IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY AT HARD TO REACH COMMUNITIES IN RIVERS STATE, NIGERIA

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Abstract: **The National Population Commission (2017) had indicated increasing growth in the population of Rivers State from 5,198,716 in 2006 to 7,034,973 in 2017. According to the commission two third of the total population dwell in the hard to reach areas ,and most of the community members hardly interface with health care workers throughout the year. The health care delivery system therefore direly need the support of Information and Communication Technology (ICT) in the health care facilities and in the rural communities and hard to reach remote areas in order to bring health care delivery to vulnerable dwellers .Information and Communication Technology at hard to reach communities in Rivers state was an important health support system to the health care needs of people living in distant areas, oceanic communities, and hard to reach areas in providing health care pathways or providing best evidence-based care when users are at distant places or location. The level of neglect on the people living in these areas had been gross; uncountable numbers had suffered morbidity; while others had suffered mortality. To carry out the research, 353 respondents were drawn from health institutions through systematic random sampling procedure in Rivers state through the instrumentation of Yaro Yamen's sampling procedure. The data obtained from the respondents were measured, and analyzed using various parameters. The descriptive research design was used through a structured questionnaire. Various measurement variables were used to test the validity, reliability and consistency of the instruments such as the face, and content validity; percentages, mean and the measure of variability; and the Likert's Response scale were applied to test the consistency. Studies found out that the level of application of ICT to the communities by governmental agencies, cooperate bodies, and Non –Governmental bodies on tele-health performance had been low. The study had increased the awareness level of stakeholders, the government, private investors, individuals and the level of preparedness to fund the capacities and competencies of health care workers within its specified scope and achievable time frame had been enhanced.**

Keywords: **ICT; assessment, application, reliability, healthcare systems, tele-health, Performance.**

I.   INTRODUCTION

The National Population Commission (2017) had indicated increasing growth in the population of Rivers State from 5,198,716 in 2006 to 7,034,973 in 2017. According to the commission two third of the total population dwell in the hard to reach areas ,and most of the community members hardly interface with health care workers throughout the year. The health

care delivery system therefore direly need the support of Information and Communication Technology (ICT) in the health care facilities and in the rural communities and hard to reach remote areas in order to bring health care delivery to vulnerable dwellers. Information and Communication Technology awareness for effective health care delivery in hard to reach communities in Rivers state; telecommunication systems that brings health at distant places or location for communal benefits. This kind of communication takes place in synchronous or asynchronous way, between health professionals and patients or care givers. It involves a targeted sharing of information between specific individuals or individuals who play distinct roles for diagnostic, management, counseling, educational, or support purposes; mails and smart phones can be used for Tele care. The importance of Information and communication technology (ICT) cannot be overemphasized in the dissemination of health information across the geographically and socially isolated landscapes in the healthcare delivery system, it is a key concern to unlock the health care needs of any serious society to substantially make breakthroughs for immediate and long term health benefits to the people. Tele health had involved targeted sharing of information between specific individuals or individuals who play distinct roles for diagnostic, management, counseling, educational, or support purposes; mails and smart phones can be used to interpret data, manage health records, respond to risk, mitigate or prevent risk; reduce morbidity and unnecessary mortality .The chaotic nature of health needs to be addressed by the use of ICT which can bring succor to the community, and people needed greater attention. Appropriate assessment of the impact of ICT in the health care delivery system is likely going to transform the health care system in the state.

According to Daniel (2011) the aim of health information is the creation, storage, transmission and the management of information to promote health, prevent illness, treat diseases, and manage

Chronic illnesses. Asuru (2015) was of the view that using ones' intellectual capacity to build better attitude will be consistent to enhancing better performance, interpret data, manage health records, respond to risk, mitigate or prevent risk; define concepts of patients' behavioral patterns and lifestyles in order to proffer solutions.

The capturing of patients through electronic patients records, the information management system, the consultation of distance health services, patients tracking, e-visits and e-care were some of the health services that had brought easy medical benefits to enlightened communities. According to Daniel (2011) the building blocks of modern day health care services are the application of efficient and effective healthcare.

Ducut & Fontelo, (2011) were in support of Asiabaka, (2010). Asian (2012) that ICT participation and capacity building processes should include the old, young, male and female; the employed and unemployed. The level of awareness, knowledge and competencies of health workers had been seen to build institutions to ensure continuity, better structures, coordination and enhanced performance.

Aim of the Study

The aim of the study was to determine the performance level of ICT in the health care delivery of oceanic, distant and hard to reach communities in Rivers State.

The specific objectives are:

1. To ascertain the level of awareness on ICT by stakeholders on tele health in their level of performance in the health care delivery system in Rivers State, Nigeria.

2. To determine the cordial relationship between health care workers and distant in their level of performance in the management of ICT in the health care delivery system.

3. To determine the level of ICT infrastructural growth in health care facilities; amongst health care workers, patients, program implementers, and policy makers, and their level of performance of ICT in the health care delivery system.

4. To ascertain appropriate and healthy ICT policies on tele health on ICT in the health care delivery System.

Research Questions

1. Is the level of awareness creations on ICT on health care high on the people living in the distant communities?

2. Is the relationship between health staff and patients cordial in the management of ICT in the health care delivery system?

3. What is the level of ICT infrastructural provisions amongst health care workers, patients, program implementers, and policy makers in the management of health care delivery in the distant and hard to reach communities?

4. Does ICT policies on health care in distant communities in the state effective?

II. MATERIALS AND METHODS

Materials

The study was done on the hard to reach, oceanic and distant communities in the in the 23 Local Government Areas of Rivers state, Nigeria; with an accessible population of 3000. The instrument used was the structured questionnaire which had 2 sections; section 1 had the demographic data while section 2 had awareness creation, attitude of community members, infrastructural provisions and policy frameworks for those living in the distant places.

Methods

Descriptive survey design was used to assess the respondents .Out of an accessible population of 3000 stakeholders from various community structures in the hard to reach communities in Rivers State, the Yaro Yamen's sample determination measurement was used to determine the sample size through a systematic random sampling procedure, every 9th community member was selected from the first; till the sample size of 353 was realized. The gender of the sample was 219 (62%) male, and 134(38%) female. The age range were 18-30 ;31-43;44-56;57-69;70 and above; educational qualification were Non – formal were 33;primary level were 50;secondary level were 240 , tertiary levels were 30 .Occupation were fishermen 223; artisans were 50,oil workers 30; farmers were 50.

Method of Data Analysis

Data analysis were carried out on the data obtained. To ensure the validity and consistency of the instrument, face and content validities were used, the distribution of variables were computed and presented on tables, percentages, mean, standard deviation and response scores.

The Pilot Study

Pilot study was carried out before the main study. The pilot study was necessary because of the following reasons.

i. To ensure effective validity and reliability of results.

ii. To ensure that each question is appropriately drafted and that the instructions in the questionnaire were comprehensible.

iii. To identify trouble shooting effects (such as low finance, timing of the tidal waves in the creeks and oceanic communities, festivals, stress) caused by the procedure and the environment, and sought actions to reduce them

iv. To be sure that respondents will understand the information in the questionnaires and adhere to the research protocols.

v. Check for the correctness of information and operation of equipment

vi. Check if the research assistants are skilled to successfully administer (distribute and collect) the instrument.

The assistants that were involved in the pilot study were excluded in the main study to avoid Bias.

Training of Data Collectors and Data Quality Assurance

A 4 Day training were conducted for 12 assistants who were employed for the research work, they consisted of 12 community health volunteers, 4 health officers and two guides who understood the oceanic, creek and hard to reach communities.

Training involved the following aspects:

A Brief introduction of the study objectives to the respondents.

B Face-to-face interaction skills with respondents on incomplete, inaccurate, inconsistent Information.

C. The techniques of questionnaire distribution and collection were taught on systematic random sampling procedure.

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D. Training on overcoming stress and difficulties during the data collection field processes.

E. Training was carried out for 4 days, with practical checks given by the principal researcher. After the completion of training each team was allotted one senatorial zone to distribute and to collect the data. Regular monitoring and evaluation were carried out by the researcher to ensure high degree of completeness of the data, data accuracy, consistency, and validity of the data.

Ethical Consideration

Informed consent notice were administered to the various community leaders as to get entry. Also administered letters were given to respondents to ensure respondents' confidence to the potential subjects and only those who gave their consents were recruited into the study. Interviews were conducted in such a manner that ensured confidentiality and privacy of the subjects.

Criteria for Inclusion and Exclusion in the Study:

Inclusion Criteria:

1. Those that were willing to participate.

2. Those that were within the systematic sampling procedure

3. Those that were known to be healthy.

4. Those that had no biases on the questionnaire.

5 Those that fell within the age brackets.

The Exclusion Criteria:

1. Persons not willing to Participate.

2. Persons that were not within the range of the questionnaire.

3. Those who are familiar with the multiple choice question.

4. Persons who are known to be unhealthy

III. RESULTS AND DISCUSSION

TABLE 1: Demographics of Respondents.

S/N	Variables	Respondents Frequency	Response Rate
	Gender		
1	Male	219	62%
2	Female	134	38%
	Total	**353**	**100%**
	Age		
1	18-30	84	24%
2	31-43	124	35%
3	44-56	88	25%
4	57-69	39	11%
5	70+	18	5%
	Total	**353**	**100%**
	Qualification		
1	Non Formal	33	9%
2	Primary	50	14%
3	Secondary	240	68%
4	Tertiary	30	9%
	Total	**353**	**100%**

	Occupation		
1	Fishermen	223	63%
2	Artisans	50	14%
3	Oil workers	30	9%
4	Farmers	50	14%
	Total	**353**	**100%**
	Religion Affiliation		
1	Orthodox	166	47%
2	Pentecostalism	94	27%
3	Traditional	82	23%
4	Islam	11	3%
	Total	**353**	**100%**

Table 1 captured the demographics revealing the gender, age, educational qualification and occupation of Respondents. On gender, male respondents were 219(62%); while female respondents were 134(38%).The data had revealed that in most of the hard to reach communities males are in greater number. The age of respondents revealed that the majority of residents in the communities were mainly people within the age intervals of 31-43, 44-56; and 18-30 respectively. These were the active population and are more economically viable. The data on educational qualification showed that those with secondary school qualification are in majority. This result revealed clearly that the creeks, oceanic communities had people that can express their feelings naturalistically, and independently, and can interact with researchers. The occupational qualification revealed that majority of the residents are low income earners. Mostly fishermen. However, their religious affiliation had occasionally affected their behavior. Most of the respondents are orthodox, Pentecostals, and traditional. The population of Islam was low about 3%.

Table 2: Respondents Frequency Score and percentages

S/N	VARIABLES	NO OF RESPONDENTS					SCORE
		SA	A	SD	D	U	
1	ICT Awareness	7(2%)	25(7%)	321(91%)	25 (7%)	0(0%)	353 (100%)
2	IEC/BCC	0 (0%)	0 (0%)	117 (33%)	212(60%)	24 (7%)	353(100%)
3	Advocacy	0(0%)	0(0%)	222(63%)	131(37%)	0(0%)	353 (100%)
4	Cordial relationship between health care workers and distant patients	0(0%)	0 (0%)	210(59%)	140(40%)	10 (3%)	353 (100%)
5	Software and hardware assessment	4 (1%)	8(2%)	186 (53%)	155(44%)	0(0%)	353 (100%)
6	Energy	2 (1%)	8 (2%)	74 (21%)	255 (65%)	14 (4%)	353 (100%)
7	Base stations	0(%)	7(2%)	244(69%)	102(29%)	0(0%)	353(100%)
8	Effective ICT policies	0(0%)	0(0%)	280(79%)	73(21%)	0(0%)	353(100%)

On Table 2 the data had revealed that 321 or 91% of respondents observed that ICT awareness was low .They were not comfortable with the low level of information, education and communication administration .The respondents revealed that behavioral change was low as 99% agreed that telecommunication systems were unknown for distant places or location.

Respondents agreed that advocacy to governmental agencies, political leaders, large organization ;non-governmental organization could be positive for the communities; 98% of respondents believed that there had been no cordial relationships with health workers since it had been difficult to interface with health workers over the years, unless very rarely on issues of other health engagement outside ICT, mainly on immunization.

Majority of respondents (97%) infrastructural provisions are very much insignificant. They expressed their dissatisfaction on almost a comatose energy system. They believed that base mass that would have helped in communication does not exist; and that government policies on ICT were not effective.

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Table 3: Respondents Score Analysis using Likert kind measurement scale, mean and standard deviation.

S/N	Variables	No of Respondents					Score	Mean	Deviation	Variance	Standard Deviation
		SA	A	SD	D	U					
1	ICT awareness	5	4	3	2	0	14	9	14-9	5	
2	IEC/BC	0	0	3	2	1	6	9	6-9	-3	
3	Advocacy	0	0	3	2	0	5	9	5-9	-4	
4	Cordial relationship between health care workers and distant patients	0	0	3	2	1	6	9	6-9	-3	
5	Software and hardware assessment	5	4	3	2	0	14	9	14-9	5	
6	Energy	5	4	3	2	1	15	9	15-9	6	
7	Base station	0	4	3	2	0	9	9	9-9	0	
8	Effective policies	0	0	3	2	0	5	9	5-9	-4	
	Total	15	16	24	16	3	74			112.5	10.6

The result on Table 3 revealed the respondents' consistent response score, according to the score the mean value was 9 and the standard deviation was 10.6 .The measurement revealed that the level of dispersion was significant; and that the respondents in their character were naturalistic and independent in their opinion. The almost nonexistence of significant health services in the creeks, oceanic communities and other hard to reach locations had been very glaring; that the people living in these communities had been grossly neglected on health care.

IV. DISCUSSION

Table 1 captured the demographics revealing the gender, age, educational qualification and occupation of Respondents. On gender, male respondents were 219(62%); while female respondents were 134(38%).The data had revealed that in most of the hard to reach communities males are in greater number. The age of respondents revealed that the majority of residents in the communities were mainly people within the age intervals of 31-43, 44-56; and 18-30 respectively. These were the active population and were more economically viable. The data on educational qualification showed that those with secondary school qualification are in majority. This result revealed clearly that the creeks, oceanic communities had people that can express their feelings naturalistically, and independently, and can interact with researchers. The occupational qualification revealed that majority of the residents were low income earners. Mostly fishermen. However, their religious affiliation had occasionally affected their behavior. Most of the respondents are orthodox, Pentecostals, and traditional. The population of Islam

Was 3%.The implication of religion was the abilities of its adherent to believe in some supernatural healing process. Over the years these community leaders and members had engaged on herbal medicine, faith healing processes.

The aim of the study was to determine the performance level of ICT in the health care delivery of oceanic, distant and hard to reach communities in Rivers State.

The specific objectives were to ascertain the level of awareness on ICT by stakeholders on tele health in their level of performance in the health care delivery system in Rivers State, Nigeria. On Table 2 the data had revealed that 321 or 91% of respondents observed that ICT awareness was low .They were not comfortable with the low level of information, educational and communication administration .The respondents revealed that behavioral change was low as 99% agreed that telecommunication systems were unknown for distant places or location. This kind of communication takes place in synchronous or asynchronous way, between health professionals and patients or care givers. According to Adeleke *et al.*, (2014) ICT is capable of modernizing the health care delivery system in Nigeria; transform health administration, ensure data availability, data gathering, validity, and reliability of healthcare activities and service, and to ensure dedicated communication links using ICT to boost electronic medical records and knowledge-based healthcare services It involved targeted sharing of information between specific individuals or individuals who play distinct roles for diagnostic,

management, counseling, educational, or support purposes; mails and smart phones can be used for Tele care. Respondents agreed that advocacy to governmental agencies, political leaders, large organization; non-governmental organization could be positive for the communities. Blanchard et al. (2013) suggested that although ICT is important and necessary for improved health among young people, it is not readily available.

98% of respondents believed that there had been no cordial relationships with health workers since it had been difficult to interface with health workers over the years, unless very rarely on issues of other health engagement outside ICT, mainly on immunization. Health workers hardly

Work at the distant communities. It will be very difficult to find health care services in the distant communities.

The third objective was to determine the level of ICT infrastructural as it affects distant health care performance. Majority of respondents (97%) explained that infrastructural provisions were insignificant. they explained that infrastructural provisions were low and were not encouraging including energy which was a key requirement for ICT development. Respondents queried why major stakeholders could not provide ICT accessories such as Bass station, computers, Teleconferencing; Facsimile, Video conferencing, and Email to kick start the process.

They expressed their dissatisfaction on a comatose energy system; and that government policies on ICT were not effective. Capron (2011) was of the view that studies conducted indicated that the Oceanic, remote and hard to reach areas and the rural communities are rudimentary, less attractive to investors, government and NGOs. Capron explained that little was known about potential influence on ICT use, and that the perception and contribution of ICT to health care providers in the rural and remote areas are low. Capron suggested that rapid knowledge build up and awareness creation should be engaged to enable ICT to be used for distant health.

The result of the response score revealed the validity, reliability and the consistency of the respondents that ICT awareness had was the reason why on Table 1: 76% of respondents strongly disagreed that the technical competences of ICT was high. Majority of respondents (71%) opined that health workers trained on ICT were low; and 86% explained that infrastructural provisions were low and were not encouraging including energy which was a key requirement for ICT development. Respondents queried that Computer accessories, Teleconferencing; Facsimile, Video conferencing, and Email.

The first objective was answered, the level of awareness creation was low. The second assessment was the Cordial relationship between health care workers and distant patients; table 1 revealed that the level were low. Respondents opined that the level of motivation, flexibility and rewards were not encouraging. The third objective was to determine the infrastructural level of health facilities in the state which were adjudged inadequate by the respondents as recorded on assessment on software assessment, hardware, base station and energy on Table 1.

Majority of respondents were of the view that performance had relationship with awareness creation, attitude, infrastructural provisions and policy framework. The data therefore was in support of Capron (2011) who opined that ICT could be less attractive to workers, investors, government and NGOs.

Daniel (2011) in supporting the result reiterated that rewards, clarity of purpose, commitment and cognitive behavior required knowledge of the problems; development of solutions, monitoring the processes to strengthen the solutions, review and proffer control. ICT in the health care delivery system will thrive if positive decisions are taken for the growth of tele health. Onuzulike (2011), and Adeleke et al. (2014) explained that health information and related resources should be made readily available and affordable to assist healthcare professionals in the provision of ICT tools in the healthcare services. Ajoku (2010) explained that studies had shown gaps that need to be filled to ensure better and efficient health care services.

V. CONCLUSION

The study on assessment of ICT in health care delivery at hard to reach communities had contributed to the neglected sector of health Care delivery in River state, Nigeria, and had attracted the attention of the public and implementing bodies to the fact that the value of performance had had corresponded function to either increase or decrease to the awareness, knowledge, infrastructural provisions, funding and policy frameworks that could lead to the success or failure of a desired programme within a clearly defined time and scope.

The result of the health care delivery system in Rivers State had revealed that awareness creation, ICT knowledge and the infrastructural levels on ICT in the health care system were inadequate. The assessment had raise the concerns expressed to fill the gaps to ensure efficient and effective application of the health care delivery system by implementing bodies such as government agencies, organization, the community, and Non-governmental bodies had the capacity to strengthened awareness creation; however, more efforts needs to be put in to strengthen impact creation and coordination. Joseph (2011) was of the view that the motivation of healthcare workers at the appropriate time and in the right pathway will provide better healthcare services (3); that patients' acceptability of ICT in the healthcare will be more relevant when there is continuity in the healthcare delivery system. Based on the study and the gaps, the following were recommended:

1. Engagement on government leaders, organizations leaders, policy makers, and strategic planners, and community leaders for awareness creation

2. Monitoring and evaluation of ICT action plans, activities and programs

3. Training and retraining of health workers, team building, and participation in decision. Making processes.

REFERENCES

[1] Adeleke, I.T., Sunday, A., Erinle, A., Muhammad, N., TonyChuks,A., Oluseye, A. O., and Danjuma, A. (2014). "Health Information Technology in Nigeria: Stakeholders' Perspectives of Nationwide Implementations and Meaningful Use of the Emerging Technology in the Most Populous Black Nation." *America Journal of Health Research* **3** (1–1), 17–24.

[2] Ajoku,L.I.(2011).Foundation for Educational Research & Statistics. Port Harcourt, Pearl Publishers.

[3] Amour, D., Pomey, M.P., Girard, F., & Brault, I. (2013). Conceptualizing performance of nursing care as a prerequisite for better Measurement: a systematic and interpretive review. *BMC Nursing*. **12**, 7.

[4] Asiabaka, I. P. (2010). "Access and Use of Information and Communication Technology (ICT) For Administrative Purposes by Principals of Government Secondary Schools in Nigeria." *The Researcher* **2** (1), 43–50.

[5] Asian, M. (2012). "Information and Communication Technology Penetration in Nigeria: Prospects, Challenges and Metrics." *Asian Journal of Information Technology* **6** (3), 280– 287.

[6] Asuru, V.A. (2015). Measurement and Evaluation. Port Harcourt, IAUE Publishers

[7] Blanchard, M., Atari, M., Degney, Herman, & Jane, B. (2013). "Rethinking the Digital Divide: Findings from a Study of Marginalized Young People's Information Communication Technology (ICT) Use." *Youth Studies Australia* **27** (4), 35.

[8] Capron, H.L. (2011). Computers for information age. New Jersey: Practice Hall Press.

[9] Daniel, C. (2011).On Managing People. USA, Harvard Business School Publishing.

[10] Ducut, E., & Paul, F. (2011). "Mobile Devices in Health Education: Current Use and Practice." *Journal of Computing in Higher Education*.**20** (2), 59–68.

[11] Joseph. (2011).Fundamentals of Project Management. Washington, D.C. Amacon Publication.

[12] National Population Commission (2017). National Bureau of Statistics. Abuja. NBS Press.

[13] Onuzuluike, N.M. (2010). Health care delivery systems, Owerri, Mega soft publishers.

[14] Zhou Y.Y, Kanter M.H, Wang J.J, Garrido T (2010) Improved quality between physicians and patients. *Health Affairs*. **29**(7), 1370-1375.