ISSN No:-2456-2165

Utilization of Telehealth Among Primary Health Workers in Kano, Kano State of Nigeria

Usman Mallam Hussaini
B.Sc, Department of Physical and Health Education
Bayero University, Kano (BUK)
Kano-Nigeria

Abubakar I. Hassan
PhD, Department of Physical and Health Education
Bayero University, Kano (BUK)
Kano-Nigeria

Abstract:- The study investigated Utilization of Telehealth among Primary Health Workers in Kano, Nigeria. Five research questions were answered and five null hypotheses were tested. Cross-sectional design was used in this study. The population of the study is 9,687 Primary Health Workers in Kano State. Multistage sampling procedure was used to select 300 respondents from various health care facilities under Kano State Primary Health Care Management Board (SPHCMB) using cluster and simple random samplings. A self-developed questionnaire named "Questionnaire for Utilization of Telehealth among Primary Health Workers" was used as instrument for data collection. The reliability of the instrument is 0.84, which was obtained using split-half method. Three hundred (300) questionnaires were distributed to Primary Health Care workers. Frequency count and percentage (%) used to organize the demographic information of the respondents, $\chi 2$ was used to test H_{o1}, and ANOVA was used to test H_{o2} - H_{o5} at 0.05 level of significance. The results revealed that primary health care workers in Kano state do not significantly utilize telehealth devices/services in discharging their duties ($\chi 2=170.25$, df:1, $P<0.05$); primary health care workers in Kano state do not significantly differ in utilization of telehealth based on their educational qualifications (F=1.610, df: (4,294), P>0.05); primary health care workers in Kano state do not significantly differ in utilization of telehealth based on their professions (F=1.984, df: (8,291), P>0.05); primary health care workers in Kano state do not significantly differ in utilization of telehealth based on the health facilities they are working (F=0.928, df (4,295), P>0.05); primary health care workers in Kano state do not significantly differ in utilization of telehealth based on their departments/units (F=0.960, df: (11, 288), P>0.05). It was therefore recommended among others that Kano State Primary Health Care Management Board should make the utilization of telehealth equipment/services available, accessible, affordable, effective as well as efficient at all the PHC centers in the state. There is need for provisions of modern telehealth equipment in all health sectors in the state by government and all other concerned bodies. Health workers in Primary Health Centers need to be given training and skills acquisition on how to properly use telehealth devices, equipment and services for discharging their duties.

Keywords:- *Primary Health Workers; Primary Health Centers (PHC); Telehealth Utilization; ICTs; Kano State; Nigeria.*

I. INTRODUCTION

There is considerable diversity in the nomenclature used in the field of research to refer to initiatives using some forms of information communication technology in healthcare settings, such as telehealth; telemedicine; m-Health and eHealth. The term Telehealth refers to healthcare delivery or closely-related processes (such as education), when some of the patients/clients are separated by distance and the information and communications technologies are used to overcome that distance (Wilson, 2017). Oregon Telecommunications Coordinating Council 2002) reported that telehealth is the practice of healthcare delivery using telecommunication technology including but not limited to diagnosis; consultation; treatment; transfer of medical data; education; dissemination of public health alerts and/or emergency updates. In addition to that telehealth is the use of telecommunications technology to deliver clinical diagnosis, services and patient's consultation (Wilson, 2017).

Telehealth is a type of health information technology that holds considerable promise for enhancing the provision of care in rural communities. It also provides delivery of health care services at a distance using information and communication technology (Sood et al 2007). According to Patrick (2015) telehealth is growing constantly to offer healthcare world-wide, it is an avenue to assess, diagnose, plan, implement and evaluate data over time or distances.

Communication Workers of America (2006) reported that telehealth utilizes ICT system to provide a wide array of health services to individuals without requiring the individuals to interact face-to-face with the health care provider delivering the care. The use of Information Communication Technology (ICT) facilitates healthcare delivery services have been developed in industrialized nations, for instance the United State of America, Australia, Canada and some developing nations such as India. However, despite the enormous features of information communication technology, they are hardly been utilized in the Nigerian health sector (Femi, Temitope, Foluso, Vekima, Carole & Victor, 2017).

The use of Information and Communications Technology in the field of health care systems is not something new, for example telemedicine services using video conferencing, began in the 1950s, however, the use of telemedicine grew rapidly in the 1990s due to the increased availability of low-cost, high-quality computers and high-speed Internet, as well as the development of new technology tools to support high-quality and efficiently delivered health care. Such applications rely on a high speed Internet connection, or broadband (Turisco&

ISSN No:-2456-2165

Metzger, 2002). In addition to that American Telemedicine Association (ATA, 2007) demonstrated that telehealth can ease the gaps in providing crucial care for those who are underserved principally because of a shortage of sub-specialty providers.

One of the challenges exists today in health care system in many countries including Nigeria is to reach the whole population with adequate health care services and to ensure adequate utilization of the services provided (Vlassoff, Tanner, Weiss and Rao, 2010) stated that Primary Health Care Systems in developing countries have not responded adequately to people's needs. Meanwhile, health care systems are failing in many developing countries, because the systems are not kept abreast of the challenges of a changing world.

Imhonopi & Urim, 2015 reported that, there is need for the utilization of Information Communication Technology (ICT) in Primary Health Centers (PHC) in both rural and urban areas of Nigeria to provide equity and easy access to health care services. However, the rural populations in Nigeria are seriously underserved with the Information Communication Technology (ICT) when compared with their urban counterparts. This observation points to the shortcomings being experienced in the process of implementing primary health care delivery services in Nigeria, the report added that it is pertinent to reiterate the position that, ICTs can make a lot of impact on healthcare delivery in Nigeria. Consequently, the adoption of ICTs in the health sector could enhance the capacity to monitor and report on outbreaks of diseases, disseminate guidelines for controlling and treating such diseases, and share scientific knowledge and research findings among professionals in the health community. ICT has helped to facilitate efficient health care delivery. ICT has also been seen to have the potential to promote health. However, the provision of health-promotion information, patient education, consumer education, and related terms is sometimes referred to as "telehealth". Within the telehealth schema, access to easily understandable medical information regarding medical institutions by general consumers and patients using the internet and other information technology is also referred to as e-health and this field is exploding into a large profitable market. Telehealth provides development of personal skills through provision of information, education for health, and other enhancement of life skills, it has the potential of helping people to control over their own health and over their environment and to make choices for promotion of health. Telehealth could also foster urgent intervention to save lives, speed up access to hard to reach areas, and also reduce morbidities by way of influencing behavioural change (Imhonopi & Urim, 2015).

Application of Information and Communications Technology (ICTs) is needed to support primary health care revival in Kano State. This includes the utilization of an electronic patient record, based on a unique personal client number. For example, shared patient records between primary health care sites and hospitals to ensure better and more efficient care, faster communication of test results, reduced duplication of tests, and a better understanding by providers for the comprehensive needs of the patient and population.

The researchers decided to investigate the utilization of telehealth among primary health care workers in Kano, Kano State of Nigeria, because in the state, there is a great deal of disparity in relation to quality and access to efficient healthcare at primary level between urban and rural population. This healthcare divide needs to be bridged since most of the Nigerian population that live in rural and some of those living in urban areas do not enjoy the healthcare delivery services efficiently. This necessitates their visits or attendance to secondary and sometimes to the tertiary healthcare services, which may lead to inability of the healthcare providers to cater for the needs of the potential patients. It was also observed by the researchers that effective utilization of telehealth among health workers in primary health centers will be the best solution to the aforementioned problems, but unfortunately the health workers have not effectively utilizing the telehealth devices/services in discharging their duties.

➢ *Research Questions*

- Do Health Workers in PHC of Kano State utilize telehealth devices/services?
- Do health workers in PHC of Kano state differ in utilization of telehealth based on their educational qualifications?
- Do health workers in PHC of Kano State differ in utilization of telehealth based on their professions?
- Do health workers in PHC of Kano State differ in utilization of telehealth based on the health facilities where they are working?
- Do health workers in PHC of Kano differ in utilization of telehealth based on the departments or units where they are working?

➢ *Hypotheses*

- Ho1: Health Workers do not significantly utilize telehealth devices/services in PHC centers of Kano State.
- Ho2: Health workers in PHC of Kano state do not significantly differ in utilization of telehealth based on their educational qualifications.
- Ho3: Health workers in PHC of Kano State do not significantly differ in utilization of telehealth based on their professions.
- Ho4: Health workers in PHC of Kano state do not significantly differ in utilization of telehealth based on the health facilities where they are working.
- H05: Health workers in PHC of Kano State do not significantly differ in utilization of telehealth based on departments/units where they are working.

II. PURPOSE OF THE STUDY

This study is aimed at investigating the extent to which PHC workers in Kano state utilize telehealth for preventive and curative purpose with the following specific objectives;

- To determine and explain whether Health Workers utilize telehealth devices/services in PHC of Kano State-Nigeria.
- To determine whether primary health workers differ in the utilization of telehealth in PHC of Kano State based on their educational qualifications.

ISSN No:-2456-2165

- To determine whether primary health workers differ in the utilization of telehealth in PHC of Kano State based on their working professions.
- To identify whether differences exist among primary health workers in the utilization of telehealth based on health facilities where they are working.
- To identify whether differences exist among primary health workers in the utilization of telehealth based on their departments/units where they are working.

III. SIGNIFICANCE OF THE STUDY

The study is beneficial in the following ways;

- The study explores appropriate strategies and recommendations that will help to facilitate effective and efficient utilization of telehealth services among health workers in different primary healthcare centers of Kano State.
- The study will serve as reference materials to the state ministries of health, hospital management boards, national health policy committees, NGOs and other concerned bodies for implementing effective and efficient telehealth utilization among health workers in different health facilities.
- It will give an in-depth understanding of what telehealth services mean with regard to healthcare delivery system in the state and the country at large.
- It will also contribute to the existing body of knowledge of the healthcare workers to facilitate effective use of ICTs in their respective fields.

IV. DELIMITATION OF THE STUDY

This study is delimited to health workers of professional (senior/junior community health extension workers, environmental health technicians/assistants, pharmacy technicians/assistants, laboratory technicians/assistants, dental technicians/assistants, food hygiene technicians/assistants, nurses, medical record officers) and educational qualifications (SSCE/WASCE/Grade II, Professional Certificate /Diploma/ NCE, Degree/HND, Masters) that are working in different PHC facilities (such as Primary Health Centers, Basic Health Centers, Primary Health Posts and Comprehensive Health Centers) under State Primary Health Care Management Board, Kano State of Nigeria.

V. METHODOLOGY

➢ *Research Design*

Cross-sectional design was used in this study. Cross-sectional design provides a clear snapshot of the outcome and the characteristics associated with it, at a specific point in time. Cross-section studies are capable of using data from a large number of subjects and, unlike observational studies, is not geographically bound. It can estimate prevalence of an outcome of interest because the sample is usually taken from the whole population, (University of Southern California Libraries, 2016).

➢ *Population of the Study*

The population of this study consists of all health workers working under Primary Health Care Management Board, Kano State of Nigeria. According to Kano State Ministry of Health, (2017) analysis, the total population of the health workers working under Primary Health Care in the state were nine thousand six hundred and eighty-seven (9,687).

➢ *Sample and Sampling Technique*

The study employed cluster sampling to divide the primary health care centers based on the 6 existing zones of the state primary health care management board (namely: Bichi; Dawakin Tofa; Gwale; Nassarawa; Rano and Wudil). Simple random sampling was used to select (50 samples) from each of the six existing zones in the state. Moreover, simple random sampling was used to select 75 respondents from each health facilities (such as Basic Health Center; Comprehensive Health Center; Primary Health Center and Primary Health Post).

➢ *Instrument for data collection*

The instrument for data collection was self-developed questionnaire, named "Utilization of Telehealth among Primary Health Workers in Kano, Kano State of Nigeria". The questionnaire consisted of two sections (A & B). Section A sought for Demographic Information of the Respondents while section B sought information on different telehealth services/devices used by Primary Health Care Workers based on their educational qualifications, professions, and health facilities as well as departments/units where they are working. The reliability index of 0.84 was obtained using split-half method, this made the instrument reliable for usage.

➢ *Data collection Procedure*

Three hundred questionnaires were distributed to 300 different primary health workers, this was done based on the respondents' educational qualifications; professions; and health facilities as well as their departments/units where they are working. The exercise was done with the help of (4) research assistants. They assisted the researchers in distributing, administering and retrieving the questionnaires. This was done within a period of three (3) weeks.

➢ *Data Analysis*

Data collected was analyzed using frequency count and percentage (%) to organize the demographic information of the respondents, $\chi 2$ was used to test H_{o1}, and ANOVA was used to test H_{o2} - H_{o5} at 0.05 level of significance.

VI. RESULTS

Variables	Frequency	Percentage%
1. Educational Qualification		
-SSCE/WASCE/Grade II	5	1.7%
-Professional Certificate /Diploma/ NCE	251	83.7%
-Degree/HND	36	12.0%
-Masters	8	2.6%
Total	300	100%
2. Profession		
-Senior/Junior Community Health Extension Workers	77	25.7%
-Environmental Health Technicians/ Assistants	96	32.0%
-Pharmacy Technicians/Assistants	56	18.7%
-Laboratory Technicians/Assistants	25	8.3%

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-Dental Technicians/Assistants	18	6.0%
-Food Hygiene Technicians/Assistants	17	5.7%
-Nurses	8	2.7%
-Medical Record Officers	3	1.0%
Total	300	100%
3. Health Facility		
-Primary Health Center	119	39.7%
-Basic Health Center	69	23.0%
-Primary Health Post	55	18.3%
-Comprehensive Health Center	57	19.0%
Total	300	100%
4. Departments/Units		
-Labour unit	15	5.0%
-Out Patients Department	53	17.7%
-Antenatal Care Clinic	18	6.0%
-Pharmacy Department	49	16.3%
-Health Education unit	36	12.0%
-Environmental unit	51	17.0%
-Growth Monitoring Department	9	3.0%
-Directory Observe Treatment Unit	8	2.7%
-Family Planning Department	12	4.0%
-Laboratory Department	30	10.0%
-X-Ray Department	18	6.0%
-Others	1	0.3%
Total	**300**	**100%**

Table 1. Demographic Information of the Respondents

Table 1 shows that holders of SSCE/WASCE/Grade II were 5(1.7%), Professional Certificate /Diploma/ NCE holders were 251(83.7%), those with Degree/HND were 36(12.0%) and Masters holders were 8(2.6%). This means that Professional Certificate/Diploma/NCE holders were the majority. The table also shows the professions of the respondents as follows: Senior/Junior community Health Extension workers were 77(25.7%), Environmental Health Technicians/Assistants were 96(32.0%), 56(18.7%) were Pharmacy Technicians/Assistants, Laboratory Technicians/Assistants were 25(8.3%), Dental Technicians/Assistants were 18(6.0%), Food Hygiene Technicians/ Assistants were 17(5.7%), 8(2.7%) were Nurses, and 3(1.0%) were Medical Record Officers. This means that Environmental Health Technicians/Assistants were the majority. It also reveals by the table that health workers working in primary health centers were 119(39.7%), 69(23.0%) were working in basic health centers, those working in primary health posts were 55(18.3%), and those working in comprehensive health centers were 57(19.0%). This means that health workers working in primary health centers were the majority. For departments/units the table reveals that health workers working in Labour unit were 15(5.0%), 53(17.7%) were from Out Patients Department, health workers from Antenatal Care Clinic were 18(6.0%), 49(16.3%) of the workers were from Pharmacy Department, those working in Health Education unit were 36(12.0%), 51(17.0%) were in Environmental unit, health workers from Growth Monitoring Department were 9(3.0%), 8(2.7%) were in Directory Observe Treatment Unit, health workers in Family Planning Department were 12(4.0%), 30(10.0%) health workers were from Laboratory Department, 18(6.0%) health workers were from X-Ray department, while 1 (0.3%) health worker was marked as Others. This reveals that respondents who were from Out Patients Department, were the majority.

Variables	Frequency	Percent%
Desktop Computer	11	3.7%
Laptop Computer	26	8.7%
Medical Scopes	6	2.0%
Email	4	1.3%
Video Conferencing	2	0.7%
Illumination Systems	1	0.3%
Vital Sign Monitors	3	1.0%
ECGs	4	1.3%
Mobile-Health	242	80.7%
Retinal Camera	1	0.3%
Total	**300**	**100%**

Table 2: Tele-Health Devices/Services Used by PHC workers in Kano State

Table 2 indicates Tele-Health devices/services used by health workers for discharging their duties in PHC centers of Kano State, Nigeria. The table shows that 11(3.7%) of the respondents used Desktop Computers, 26(8.7%) of the respondents used Laptop Computers, Medical Scopes were used by 6(2.0%) of the respondents, Emails were used by 4(1.3%) of the respondents, 2(0.7%) of the respondents used Video Conferencing, Illumination Systems was used by 1(0.3 %) of the respondents, Vital Sign Monitors were used by 3(1.0%) of the respondents, ECGs used by 4(1.3%) of the respondents, 242(80.7%) of the respondents used Mobile-Health for discharging the duties, while Retinal Camera was used by 1(0.3%) of the respondents. This means that majority of the respondents used Mobile-Health for discharging their duties in PHC centers of Kano State Nigeria.

Tele-Health Devices/Services Used	FO	FE	$\chi 2$	df	P
Utilize	37	150.0	170.25	1	.001
Not utilize	263	150.0			
Total	**300**				

Table 3. Summary of $\chi 2$ on utilization of Tele-Health Devices/Services among PHC staff

$\chi 2_{crit.}$=3.84, df=1, (P<0.05)

Table 3 shows the summary of $\chi 2$ on the utilization of telehealth devices/services among PHC staff in Kano state, Nigeria. The table reveals that the P-value is less than the value (P<0.05). Therefore, the null hypothesis which stated that Health Workers do not significantly utilize telehealth devices/services in Primary Health Centers of Kano State is hereby rejected. This means that health workers in PHC centers of Kano state significantly not utilize telehealth devices/services in discharging their duties.

Utilization of Telehealth	Sum of Squares	df	Mean Square	F	P
Between Groups	64.593	4	652.7488	1.610	.243
Within Groups	1899.635	294	6.461		
Total	**1964.227**	**298**	**405.413**		

Table 4. Summary of one-way ANOVA differences on tele health utilization based on Educational qualifications

F=1.610, df:(4,294), P>0.05

Table 4 shows the summary of ANOVA on the differences on utilization of telehealth devices/services base on Educational Qualifications among health workers in Primary Health Centers, Kano State of Nigeria. The table reveals that the P-value is greater than a value (P>0.05). Therefore, the null hypothesis which stated that Health Workers do not significantly utilize telehealth devices/services in Primary Health Centers of Kano State based on educational qualification is hereby accepted. This means that health workers in PHC centers of Kano state do not significantly differ in utilization of telehealth based on their educational qualifications.

Utilization of Telehealth	Sum of Squares	df	Mean Square	F	P
Between Groups	101.662	8	2.434	1.984	.757
Within Groups	1863.885	291	6.2858		
Total	**1965.547**	**299**			

Table 5. Summary of one-way ANOVA differences on utilization of telehealth based on type of profession

F=1.984, df: (8,291), P>0.05

Table 5 shows the summary of one-way ANOVA on the differences on utilization of telehealth devices/services among health workers in Primary Health Centers, Kano State of Nigeria based on profession. The table reveals that the P-value is greater than a value (P>0.05). Therefore, the null hypothesis which stated that Health Workers do not significantly utilize telehealth devices/services in Primary Health Centers of Kano State based on professions is hereby accepted. This means that health workers in PHC centers of Kano state do not significantly differ in utilization of telehealth based on their professions.

Utilization of Telehealth	Sum of Squares	df	Mean Square	F	P
Between Groups	24.412	4	6.103	.928	.448
Within Groups	1941.134	295	6.2858		
Total	**1965.547**	**299**			

Table 6. summary of One-way ANOVA on the differences on telehealth utilization based on health facilities

F=0.928, df: (4,295), P>0.05

Table 6 shows the summary of one-way ANOVA on the differences on utilization of telehealth devices/services among health workers in Primary Health Centers, Kano State of Nigeria base on health facilities. The table reveals that the P-value is greater than a value (P>0.05). Therefore, the null hypothesis which stated that Health Workers do not significantly utilize telehealth devices/services in Primary Health Centers of Kano State based on health facilities is hereby accepted. This means that health workers in PHC centers of Kano state do not significantly differ in utilization of telehealth based on their health facilities.

Utilization of Telehealth	Sum of Squares	df	Mean Square	F	P
Between Groups	69.518	11	6.320	.960	.483
Within Groups	1896.029	288	6.5853		
Total	**1965.547**	**299**			

Table 7. Summary of one-way ANOVA on the differences on telehealth utilization base on differences based on departments/units

F_{cnt}=0.960, df (11,288), P>0.05

Table 7 shows the summary of one-way ANOVA on the differences on utilization of telehealth devices/services among health workers in Primary Health Centers, Kano State of Nigeria base on departments/units. The table reveals that the P-value is greater than a value (P>0.05). Therefore, the null hypothesis which stated that Health Workers do not significantly utilize telehealth devices/services in Primary Health Centers of Kano State based on departments/units is hereby accepted. This means that health workers in PHC centers of Kano state do not significantly differ in utilization of telehealth base on their departments/units.

VII. DISCUSSION

The primary health workers in Kano state significantly not utilize telehealth devices/services in discharging their duties. This finding is in line with report by (Femi E.et al, 2017) that Nigeria is yet to fully adopt the use of technology in health care delivery. The finding however, is contrary with (Australasian Telehealth Society, 2017) which reports that States and territories have been developing telehealth programs for over 10 years across Australia. In more coordinated models such as Queensland, Northern Territory and Western Australia, these models have become robust. However, they have existed due to the remoteness of their patients where telehealth just makes sense.

Health workers in PHC centers of Kano state do not significantly differ in utilization of telehealth base on their educational qualifications. This is in contrary with what (Australasian Telehealth Society, 2017) reported that almost every medical specialty, including General Practice and Nursing, Allied health, and Aboriginal Health Practitioners, are making use of telehealth. It is also not in line the finding of this study that health workers in PHC centers of Kano state do not significantly differ in utilization of telehealth base on their professions, health facilities as well as departments/units where they are working. The findings also were not in line with report by American Hospital Association, (2015) which states that hospitals and health systems are adopting telehealth technologies to provide convenient access for patients and these technologies hold great promise to increase access and patient satisfaction. According to (Imhonopi &Urim, 2013) the common denominators in literature have identified the challenges to ICT application in the Nigerian health sector as: epileptic power supply, illiteracy, high cost of ICTs, lack of clear-cut policy and lack of expertise. This is in line with the findings of this study that health workers working in PHC

centers of Kano state do not significantly differ in utilization of telehealth base on their qualifications; professions; health facilities and the departments/units where they are working.

VIII. CONCLUSION

Base on the findings of this study, the following conclusions were made:

- Health workers do not utilize telehealth devices/services in PHC of Kano State (such as Desktop Computer, Laptop Computer, Medical Scopes, Email, Video Conferencing, Illumination Systems, Vital Sign Monitors, ECGs, Mobile-Health and Retinal Camera) for discharging their duties.
- Health workers working in PHC health facilities of Kano state do not differ in utilization of telehealth devices/services based on educational qualifications.
- Health workers working in PHC departments/units do not significantly differ in utilization of telehealth devices/services based on their profession.
- Health workers working in PHC health facilities of Kano state do not differ in utilization of telehealth devices/services based on department/unit they are working.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

- Primary Health Care Management Board should make the utilization of Telehealth equipment/services available, accessible, affordable, effective as well as efficient at all the PHC centers in Kano state respectively.
- There is need for provisions of modern telehealth equipment in all health sectors of the state by government and all other concerned bodies.
- Health workers in Primary Health Centers need to be given training and skills acquisition on how to properly use telehealth devices, equipment and services for discharging their duties.
- There should be regular maintenance of telehealth equipment available at PHC centers in the state.

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