

PATIENT INFORMATION SYSTEM AND SERVICE DELIVERY OF HOSPITALS IN SOUTH-SOUTH, NIGERIA

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ABSTRACT

The study examined the relationship between patient information system and service delivery of hospitals in South-South, Nigeria. The objective of the study was to examine how patient information system influence measures of service delivery of hospitals in South-South, Nigeria. The cross-sectional explanatory survey research design was adopted for the study. The population of this study consisted of nine (9) Teaching Hospitals in the South-South, Nigeria of Nigeria. By the adoption of census, the entire population of nine (9) Teaching Hospitals in the South-South, Nigeria was studied. Thus, ten (10) respondents were selected from each of the Teaching Hospitals giving us a total of ninety (90) respondents. Structure questionnaire was use as instrument for data collection after face-validation. Cronbach alpha was used to test the internal consistency of the instrument. Out of ninety (90) copies of the questionnaire administered, a total of 79 were retrieved. Arithmetic mean was used for the univariate analysis while the test of hypotheses was done using Correlational Statistical tools of Spearman Rank Order Correlation and Partial Correlation. The findings revealed that patient information system have significant positive influence on service delivery of hospitals in South-South, Nigeria. The study concluded that the implementation of patient information system in a hospital enhances service delivery in terms of patient turnaround time, patient treatment consistency, and patient record status. It was also recommended that there should be regular training and retraining of medical practitioners to equip them with the prerequisite digital capabilities needed to use health information systems for better service delivery.

Keywords: Patient Information System, Service Delivery, Patience Records, Patience Treatment

INTRODUCTION

Patient Information System consists of a set of software and platforms designed to manage patient registration, patient admission, patient billing, and discharge. Information systems in this category include patient registration application, client-resource management application and health service billing application. This set of health information system enables doctors and nurses to have accurate database about the number of patients admitted and those discharged (Ball, 2013; Özoğul et al., 2019). Patients' demographics are also captured by this system and this makes it easier for the hospital to contact them virtually. The billing system reduces the stress often associated with paying medical bills. This system even makes it possible for patients to order medicines from the comfort of their homes and have them delivered by paying online.

In addition to leveraging on patient management information system, some hospitals have advanced to adopting mobile medical information system. Mobile medical information system consists of smart phone compactible online applications and portals that enable healthcare givers and patients to create and access health records as well as share relevant update about the health status of the patient virtually irrespective of their geographical locations and time. Examples include patient portals, medical examination applications, and store-and-forward telemedicine. They are also known as virtual medical applications. With these virtual medical information

systems, medical practitioners can monitor and attend to their patients across wide geographical dispersion. However, the reality within the hospital system in South-South, Nigeria is that these innovations are yet to be fully integrated. It appears that most of the hospitals in South-South, Nigeria are yet to adopt these emerging innovations in the management of hospital information. It is perhaps not surprising that adoption of health information systems in some of the hospitals is still low since those that are supposed to use it do not appear to be prepared for it. Yet, in the face of the covid-19, there has been a serious clamour for adoption of health information systems in the delivery of medical services in hospitals across the country. This study therefore, seeks to examine how patient information systems influences the service delivery of hospitals in South-South, Nigeria.

Research Hypotheses

The following hypotheses were formulated to be tested in the course of this study

- Ho₁ There is no significant correlation between patient information system and patient turnaround time of hospitals in South-South, Nigeria.
- Ho₂ There is no significant correlation between patient information system and patient treatment consistency of hospitals in South-South, Nigeria.
- Ho₃ There is no significant correlation between patient information system and patient record status of hospitals in South-South, Nigeria.

Patient Information System and Service Delivery

Good health should be the concern of every individual, because an ill person will find it challenging to either work or carry out other forms of activities, although, sickness is inevitable in the entire human lives. In maintaining good health hospitals are charged with the responsibility of offering quality service, one of the best ways to offer this quality service could be predicted on the ability of the clinicians or hospital medical experts in adopting a working patient management information system. This is because hospitals are becoming more reliant on the capability of Patient Information System to assist in the diagnosis process and management, for better and improved services and practices. The assertion of Hatcher (2018) revealed that Patient Information System is to streamline the flow of information across the hospital towards effective decision making for patient care, in an optimized and efficient manner. Through adoption of a system in managing patient information, medical experts will be able to make effective decision in relation to patient health status which will boast their service delivery in terms of patient turnaround time (record access time, doctors access time, doctor-patient time and auxiliary service duration), patient treatment consistency (history consistency, treatment consistency and appointment consistency) and patient records status (record security, record availability and health state).

More so, Bergen (2020) averred that patient information management system facilitates the processing of patient information in a clinical state which promotes timely patient care and facilitate day to day operation of the hospital and eases overburdened staff. This goes a long way in enabling medical staff improve in their level of performance in terms of rendering adequate or quality services to patient by saving their time, making available their record status and ensuring consistent treatment. Saka in Demokaan (2018) support the above postulation that patient information management systems keep a lot of data base on the fact that hospitals have so many medical functions. In this type of system, there is a wide variety of information available from the workforce used by the patient to what the staff can make or do in order to follow the functioning of the hospital and facilitate administrative tasks. The system provides feedbacks on patient care processes for hospitals. It reminds us of the necessary tasks to perform and allows us to develop a diagnosis and treatment protocol that can be applied to a special patient. Hospitals collect and process all necessary information is processed and collected through computers about health care services and management of patient health condition. This information can be transferred between

the units via the system in the electronic environment. It plays integrating role different information that emerges in terms of medical, financial and management functions of the hospital.

Patient Information System could bring about consequent influence on service delivery of hospitals through patient registration app. Through this application, patient could book a doctor or any medical expert and demand or a particular service. Since hospitals are always crowded, a patient could schedule his or her appointment with the use of this app. This is because the advancement in health information system in terms of patient management information system, has led to the emergence and adoption of artificially intelligent software packages that make it possible for certain administrative service functions to be performed on mobile phones instead of patient and clinicians always going to the physical work space. This system is used to manage and maintain electronic medical records, patient information, prescriptions, lab reports etc. It is an effective tool in the hand of the hospital management. This is in agreement with the position of David et al. (2017) that the use of patient registration applications in promoting seamless interface among members of a hospital was necessitated by obvious increase in the amount of time patients and medical practitioners spent on their phones. The beauty of patient registration application is that it provides a unified patient registration form and gives access to public web pages and social links of a hospital to digital patients hence promoting their service delivery.

Furthermore, client resource management app equally played a better role in advancing service delivery of hospitals in South-South, Nigeria. This is because with client-resource management app, clinicians are able to know wards in the hospitals that are free, department that lack facilities and number of patients that are admitted into different section of the hospital through desktop virtualization. This will by cut the process of the clinicians moving around the clinic or hospitals to check. With the aid of client-resource app, such expert could just be in his or her office and document the hospital's activities. This is in line with the assertion of Ana et al. (2016), that this App enables health practitioners lubricate the relationship that exist between them and their client or patients. This is because the adoption of this will enhance quality service delivery.

Interestingly, organizations are gradually moving towards digitalization. Hospitals in South-South, Nigeria are not left out. This is because the growing popular demand for improved health care by hospitals has been increasing the need for more efficient hospital management and stronger oversight of the use of public funds. To achieve these goals, it is necessary to improve the recording of information, not only to assure accurate patient clinical histories and to generate technical knowledge, but also to facilitate the administrative and financial management of hospitals. In managing these finances, hospitals map our strategies such as health service billing system to enable them address the challenging they could have in terms of found management. Whereas, these strategies such as health service billing system supports transfers of funding between patient and the hospital for health services rendered by the hospitals, among other aspects. Health service billing system charges for services rendered in the ambit of the hospital and as sources of information for the planning, control, evaluation and auditing of health services so as to promote service delivery of hospitals in terms of patient turnaround time (record access time, doctors access time, doctor-patient time and auxiliary service duration), patient treatment consistency (history consistency, treatment consistency and appointment consistency) and patient records status (record security, record availability and health state).

System Theory

Ludwig von Bertalanffy established systems theory as a theoretical science directed at researching systems and the characteristics they have in common as general aspects of reality (Von-Bertalanffy in Nmechiele, 2020). Due to its interdisciplinary perspective, and its foundational principles of physics, biology and engineering, systems theory has been used in numerous fields, including management, psychotherapy and economics (Skyttner in Nmechiele, 2020). Von Bertalanffy in Nmechiele (2020) defined a system as being a set of dynamic elements maintaining integrity via

mutual interactions. A system is defined as being a set of two or more interrelated elements that satisfy the following conditions (John, 2017)

- i. The behaviour of each element has an effect on the behaviour of the whole
- ii. The behaviour of the elements, and their effects on the whole, are interdependent, as determined by the state or type of activity in at least one other part of the system
- iii. All subsystems have an effect on the behaviour of the system, but none has a solely independent effect on it.

The adoption of this system theory as the second theory which this study anchored on is predicted on the fact that health information system effects ensure faster and easier access to reliable, accurate internal and external information, transparency of business processes, as well as identification of bottlenecks in the production process which is not far from organizational (hospitals') communication. Strategic health information system effects shape hospitals' communication to both itself and its patients to create competitive advantage, align business strategies to directly support organizational (hospitals') goals, and improve relationships with patients.

Health information system in terms of Clinical Information System ensures operational and cost savings, supply chain management savings, staff cost savings, and improved hospitals' efficiency of both medical practitioners/patient and clinical processes. Clinical Information System effects are associated with improved skill levels, in utilizing laboratory information system, nursing information system, radiology information system & intensive care unit information system, as well as creating a culture conducive to change and innovation. If health information system does not support service delivery of hospitals, it can inhibit hospital's growth and development. Organizations (hospitals) differ in terms of digitalized infrastructure/equipment, manpower strength and levels of management that could adopt health information system.

The essential mechanism for health information systems' value creation is innovative interaction and synergy between clinicians and patient. Health information system creates value only under certain conditions, that is, when it is synergistically operated with other system. The adoption of health information system will depend on hospitals' structures, processes and culture.

Another aspect of health information system is its structure that encompasses technological, as well as hospitals' context. The performance of the system depends on the effectiveness of both the clinicians and patient. Moreover, health information system is bound up with the historical and cultural aspects of its ongoing development and use in clinical interaction.

METHODOLOGY

The cross-sectional explanatory survey research design was adopted for the study. The population of the study consisted of nine (9) Teaching Hospitals in the South-South, Nigeria of Nigeria.

Table 1 Study Population

S/N	Teaching Hospitals in South-South
1.	University of Port Harcourt Teaching Hospital, Rivers State.
2.	Rivers State University Teaching Hospital, Rivers State
3.	Pamo Medical University Teaching Hospital, Rivers State
4.	University of Uyo Teaching Hospital, Akwa Ibom
5.	University of Calabar Teaching Hospital, Cross Rivers State
6.	University of Benin Teaching Hospital, Benin City, Edo State
7.	Delta State University Teaching Hospital, Oghara, Delta State
8.	Igbinedion University Teaching Hospital, Okada, Delta State
9.	Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State

Source Federal Ministry of Health.

The study covered the entire nine (9) Teaching Hospitals operating in South-South, Nigeria. Thus, the study was a census research using the entire study population. Considering the framework of the study, both primary and secondary sources of data were employed in order to generate valid information. For the primary source, structured questionnaire was used. Mean and standard deviation were used for the univariate analysis while the bivariate analysis was done using Spearman rank order correlation with the aid of SPSS Version 25.0. The spearman rank order (Rho) was considered to be the most appropriate for the study as it measures the degree of relationship between the two set of ranked observations.

Results

Patient Information System and Service Delivery

- Ho₁ There is no significant correlation between Patient Information System and patient turnaround time of hospitals in South-South, Nigeria.
- Ho₂ There is no significant correlation between Patient Information System and patient treatment consistency of hospitals in South-South, Nigeria.
- Ho₃ There is no significant correlation between Patient Information System and patient record status of hospitals in South-South, Nigeria.

Correlations between Patient Information System and Service Delivery

		Patient Information System	Patient Turnaround Time	Patient Treatment Consistency	Patient Record Status
Spearman's rho	Correlation	1.000	0.887**	0.684**	0.781**
	Patient Information System				
	Coefficient				
	Sig. (2-tailed)		.000	.000	.000
	N	79	79	79	79
	Correlation	0.887**	1.000	0.755**	0.767**
	Patient Turnaround Time				
	Coefficient				
	Sig. (2-tailed)	.000		.000	.000
	N	79	79	79	79
	Correlation	0.684**	.0.755**	1.000	0.632**
	Patient Treatment Consistency				
	Coefficient				
	Sig. (2-tailed)	.000	.000		.000
	N	79	79	79	79
	Correlation	0.781**	0.767**	0.632**	1.000
	Patient Record Status				
	Coefficient				
	Sig. (2-tailed)	.000	.000	.000	
	N	79	79	79	79

** . Correlation is Significant at the 0.01 level (2-tailed).

Source SPSS Output

Column two of table above shows r value of 0.887 at a significance level of 0.00 which is less than the chosen alpha level of 0.05 for the hypothesis relating Patient Information System and patient turnaround time. Since the significance value is less than the alpha level of 0.05, the null hypothesis (H_{01}) which states that there is no significant correlation between Patient Information System and patient turnaround time of hospitals in South-South, Nigeria is rejected and the alternate hypothesis (H_{a1}) is accepted. This implies that there is a very strong positive correlation between Patient Information System and patient turnaround time of hospitals in South-South, Nigeria.

Column three of table above shows r value of 0.694 at a significance level of 0.00 which is less than the chosen alpha level of 0.05 for the hypothesis relating Patient Information System and patient treatment consistency. Since the significance value is less than the alpha level of 0.05, the null hypothesis (H_{02}) which states that there is no significant correlation between Patient Information System and patient treatment consistency of hospitals in South-South, Nigeria is rejected and the alternate hypothesis (H_{a2}) is accepted. This implies that there is a high positive correlation between Patient Information System and patient treatment consistency of hospitals in South-South, Nigeria.

Column four of table above shows r value of 0.781 at a significance level of 0.00 which is less than the chosen alpha level of 0.05 for the hypothesis relating Patient Information System and patient record status. Since the significance value is less than the alpha level of 0.05, the null hypothesis (H_{03}) which states that there is no significant correlation between Patient Information System and patient record status of hospitals in South-South, Nigeria is rejected and the alternate hypothesis (H_{a3}) is accepted. This implies that there is a strong positive correlation between Patient Information System and patient record status of hospitals in South-South, Nigeria. These results show that the adoption of Patient Information System brings about improved medical service delivery.

Patient Information System and Service Delivery

The tests of hypotheses four to six revealed that there is a very strong positive correlation between Patient Information System and patient turnaround time of hospitals in South-South, Nigeria, and the tests of hypotheses five to six revealed that there is a high positive correlation between Patient Information System and service delivery of hospitals in South-South, Nigeria. These findings imply that hospitals that adopt the use of Patient Information System will enjoy better medical service delivery in terms of patient turnaround time, patient treatment consistency and patient record status. These findings are in tandem with the revelation of Hatcher (2018) that Patient Information System streamlines the flow of information across the hospital towards effective decision making for patient care, in an optimized and efficient manner. Bergen (2020) asserted that patient information management system facilitates the processing of patient information in a clinical state which promotes timely patient care and facilitate day to day operation of the hospital and eases overburdened staff. The adoption of Patient Information System in a hospital goes a long way in enabling medical staff improve in their level of performance in terms of rendering adequate or quality services to patient by saving their time, making available their record status and ensuring consistent treatment. In agreement with the above postulation, Saka in Demokaa (2018) stated that patient information management systems keep a lot of data based on the fact that hospitals have so many medical functions. Obviously, this system accommodates a wide variety of information available from the workforce used by the patient to what the staff can make or do in order to follow the functioning of the hospital and facilitate administrative tasks. It also provides feedbacks on patient care processes for hospitals. It reminds us of the necessary tasks to perform and allows us to develop a diagnosis and treatment protocol that can be applied to a special patient. Hospitals collect and process all necessary information through computers about healthcare services and management of patient health condition. This information can be

transferred between the units via the system in the electronic environment. This helps to keep all the units abreast with all necessary information required by them.

Through patient registration app, patient could book a doctor or any medical expert and demand for a particular service. This is going to save time and energy for both the patient and the doctor. Explicitly, having such a platform will definitely improve patient turnaround time, patient treatment consistency, and as well as patient record status. Since hospitals are always crowded, a patient could schedule his or her appointment with the use of this app. This is because the advancement in health information system in terms of patient management information system, has led to the emergence and adoption of artificially intelligent software packages that make it possible for certain administrative service functions to be performed on mobile phones instead of patient and clinicians always going to the physical work space. This system is used to manage and maintain electronic medical records, patient information, prescriptions, lab reports etc. It is an effective tool in the hand of the hospital management. This is in agreement with the position of David et al. (2017) that the use of patient registration applications in promoting seamless interface among members of a hospital was necessitated by obvious increase in the amount of time patients and medical practitioners spent on their phones. The beauty of patient registration application is that it provides a unified patient registration form and gives access to public web pages and social links of a hospital to digital patients, hence promoting their service delivery.

Going further, utilizing client-resource management application in a hospital enables clinicians to know wards in the hospitals that are free, department that lack facilities and number of patients that are admitted into different section of the hospital through desktop virtualization. This will by cut the process of the clinicians moving around the clinic or hospitals to check. With the aid of client-resource app, such expert could just be in his or her office and document the hospital's activities. Energy, time, cost, etc. are saved, adding to a better service delivery in the healthcare centre. This is in line with the assertion of Ana et al. (2016) that client-resource management application enables health practitioners lubricate the relationship that exist between them and their client or patients. This is because the adoption of this application will enhance quality service delivery.

CONCLUSIONS

Based on this, it suffices to conclude that the implementation of patient information system in a hospital enhances service delivery in terms of patient turnaround time, patient treatment consistency, and patient record status, amongst other things. The study also concludes that the use of technology in hospital administration is a sure way to meet with the flood of medical attention in this 21st century world. It therefore implies that hospitals that do not see this opportunity and make judicious use of it might be eluded of the benefits that accrue it.

1. Patients should be encouraged to register and judiciously make use of patient registration app and client-resource management app, thus reducing the influx of patients into the hospital building, and in so doing, adding to service delivery.
2. Health service billing app should be utilized for any billing purpose in the hospital to enhance patient record status.
3. Hospitals authorities, health care givers and patients should encourage one another on the frequent and effectual utilization of Health Information System for the betterment of all involved in the process.
4. Doctors and patients should be highly encouraged to make use of patient mobile portal in attending to patients' everyday need, as this will reduce the stress of patients coming to the hospital on every slight need of medical attention, and also improve their turnaround time and treatment consistency.

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