Perception of Herbal Practitioners on the Application of Modern Technology on Healthcare Delivery in Nigeria

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Abstract

The study was to exploring the perception of herbal practitioners on the application and impact of modern technology on healthcare delivery in Nigeria to aid or improving medical healthcare service to the patient at a distance. A survey was conducted in some States in Nigeria to know the opinion of herbal practitioners. A questionnaire was set up to know the perceptions of herbal practitioners in four domains: usefulness of the technology for patients and practitioner’s practice; perceived knowledge about the use of telediagnosis was developed and administered. The study was conducted in South Western and North-Central part of Nigeria. Three performance metrics were used, System Reliability Index (SRI), System Degree of Relevance (SDR), and System Ease of Usage (SEU) for evaluation are 3.42, 3.15.and 2.88 were achieved respectively. The hypothesis derivative crouch coefficient ranges between 0.72 and 0.85 validity and reliability of the system. The majority (80%) prefer a telediagnosis application in terms of improving patient management and satisfaction. Others have reservations about the technical reliability, privacy, practice expenses, cost of setting up the equipment, time, trust, skill, and diagnostic accuracy of patients. In conclusion, the majority of herbal practitioners agreed and supports the concept of modern technology and its application into the current practitioner’s practice. However, this study has identified certain barriers to the use of modern technology application and where practitioners would need support of the technology, especially in aspects related to sharing of information about diseases and its treatment on a database using the electronic medium for herbal medications

Keywords

Herbal practitioner’s perception; Modern technology; Healthcare delivery; Nigeria

1. Introduction

 In health care, especially in Nigeria, the use of modern technology like information technology (IT) has progressed drastically since the beginning of electronic patient registration, leading to improvements in the interfacing and fusion capa­bilities of a large variety of computer and telecommunication technologies. The perception of herbal practitioners to modern technology in herbal medicine in Nigeria was not investigated. Therefore, as the technology been applied in telemedicine successfully to orthodox medicine, it is considered to be successful in herbal medicine and its prescriptions with same technology, though, the existing studies on telediagnostic have been examined using the application of modern technology device to improve healthcare delivery on orthodox medicine, but most of these researchers worked on imageries as source of information (Ogirima, 2018b). Who are the herbal practitioners? Herbal practitioners are those specialized personnel that give herbal treatments to patients (Ogirima, 2018). In the modern technology, herbal practitioners treat patients with modern technology devices such as telephone, internet, short message service and videoconferencing depends on patients’ accessibility. These available forms of modern technology devices was been utilized by herbal practitioners that helped greatly in carrying out routine the obligations and responsibilities of practitioners in enhancing healthcare delivery in Nigeria compare to the previous face-to-face medication (Ogirima, 2017). In collaborative environments the application of modern technology has enhanced prescription at distance easier on a real-time diagnosis of patients by herbal practitioners with the integration of electronic healthcare services (Ogirima, et al., 2017 and Ogirima, 2018b). During the spread of Coronavirus pandemic (Covid-19), many Nigerian get prevention and curative solutions through the dissemination of information and awareness through this modern technology such as telephone, internet, radio, television and internet from herbal practitioners.

The study is limited to selected herbal centres in Oyo, Ogun, Lagos, Ekiti, Ondo, Osun, Kwara, and Kogi States in Nigeria having the same tropical medicinal plants for curing tropical diseases like malaria, typhoid, and sexually transmitted diseases. The choice of the studied areas was as a result was of ease accessibility to tropical medicinal plants and established herbal medical organizations ( such as Ogi Herbs, Yemkem Ltd, Oko Oloyun, and Lambo Herbal Center), and high level of patronage of people seeking for herbal medication. Over one hundred medicinal plants were used during this study for the curative of tropical disease common in Nigeria ( Ogirima, 2018a)..

The study was to check how the herbal practitioners perceived the idea of the technology in healthcare delivery. Hence no existing studies on telediagnostic have been applied on herbal medicine; and the knowledge of herbal medicines in Nigeria are mainly observed, practiced and passed verbally from generation to generation. As time goes by, the knowledge on the practices of herbal medicine to treat illness is at risk of being deteriorated or lost. This usually happens when the practitioners have no children to inherit their knowledge or if the descendants have no interest in herbal medicine. The skill of practising herbal medicine could be taught to selected people and if none found due fit to inherit such dexterity, the knowledge is buried with the dead practitioners (Ogirima, 2018a and Ogirima, et al., 2019). The goal of the study is to explore the perception of herbal practitioners on the application of modern technology such as IT on healthcare delivery in Nigeria.

1. Review of Related Works

In a collaborative telediagnosis, diagnosis made at a remote site and it based on assessment of data transmitted from the device that monitors the patient and transfer media link to the diagnostic centre with aid of modern technological instruments. This determines the nature of a disease at a site remote from the patient on the basis of telehealth methods of transmitted data. This is done through telecommunication device like telephone, internet and video conferencing (Setyono et al., 2014, Ogirima, et al., 2014. and Ogirima, 2015a). Perfect telediagnosis need ICT for an effective patient’s diagnosis on a real-time interaction and consultation through an online communication for instance video conferencing (Kennedy et al., 2006). Telediagnosis application has been used by nurses in the hospital, physicians and other consultants to diagnose common diseases in order to reduce cost ease patients on appointments and minimize patient visit. Among the procedures used in telediagnosis application includes the application of telephone, internet usage and computer telephony (Jing et al., 2016). Telephones found to be very useful for telediagnosis in modern medicine. Correspondences with patients through telephone have provided useful information to have affective symptoms, health related quality of life, and disability and medication compliance inpatient to medical care (Revicki et al., 1997 and Ogirima, et al., 2017). This aids in healthcare delivery and exchange of healthcare information among the across the geographical distances having and willing to have medication at distance by health workers. It involves between the client and the expert (real-time or pre-recorded), and the kind of transmitted information (Seunghyun et al., 2010, Ogirima, et al., 2014 and Ogirima, et al., 2017).

Gholamhosseini and Ayatollah (2017) conducted a survey on practitioners e-health readiness in healthcare to evaluate Iranian hospitals in preparedness for full implementation of e-health for distribution of the technology among the hospital in Iran, however, no specific procedure and tool was mentioned for the designed assess or measure of the e-health readiness.. Though, the study was to design to check an e-health readiness assessment and to apply this tool to review the Emuoyibofarhe (2012) on e-health models and its relative simplicity method for assessing hospitals essential information to assist healthcare facilities focus preparations and planning for proper e-health implementations. Emuoyibofarhe (2012) conducted a survey on e-health readiness status in rural healthcare centres in Western part of Nigeria. Both researchers (Gholamhosseini and Ayatollahi, 2017 and Emuoyibofarhe, 2012) used some critical factors of e-health readiness, such as need-change readiness, engagement readiness and structural readiness to assess the e-health preparedness status of health practitioners’ perspectives, the opinion of the public, the patients and healthcare managers from both countries. The result of the studies was found that healthcare managers were not ready for the deployment of e-health facilities. Ajala, et al., (2015) highlighted the challenges faced in development and adoption of telemedicine in Southwestern Nigeria as technological and non-technological factors. The researchers further grouped the challenges the adoption of telemedicine into unfavorable government Policy, poor funding, and technical know-how.

The results obtained from the evaluations shows that despite the awareness of telemedicine by medical practitioners in Iranian hospitals and southwestern Nigeria, only a few medical facilities have integrated telemedicine into healthcare services till date. Electronic prescribing application usage assessment on deployment platforms was conducted to determine prescriber acceptability and satisfaction of the application to automate the prescription system into the service (Ogirima, et al., 2013 and Ogirima, 2015b). In this paper, the end user's most preferred platform was conducted to investigate and compare the analysis based on factors that could influence the user’s choice of mobile or web platform; the factors including cost, ease-of-use, mobility, privacy, and security (Ogirima, et al., 2013). These aspects include the practitioners’ concerns with cost, time, security and diagnostic accuracy was conducted on telediagnosis setting , practice expenses and diagnoses time, the perceptions of usefulness were lower, because of some respondents views. Some were of the opinion that cost, time, security, unclear remuneration guidelines, lack of direct contact and comfort with technology was identified as barriers to the integration of ICT (Estain, et al., 2016 and Tsai, 2016).

However, some of the existing studies of modern technology was done on orthodox medicine and examined with aids of modern technology devices for effective healthcare delivery ( Claudio, et al, 2007; Seunghun, et al., 2010; Musheer and Tanvir, 2012; Kasasab, et al., 2012; Sanchez-Santana, et al., 2013; Ryhan, 2013; Hafez, 2014; Abo-Zahhad, et al., 2014; and Mamadou, et al., 2014). Most of these researchers use the modern technology to detects and worked on imageries using information technology (IT) to dissemination of information among tele-consultants to review the health status of the patients. An architectural framework was proposed for the application of modern technology to be used by herbal practitioners in collaborative environment using IT connectivity in diagnosing and prescribing herbs to patients using the technology to complement the modern applications of health care delivery (Ogirima, et al., 2017 and Ogirima, et al.; 2019).

1. Methodology

This section comprises of collaborative assessment factors, the research questions, the study area, and sample size, data collection instrument, method and tools for data analysis for the user-preferred platforms to access electronic prescription applications are discussed.

* 1. Collaborative Factors

The factors that could affect the functioning of the established herbal organization with respect to the modern technology include three aspects of collaboration: knowledge, trust, and institutions into the following reasoning:

1. Perceived ease use of the telehealth technology effort.
2. Perceived usefulness of the technology with respect to teleherbal application.
3. Usage Intention usage of the system by practitioners.
4. Technological efficacy and capability to use the teleherbal application.
5. Social trust of the practitioners.
6. Institutional trust among the herbal practitioners.
7. Social participation in how actively a practitioner has taken part in other social free-time activities.
8. An attitude of herbal practitioner using the introduced technology.
9. Technological complexity of practitioners’ perceptions regarding effort of understanding of the newly introduced technology
10. Compatibility of the new technology’s consistency with the existing face-to-face and experience
11. Expected practitioner’s satisfaction in terms of use, which can serve as an indicator of acceptance of the new technology.
12. Perceived risk perspective that could affect expected practitioner’s satisfaction.

* 1. Research Questions
1. Is the usage of this technology more cost-effective than face-to-face platform or vice-versa?
2. Do prescribed herbs and patient information more secure on the collaborative platform than face-to-face platform or vice-versa?
3. Is there any level of privacy when using collaborative telediagnosis to herbal healthcare delivery?
4. Is there any mobility level of the teleherbal system when deployed?
5. How easy it is when using collaborative teleherbal technology?
6. Collaborative telestaff meetings useful necessary?
7. What is your opinion in terms of scientiﬁc level/merit of meetings?
8. Is there any utility of these teleconferences for your daily herbal practice?
9. What is the effect of this telediagnosis compare to face-to-face technique?

More research questions are shown in Appendix A.

* 1. Measurement

The measurements items of the questionnaire in the study were generated from in-depth interviews with herbal practitioners in the studied areas who have used the new introduce herbal telehealth system.

* 1. Study Areas and Sample Size

The population of the study comprises of herbal health service providers from eight selected States of Nigeria which includes Kogi, Kwara, Ondo, Lagos, Ogun, Ekiti, Oyo, and the Osun States. The health service providers consist of Yoyo Bitters, Yemkem, Ayodele slimmer, Oko Oloyun, Lambo Herbs, and Anajinono Herbs. The staffs were the respondents. A total of 100 copies of the questionnaire were distributed among the studied centre organization staff that serves as respondents, the organizations include Yoyo Bitters, Yemkem, Oko Oloyun, Ayodele slimmer, Lambo Herbs, and Anajinono Herbs. Ninety-five (95) respondents returned the questionnaire sheets representing response rate 95% as shown in Table 1. The respondents were asked to be free in rating the questionnaire on how significant the influence of the choice of telediagnosis in herbal healthcare delivery. Respondents, who provided feedback on their introduced technology readiness assessments’ tool and who completed the final telediagnosis readiness assessment tool for respective employees of the selected organizations. A purposive sampling method was used to invite them to take part freely in the study. The majority of the respondents were male and most in age group of 40–49 years.

The study is limited to the Southwestern (Oyo, Ogun, Lagos, Ekiti, Ondo, and Osun State) and some part of the North-Central (Kwara and Kogi State) part of Nigeria has the same tropical medicinal plants for curing tropical diseases like malaria, typhoid, sexually transmitted diseases etc. The collaborative telediagnostic system for medical care services is only available at designated centres. Choice of the studied areas was based on availability herbal materials, established the herbal medical organization (e.g. Yemkem, Oko Oloyun, Lambo Herbal centre etc.) and high response of patronage of patients that use herbal medication. The study lasted for six(6) years (2013 – 2018).

* 1. Data Collection Instrument

The study started since January, 2015 to July 17, 2016 involving group discussions, unstructured interviews in Appendix A, personal observations and verbal talks with informers to obtain information about the preparation of herbs from the local community, reginal vegetation locality, use, conservation, treatments and the idea of using modern technology diagnosing and prescriptions. Well-structured questionnaires (in Appendix A) were used to gather primary data for the study. Primary data source employed for the study was administered to the 100 respondents. 95 respondents compiled and returned the administered questionnaire. Other sources of data used included Internet facilities and medical books.

* 1. Method of Data Analysis

The descriptive survey was adopted in obtaining the opinion of the respondents from the studied organization which served as a sample of the targeted population perception of herbal practitioners for the usage of the new technology. Microsoft Excel was used for the analysing of the captured data obtained from the respondents.

1. Results and Discussion

The result obtained from respondents’ data was analyzed with the aid of Microsoft excels was used to get the frequency and response mean depicts user’s satisfaction with most of the features of the new technology. The statistics of data sources are summarized in Tables. Table 1 show detail descriptive demographic and professional characteristics of the respondents, Table 2 show users respondents frequency rating among the means of diagnoses and prescriptions, Table 3a shows data analysis of the administered questionnaire, Table 3b shows Data Analysis of the Administered Questionnaire, Table 4 show Users Evaluation Metrics Assessments rating and Table 5 show Reliability and validity analysis results from the hypothesis. The response mean values are in the upper classes of the rating scale exception of items 22 (Q22) through item 25 (Q25) were reversal items.

Figure 1 show chart representing the preferred diagnosis as in Table 1. Figure 2 show chart rating of diagnoses and prescriptions of Table 2. Figure 3 show chart representing the numerical response of Table 3a. Figure 4 show chart representing the numerical frequency of the respondents’ response in Table 3b. Figure 5 show distribution the respondent’s organization centres from Table 1. Figure 6 showing the bar chart of users’ metrics evaluation of the system in Table 4. Figure 7 show the Graphical Reliability and validity analysis results of the hypothesis of Table 5 that show the hypothesis derivative crouch coefficient ranges between 0.72 and 0.85. With the rating, it was discovered that the response of herbal practitioner perspective shows that the developed system would be more useful to complement the orthodox medicine with means response of 3.37 as depicted in Figure 3. Figure 4 shows numerical frequency of the respondents in Table 3a with corresponding responses mean of the technical requirements of the developed system. The technical know-how with mean response of 2.88 rated low as a result of low awareness of the developed system and while the user perspective about the system rated high with mean response of 3.39.

The study was evaluated using the statistical analysis of individual Likert items as presented in Tables 3a and 3b. The evaluation aim was to determine the relevant of the system to healthcare delivery services. The result obtained from the study is capable to assist herbal practitioner in getting an accurate and decision making, and reduces wrong medication error thereby increasing the efficiency of diagnostic skills. The bar chart representations of the analysis are presented in Figures 3a and 3b respectively. The users’ assessment of the SRI and SDR are both equal while SEU has low rating. Table 4 show users evaluation metrics assessments of the respondents’ frequency rating target. The low rating of the SEU due to lack of computer literacy, hardware requirements and the cost of putting the system into use and. Figure 6 show the performance evaluation..

This study evaluates Nigerian herbal practitioner’s perceptions on the usefulness of modern technology application on telediagnosis in herbal medicine. Generally, most of the respondent’s optimism was expressed with respect to advantages derived from the new technology for patients, compared with its advantages to face to face herbal care practice. Most respondents felt that teleherbal system could be useful in enhancing herbal care practice, patient management, and patient satisfaction. Some respondents were wary of the consequences of telediagnosis in herbal care practice. The aspects are the practitioners’ concerns with cost, time, security and diagnostic accuracy. But some attributes which include the setting up cost of telediagnosis, practice expenses and diagnoses time, perceptions of usefulness was lower, because of some of the inability of respondents to express strong views (Estai, et al., 2016).

However, majority of herbal practitioners prefer the new technology and ready to exploits it, this study contrasts both the claims of Emuoyibofarhe (2012) study on the readiness of the telemedicine application in orthodox medicine with respect to practitioners perspective in Western Nigeria and that of (Ajala, et al., 2015) claims affecting issues in adoptation of telemedicine in South Western Nigeria into unfavorable policy and funding of government, and technical knowhow with well-trained herbal practitioners having the necessary requirements in an established organization that has adequate herbal care requirements with digital cameras, and computers linked with internet connectivity for a joint diagnosing of patients. Therefore, the usage of ICT infrastructure in this idea will help in saving the cost for the purchasing teleherbal equipment; reduce practice expenses and consultation expenditures. Addressing telediagnosis in herbal medicine can be beneficial to the practice aspects that could motivate other herbal practitioners to participate in integrating this technology into daily practice. It would be helpful to re-evaluate herbal practitioners’ perceptions as new issues may emerge when telediagnosis in herbal medicine becomes more widely used. Furthermore, policymakers must establish well-defined standards and laws that can regulate the use of telediagnosis in herbal delivery healthcare practice.

This study has really shows the practitioner’s perceptions of the technology, and has explicitly showed as in its perceived strengths in terms of patient care, safety, efﬁcacy, empowerment of patient, and treatment effectiveness of tropical diseases. There were different opinions regarding the safety and efﬁcacy among herbal practitioners; however, the majority were in favour of collaborative telediagnosis and prescription application in herbal medicine. The study has contributed to the literature and uniqueness in terms of size and qualitative design. The limitations of the study include small sample sizes of the practitioners be interviewed and also served as respondents of the administered questionnaire. Probably it will reduce the individual opinions; thereby limiting the understanding of the major contributing factors to discrepant views. This could be biased to practitioners to create equality between strengths and weaknesses.

This research work is limited to selected herbal centres in the Southwestern (Oyo, Ogun, Lagos, Ekiti, Ondo and Osun State) and selected states in North Central (Kwara and Kogi State) Region of Nigeria having the same tropical medicinal plants for curing tropical diseases like malaria, typhoid, and sexually transmitted diseases. The choice of studied areas was informed by ease of accessibility to tropical medicinal plants and established herbal medical organizations ( such as Yemkem Ltd, Oko Oloyun, Lambo Herbal Center), and high level of patronage of people seeking for herbal medication. Over one hundred medicinal plants were used during this research work for the curative of tropical disease common in Nigeria (Ogirima, 2018a).

**Table 1**: Demographic of Level Practitioner

|  |  |
| --- | --- |
| Characteristics  | Frequency |
| **Gender** |  |
| Male | 84 |
| Female | 11 |
| **Ages** ( in Years)  |  |
| 15 - 25 yrs | 22 |
| 26 - 35 yrs | 30 |
| 36 - 45 yrs | 15 |
| 46 - 55 yrs | 10 |
| ≥ 56yrs  | 18 |
| **Qualification** |  |
| Post Graduate | 21 |
| Graduate/HND | 30 |
| NCE/OND | 31 |
| SSCE | 8 |
| Others | 5 |
| **Herbal Centres** |  |
| Oko Oloyun | 20 |
| Yemkem | 12 |
| Ayodele Slimmers | 9 |
| Yoyo Bitters | 22 |
| Lambo Herbs | 11 |
| AnajinonoHerbs | 21 |
| Others | 0 |
| **Experience**  |  |
| 0 – 5 Yrs | 18 |
| 6 – 10 yrs | 15 |
| 11 – 15 yrs | 20 |
| 16 – 20 yrs | 17 |
|  ≥ 20 yrs | 25 |
| **No. of consultant** |  |
| 0 – 5 Staffs | 23 |
| 5 – 10 Staffs | 20 |
| 10 – 15 Staffs | 23 |
| 15 – 20 Staffs | 12 |
|  > 20 Staffs | 17 |
| **Prefered Diagnosis** |  |
| Face-to – Face | 12 |
| Internet/Web | 24 |
| Telephone | 12 |
| Telediagnosis | 47 |

**Table 2**: Herbal Practitioners’ Rating of the Means of Prescriptions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Strength** | **Face – Face** | **Internet/Web** | **Telephone** | **Telediagnosis** |
| Y | N | Y | N | Y | N | Y | N |
| Convenient | 20 | 15 | 30 | 25 | 20 | 26 | 30 | 34 |
| Easy | 10 | 22 | 25 | 20 | 25 | 10 | 40 | 48 |
| Inexpensive | 60 | 50 | 10 | 20 | 20 | 15 | 10 | 15 |
| Satisfactory | 19 | 30 | 31 | 10 | 10 | 35 | 40 | 25 |
| Large Network User | 10 | 35 | 25 | 30 | 30 | 15 | 25 | 20 |
| Allow Simultaneous Communication | 25 | 35 | 10 | 20 | 25 | 24 | 40 | 26 |
| Instantaneous **/** Real time | 10 | 30 | 15 | 35 | 15 | 25 | 60 | 10 |
| Small delay | 15 | 30 | 25 | 20 | 15 | 25 | 35 | 25 |

**Table 3a**: Analysis of the Administered Questionnaire (Ogirima, et al., 2017).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Likert Item | SD | D | N | A | SA | Mean |
| Q7Q8 | Would you like to adopt technology in your interactions with your clients?Do you think that application will enhance health service delivery to your patient? | 1113 | 18 16 | 2022 | 3332 | 1312 | 3.203.15 |
| Q9Q10Q11Q12Q13Q14Q15Q16Q17 | Do you prefer your patient follow up visit for the consultation to be on computer link via internet?Do you diagnoses or prescribe herbal drugs to your patient using telephone conversation?Do you prefer to share information on herbal diagnoses with fellow colleague?Do you think inadequate power supply may affect communication with patient consultation in herbal Medicine?Will the cost of maintaining tele diagnostic facility hinder diagnoses and prescription through teleconsultation?Do you think telediagnosis of patient is safe and reliable?Do you think prescription of herbal drugs through web, telephone and other tele devices is adequate and safe?Will there be any financial gain for the patient when using telephone, and other media for prescription?Do you agree that herbal prescription is preferable to orthodox medicine? | 161618141515111012 | 151511141617171916 | 261532131525181923 | 183222313118283431 | 201712231820211313 | 3.123.202.993.373.193.123.333.223.51 |
| Q18Q19Q20Q21 | Is teleherbal prescription procedure more suitable compare to that of orthodox medicine approach?Could the new technology be used for treatment of diseases considered terminal by orthodox medicine?Is most equipment for the treatment prescribed by the new technology for various ailments readily available?Would you agree that the equipment and means of communication required to use the proposed herbal prescription system are readily available? | 17111511 | 15181516 | 27202618 | 18331930 | 18132020 | 3.053.203.153.34 |

Table 3b: Analysis of the Administered Questionnaire (Ogirima, et al., 2017).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Likert Item** | **V High** | **High** | **Medium** | **Low** | **VLow** | **Mean** |
| Q22Q23 | How can you rate technical knowhow is required to use this herbal prescription system?How would you rate the overall performance of this system as you have tested it? | 2220 | 2918 | 1826 | 1615 | 1016 | 3.422.88 |
| Q24Q25 | How much trust would you place on a diagnosis by this herbal prescription system?How likely are you ready to recommend this herbal prescription system to your herbal company? | 2016 | 3331 | 1817 | 1316 | 1115 | 3.403.18 |
|  |  |  |  |  |  |  |  |

**Table 4**: Users Evaluation Metrics of Practitioner Rating

|  |  |  |  |
| --- | --- | --- | --- |
| **Performance Parameter** | **Response Design Target** | **Number of Responses** | **Response Mean** |
| System Reliability Index (SRI) | >3 | 95 | 3.42 |
| System Ease of Usage(SEU) | <3 | 95 | 2.88 |
| System Degree of Relevance(SDR) | >3 | 95 | 3.15 |

|  |
| --- |
| **Table 5:** Reliability and Validity Analysis results of practitioner’s perceptive  |
| items Hypothesis |  Cronbach’s ∝  |

|  |  |  |
| --- | --- | --- |
| Xi | Perceived ease of use of the telehealth technology effort | 0.82 |
| X2 | Perceived usefulness of technology to teleherbal appl. | 0.77 |
| X3 | Usage Intention usage of the system by practitioners | 0.78 |
| X4 | Self-efficacy capability to use the collaborative systems. | 0.78 |
| X5 | Social trust with other health-care providers. | 0.73 |
| X6 | Institutional trust to an individual’s trust. | 0.79 |
| X7 | Social participation of actively a person | 0.74 |
| X8 | Attitude of herbal practitioner with the system  | 0.79 |
| X9 | Technological complexity perceptions new technology | 0.75 |
| X10 | Compatibility with the existing values | 0.78 |
| X11 | Expected user satisfaction acceptance of technology. | 0.76 |
| X12 | Risk perspective affect expected user satisfaction | 0.75 |

|  |  |
| --- | --- |
|  |  |

Figure 1: Bar Chart Representation preferred diagnosis in Table 1.

Figure 2: Bar Chart of diagnoses and Prescriptions of Table 2.

Figure 3: Bar Chart Representation of Herbal Practitioner Response of Table 3a.

Figure 4: Bar Chart Representation of Herbal Practitioner Response of Table 3b.

Figure 5: Distribution of Herbal Practitioner organization centres from Table 1.

Figure 6: Bar Chart of Herbal Practitioner Evaluation Metrics of the System of Table 4.

Figure 7: Graph showing Reliability and validity analysis results of the hypothesis of Table 5.

1. Conclusions

Most of the herbal practitioners (respondents) expressed posi­tive views on the technology-based solu­tions and equipment that can used to bring values to herbal practitioner’s practice in Nigeria. The study was able to identify certain barriers to the application of telediagnosis, and identified where practitioners could need support of using modern technology, especially in aspects related to expenses, equipment setup costs, time, technical incompatibility and security. It has been established that transmission of information about patient to other herbal consultants can be more accurate, and the interactivity of telediagnosis makes it easier to discuss the information about a patient in real time, increasing diagnostic accuracy to up to 80%. Based on results obtained, the study clearly shows that in telediagnosis user using the modern technology are highly satisfied. Also, in order to verify the new technology acceptance from the perspective, we presented variables to check from the Cronbach’s ∝ of the mean reliability analysis of the hypothesis. The results obtained from the respondents perspective study shows that various organizations in Nigeria, especially those from the studied areas are eager to use the new technology so that proper monitoring, diagnose and sharing information about a patient with other healthcare providers at distant.

However, this study has identified certain barriers to the application of modern technology for prescription in herbal medicine, and identified where practitioners would need the support to use the technology, especially in aspects related to sharing of information about diseases and its treatment on a database using electronic medium for herbal medications.

**Conﬂict of interest**

There is no conﬂict of interest

**Acknowledgements**

I wish to acknowledge Prof. Afolabi Adeolu Olabode and Dr. (Mrs.) Baale, Abimbola Adebisi, both were my Ph.D Supervisor and Co-Supervisor respectively. I appreciate my family, Mrs A.O. Ogirima, my children, Nimatallahi, Shamssiyyat, Hayatuldeen, Biizinillah and Faimat for their cooperation, patience and understanding throughout this study. I appreciate effort of Professor Arulogun O. T.; he was then the Director of ICT, Ladoke Akintola University of Technology, Ogbomoso, Nigeria for allowing me to use the centre resources to test the innovating idea. I express my deep gratitude to my senior brother, Dr. Ogirima Sanni Aminu of Ahmadu Bello Teaching Hospital, Shika , Zaria, Nigeria for allowing me to compare this research work with that of orthodox medicine

**Funding**

This is a self-funding research work. It is a PhD research work

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**Appendix A**

**Interview conducted during the field work for the Collaborative Telediagnosis and Prescription in Herbal Medicine**

The following questions were the modality used as guide during interviews. The interviews were held to cover points needed for analysis and information as test data for the implemented system.

1. Were you born by herbal practitioner?
2. How long have you been practicing?
3. How did it all start?
4. Did you receive any training to be able to do what you are doing?
5. Are you a registered herbal practitioner or Do you join association?
6. Are you happy and be proud to be called Herbalist?
7. What makes people at your level different from those at other levels?
8. What is the relationship between you and non-herbal practitioners?
9. Do you have spiritual powers for healing and where does it come from?
10. How do you diagnose your patient?
11. What are the modes of your prescription?
12. How free are you to collaborate with others (or western medicine practitioners)?
13. Do you have any rules to guide you in your work?
14. What happens if you cannot curse a disease?
15. Are there any laid down succession procedures?
16. Do you believe in almighty God?
17. As you have association can you also join Christian/ Islam religious groups?
18. Is it possible for you to practice traditional religion and still be a Christian/ Muslim?
19. How does herbal(traditional) medicine relate to Western medicine?
20. Is it possible for a person to rely on herbal or traditional medicine and have nothing to do with Western medicine?
21. At what stage do you refer patients to Western medical practitioners?
22. What do you expect them to gain from such visits?
23. Are you involved with any type of collaboration?
24. What are your views about collaboration with Western medical personnel?
25. How do you identify herbs or do you label them?
26. Do you document your practice?
27. If you have computer will you like to store your information on it?
28. Can I have access to your information?
29. Can I record or video our interaction or do you allow me take photograph of your herbs?

**Author Biographies**

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**Ogirima, Sanni Abubakar Omuya** started his professional studies from Kwara State Polytechnic, Ilorin, kwara state, Nigeria, where he obtained National Diploma and Higher National Diploma in 1988 and 1992 respectively. After completing his studies, he went for his National Youth Service Corp (NYSC) where he became a Research programmer in the department of Computer Science & Engineering, Ladoke Akintola University of Technology, Ogbomoso, Nigeria. Further to that he pursued his Post Graduate Diploma in Computer Science in the department. He later went to University of Ilorin, Nigeria where he obtained Bachelor of Computer Science, 2012 and later obtained Master of Technology (M.Tech) and PhD in Computer Science from Ladoke Akintola University of Technology, Ogbomoso, Nigeria. He is a member of Computer Professionals of Nigeria (CPN).