based information system.

Also, about 92% of the entire respondents are not contented with the paper-based information system and therefore, acknowledges the need of a change in operation to an automated hospital information system.

7.0   Recommendations

The authors would like to recommends as follows:

1. All the health facilities in the local government area should be changed from paper-based information system to an automated hospital information system.

2. The change to the AHIS should follow the level of priority as indicated in Figure 1.

3. Government and policy maker should endeavor to encourage and motivate this change in system operations for all the health facilities (government and private hospitals / health centers) in Esan-West L.G.A.

8.0   Acknowledgments

The authors would also like to thank and acknowledge the following corporate bodies and individuals for sharing their time, data, and insights:

1. **Esan-West L.G.A. Secretariat, Ekpoma**
    *   Mrs. Aghemelo – Admin Department
    *   Mrs. Onokhebhagbe Awolowo, Chief Matron, Health Department
2. The Medical Directors and Staff of all the hospitals and health centers in the 10 wards in Esan-West L.G.A., Edo State.
3. **Ambrose Alli University, Ekpoma**
    *   Mr. Henry Igiehon – Final Accounts, Bursary department
    *   Mr. S. Olawole – Final Accounts, Bursary department
    *   Mr. S. T. Abu – Advances, Bursary department

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