



## END USER PREFERENCES ON HOSPITAL WEBSITES IN NIGERIA

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### ABSTRACT

This paper presents a Usability study of the Nigerian Hospital websites, through usability testing of some sample hospital websites in Nigeria. The study aims to provide better understanding of the design features and content that offers an easier way of enquiring for some medical advice. Selected participants for the usability testing were given tasks to locate and find specified information in the websites and were evaluated based Nielsen usability heuristics in order to gather the users' opinion about the websites. The accessibility and availability were also evaluated and the findings indicate huge discrepancies between what people do and what the website are meant for. Each website has its own strengths and weaknesses, but in terms of interactions, our findings reveal that users misunderstand the important of reading instructions provided in websites and prefer direct interaction than by following instruction.

**Keywords:** *Usability, Usability Study, Usability Testing, Hospital Websites, Usability Heuristics.*

### 1. INTRODUCTION

World population has increased tremendously after middle of the twentieth century until present. The increase has called for management of resources in order to improve the quality human lives. More importantly, the approaches that will sustain the well-being of human lives have been given priorities. Provision of food and health care delivery are given more concern than others, because the well-being of human, irrespective of their literacy, location and even race, efficiently depends on these two. Above all, both the rich and the poor, in any part of the world are not spared of the various diseases widely available in the world's ecosystems. Therefore, it can be seen that the most prominent challenge to the well-being of all humans in the world is qualitative health care delivery.

The application of Information and Communication Technology (ICT) healthcare systems is proven to save lives, improve the quality and efficiency of the health delivery system and contain the cost [1]. Thus, it can be indicated that Information and communication Technology (ICT) in health is not about technology anymore [2]. In the delivery of health care, it is about health professionals to make more excellent treatment decisions, hospital providing higher quality and safer care, citizens making informed choices about

their health, and governments becoming more conscious to health needs [3].

Health care providers need to deliver satisfactory services in a specialized field which involves a great number of stakeholders with different concerns, needs and requirements. Some hospitals' policies have focused on providing health and medical services to the public. Less attention has been given to the responsibility to provide useful, accurate health information of high quality to their key public mainly by facilitating interactive communication with patients, citizens and physicians and community services [4]. Most importantly, hospitals are turning increasingly towards the internet and developing their own web presence in order to enhance the provision of information and also employ interpersonal and interactive communication practices [4]. The users of the domain may be patients, clinicians, health care providers, insurers, decision makers [5].

Owing to the need in making sure that websites provide what is required, and due to the discrepancy between what people do and what they are expected to do, this paper present usability study of hospital website in Nigeria in order to explore their strengths and weaknesses.

The remaining part of the paper is described as follows: Section 2 presents the first usability preliminary study, and section 3 presents the second



usability preliminary study. Section 4 presents the final usability study and section 5 is the concluding part of the study.

## 2. PRELIMINARY USABILITY TESTING 1

Preliminary study in usability testing is aimed at providing a recognizance survey of the final work [5 – 8]. Many usability testing results are more credible when they are performed at least two times before the final study [9 - 10]. A sample of users would be involved in the usability testing sessions. Some of the hospital websites in Nigeria would be investigated and users would evaluate the usability of the selected hospital websites. An interview section was conducted for both the health professionals and prospective patients in order to understand their views on a selected hospital website. The pre-study was carried out using qualitative approach by interviewing both the health professionals at University College Hospital (UCH) such as General Medicine, Anesthesia, Chemical Pathology, Pharmacy and Public Health as well as the prospective patients. Details of the interview are included.

One of Human-Computer-Interaction (HCI) methods used in the session is interview. Twenty-four questions were set and broadly divided into opening questions, questions about internet knowledge and experience, University College Hospital and you as well as the closing questions.

### 2.1 Participants

Participants were drawn from various departments of the hospital such as General Medicine and Anesthesia, Chemical Pathology, Pharmacy and public health. Prospective patients included bankers, lecturers, accountants, business managers were also interviewed.

### 2.2 Demographics Profile of the Participants

Table 1 shows the demographics of the participants based on selected variables such as age, education, designation and internet experience respectively. The health professionals with age range of 30-39yrs constitute largest percentage (60%) of the participants while those of age range 50-59yrs constitute smallest percentage (10%). On the other hand, the prospective patients with age range (20-29yrs) and age range (30-39yrs) have the same percentage. The education level of the health professionals is at Bachelor's level while that of Prospective patients ranges from bachelors through Doctoral having 50%, 40% and 10% respectively. The internet knowledge of the participants rated

fairly high since most of them responded they spent more than 3hrs with the internet a day.

Table 1: Demographics Profile Of The Participants

Variables	Elements	Percentages (%) Obtained	
		Group A (Health Professionals)	Group B (Prospective Patients)
Age	20-29	0	20
	30-39	60	20
	40-49	40	40
	50-59	0	10
	60-69	0	10
Education	Bachelor	100	50
	Masters	0	40
	Doctoral	0	10

### 2.3 Themes

Several themes emerged in the analysis. Below are the themes and are explained and also accompanied by representative participant quotes to further clarify the participant's views.

#### Theme 1: Awareness

Most participants of the University college hospital were not aware that the teaching hospital has website. Which means the university hospital community does not know it has a website.

Participant 1: *I am even hearing this for the first time that UCH has a website*

#### Theme 2: Trust

Participant wanted to trust the hospital and its website. Access to physicians/doctors' information and their specialties encourage trust in hospital website users. Physicians' credibility in form of background, years of practice and specialty should also be included on the website.

#### Theme 3: Credibility

Another theme is credibility of the hospital itself. Participants' concept about the hospital's reputation was based on their impression of Web site claims. Participants desired to see the medical facility's competence via the website.

#### Theme 4: Privacy

The participants concerns also raised issues on how private would the website be? Won't all their information be known to the public?

#### Theme 5: Accessibility

In addition, accessibility to the website at any point in time is also a critical concern that was raised by most of the participants. The accessibility of the



website must be a twenty-four hours thing and must be running all the time.

**2.4 Summary of the first Preliminary study**

All the twenty participants responded positively to the interview and their suggestions facilitate the development of the research model. This interview led to the development of the element of the constructs such as Trust, Awareness, Credibility and Accessibility.

**3. PRELIMINARY USABILITY TESTING 2**

The pre-study 2 involves practical aspect wherein the participants were invited to access and assess selected hospital websites to complete a set of pre-specified tasks using the selected hospital websites. Combination of qualitative and quantitative techniques were involved during the usability testing sessions to gather data from users while completing tasks on the three selected websites.

Sample of users was selected to participants in Usability testing session. Previous research has shown that Usability testing with five users will reveal 85% of Usability problems [11-13]. The themes and the related items for pre-study two are listed in table 2. Essentially, the themes include usability, accessibility and availability [12]. All the participants volunteered and no incentive was provided for their participation except some light refreshments. All participants gave written consent.

Table 2: Usability Testing Evaluation Criteria

Themes	Items
Usability	Visibility, Learnability, Navigation, Flexibility and Efficiency, Aesthetic, Recovery from error, Help and Documentation
Accessibility	Simplicity, Easy location of Address, Memorability
Availability	24h per 7day, 7days per week, 365days per year

Adapted from Nielsen (2008)

The usability testing was conducted within a three month, participants were asked to complete a set of pre-specified tasks using the selected hospital websites namely; Ahmadu Bello University teaching Hospital, Zaria, Kaduna; Obafemi Awolowo University Teaching Hospital complex, Ile- Ife, Osun; University Teaching Hospital, Ozalla, Enugu. Each user was assigned a group ranging from A-C. Six tasks were selected as being representative of the common activities in the use

of the three selected hospital websites (see table 3). Individual user was studied on each session and all the sessions were recorded with digital camcorder.

Table 3: List Of Various Tasks Investigated On The Three Selected Websites

Task	Activities
1	Locate Anesthesia Department of the three teaching hospital websites
2	Find a consultant in Family Medicine in each hospital website
3	Find the location/ Address of each hospital from the website
4	Find the map and direction of each hospital and write the URL respectively
5	Locate “find a doctor” in each website
6	Locate “our services Logo” in each website.

This research study involved conducting Usability testing pre and post modifications to identify problems that should be addressed and then examine the effectiveness of the corresponding adjustments and to identify themes relating to website Usability. Table4 shows the order of accessing the selected hospital websites by the participants.

Table 1: Table 4: Order Of Accessing Of Selected Websites By The Participants

Order of Assessment	Group A	Group B	Group C
1 <sup>ST</sup>	ABUTH	UTHO	OAUTH
2 <sup>ND</sup>	OAUTH	ABUTH	UTHO
3 <sup>RD</sup>	UTHO	OAUTH	ABUTH

ABUTH - Ahmadu Bello University Teaching Hospital; OAUTH - The Obafemi Awolowo University Teaching Hospital; UTHO -University Teaching Hospital, Ozalla

**4. THE FINAL USABILITY TESTING**

The three website used in both first and second preliminary studies, are further used in this final study for example figure 1. The selected teaching hospitals have different designs and features of their websites which distinctly vary from one another. This further assists the strength of the assessment. The hospital websites portals are: Ahmadu Bello university teaching hospital: [www.abuth.org](http://www.abuth.org). The Obafemi Awolowo University Teaching Hospital Complex: [www.oauthc.com](http://www.oauthc.com) University Teaching Hospital, Enugu: [www.unthenugu.org](http://www.unthenugu.org)

#### 4.1 Demographic profile of Participants

The demographics of the participants selected for the usability testing session include the following variables; age, gender, ethnicity and education. Other parameters also examined are computer experience and internet experience. The mean age for the participants ranges between 32- 39 years which indicates that the participants are matured individuals who are expected to be well familiar with hospital websites. However, the gender distribution shows that the participants were predominantly male and by ethnicity, 'Yoruba' who hails from the south western part of Nigeria. The participants were drawn mainly from postgraduate students available in the sample area and 44.4% were PhD candidates while 54.6% were master's degree students. The computer and internet experience of the participants were rated as 'fairly high' since most of them responded that they spend more than 6hrs with their computer as well as on internet daily.

#### 4.2 Participants' Tasks observation

The ease of accomplishing the selected tasks by the participants were rated as 'Good', 'Average', 'Below Average' and 'Poor' for the 100%, 66%, 33% and 0% degree of completion. This study will focus on the 'Good' performance since the study is a preliminary study and the responses are summarized in Figure 4. About 44% of the participants were able to accomplish Task 1, since this percentage is less than average, thus the 'locations of Anesthesia Department of the three teaching hospital websites' were not easy. Furthermore, about 22% of the participants were able to locate 'a consultant in Family Medicine in each hospital website' and this is well 'below average'. This indicates that the designs of the three hospitals websites were poorly designed for the location of consultant.

'Find the location/ Address of each hospital from the website' is the Task 3 required from the participants, however, about 88% of them were able to accomplish this task. This indicates that the addresses of the three websites are very obvious. Task 4 required the participants to 'find the map and direction of each hospital and write the URL respectively' but 0% of them were able to do this, which then suggests that the design of the selected hospital websites lack maps/directions since the URL were equally not located. The participants were asked to locate "find a doctor" in each website as Task 5 and 33.33% of them accomplished this task. Similarly, this percentage can be rated below average. Task 6 required the participants to locate

"our services Logo" in each website and 22% accomplished this task. Therefore it can be concluded that the location of "our services Logo" is not that conspicuous on the website.

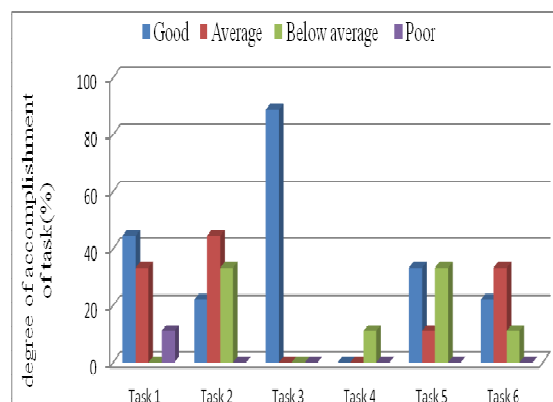


Figure 4 Percentage Degree Of Accomplishment Of Tasks

#### 4.3 Heuristic Evaluation

##### 4.3.1 Heuristic Evaluation Based on Nielsen's Guidelines

The responses of the participants were evaluated based on the suggested ten usability heuristics by Nielsen (1994) which are Visibility, Match between system and the real world, User control and freedom, Consistency and standards, Error prevention, Recognition, Flexibility and efficiency of use, Aesthetic and minimalist design, Help users recognize diagnose, and recover from errors, as well as Help and documentation.

##### A. Visibility

The responses of the participants based on visibility of the selected hospital websites as shown in figure 5. Generally, none of the participants strongly disagree as regards the visibility of the three selected hospital websites. About 44.4% of the participants agreed that Ahmadu Bello University Teaching Hospital (ABUTH) website is visible while 33.3% of the participants agreed that The Obafemi Awolowo University teaching Hospital Complex (OAUTH) and University Teaching Hospital, Ozalla (UTHO) websites are visible respectively. Thus, the result shows that ABUTH website is the most visible.

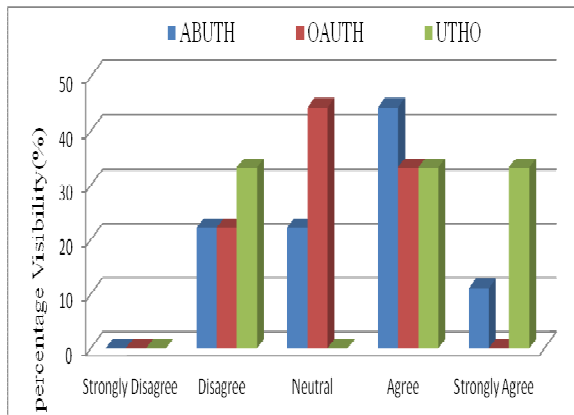


Figure 5: Percentage Visibility Of The Selected Websites

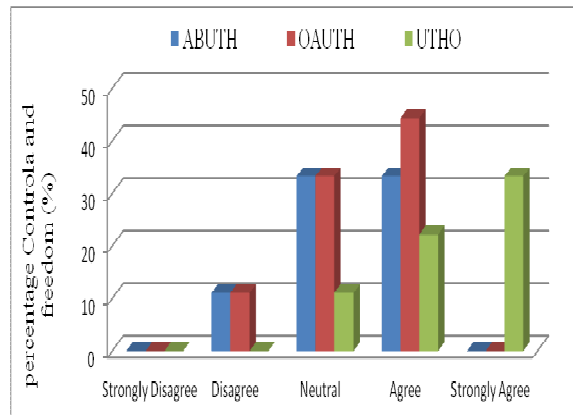


Figure 7: Percentage Control And Freedom Of Selected Hospital Websites

**B. Match between interface and the real world (learnability)**

The responses of the participants based on learnability of the selected hospital websites as shown in Figure 6. Also, none of the participants strongly disagreed in terms of learnability. About 33.3% of the participants were neutral about the learnability of both ABUTH and OAUTH websites while 11.1% were also neutral about that of UTHO. Thus, the learnability of the websites really had no significant effect.

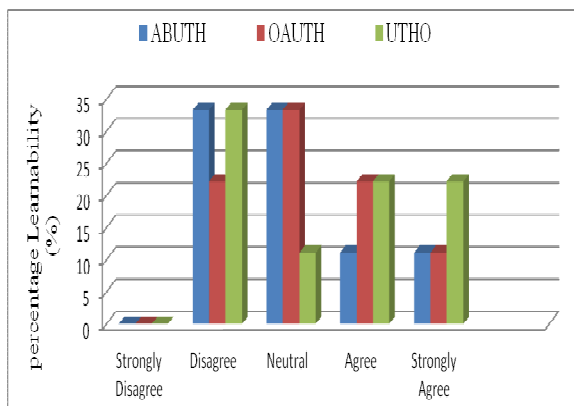


Figure 6: Percentage Learnability Of The Selected Hospital Websites

**C. Control and Freedom**

The responses of the participants based on control and freedom as shown in Figure 7. About 44.44% of the participants rated OAUTH website high compared to the other two hospital websites as more easy to navigate.

**D. Recognition**

In terms of recognition as shown in Figure 8, OAUTH was still rated high as against the two other hospital websites as 55.57% of participants rated OAUTH hospital website as easy to recognize.

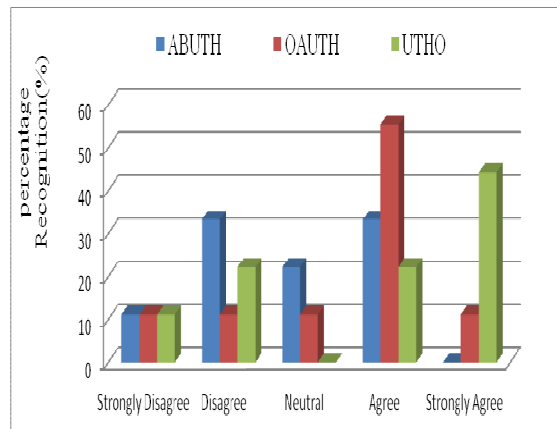


Figure 8: Percentage Recognition Of The Selected Hospital Websites

**E. Flexibility and Efficiency**

The responses of the participants based on flexibility of the selected hospital websites as shown in Figure 9. Generally, 33.33% of the participants were neutral to ABUTH and OAUTH hospital websites while 44.44%, 33.33% and 11.11% were able to locate the map of each hospital website respectively

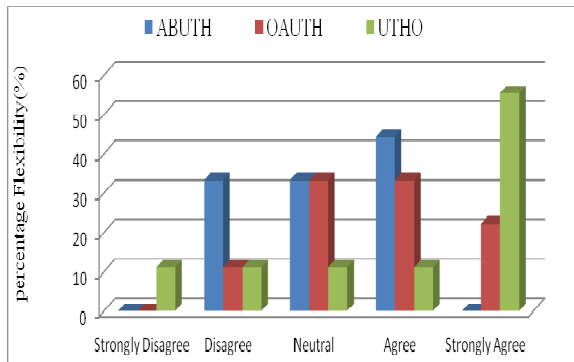


Figure 9 Percentage Flexibility Of The Selected Hospital Websites.

**F. Aesthetic**

The responses of the participants based on Aesthetic of the selected hospital websites as shown in figure 10 shows that 44.4% of participants rated ABUTH and OAUTH hospital websites high to possess Aesthetic than UTHO hospital website.

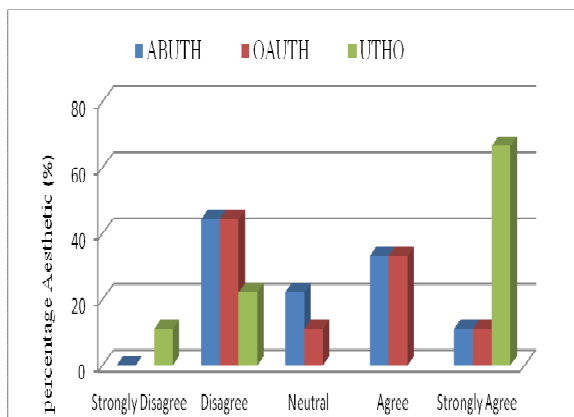


Figure 10. Percentage Aesthetic Of The Selected Hospital Websites

Also, 33.33% of participants were about to locate 'the map and direction to go to the hospital of ABUTH and OAUTH hospital websites respectively while none were able to locate that of UTHO. 66.66% of Participants on the other hand were able to locate 'find a doctor' in UTHO hospital website while 11.11% of participants were able to locate 'find a doctor' in ABUTH and OAUTH hospital websites respectively.

**G. Recovery from Errors**

The responses of the participant based on recovery from errors as shown in figure 11. 33.33% of participants disagreed to the fact that the three selected hospital websites could be recovered from errors while 11.11% and 22.22% of participants agreed that they could be recovered from errors.

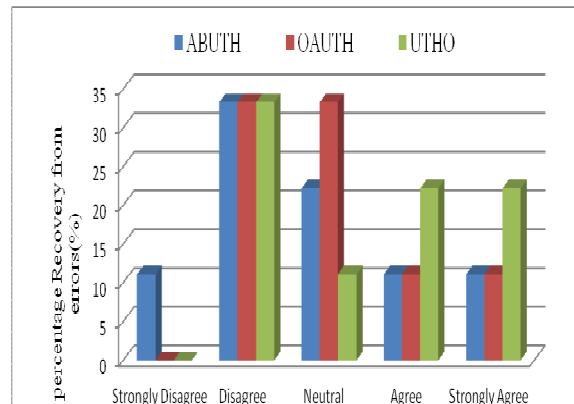


Figure 11. Percentage Recovery From Errors Of The Selected Hospital Websites

**H. Help and Documentation**

The responses of the participants based on help and documentation as shown in figure 12. None of the participants agreed that the selected hospital websites possess help and documentation as shown in the distribution of 33.33% for ABUTH, 22.22% for OAUTH and 22.22% for UTHO simultaneously.

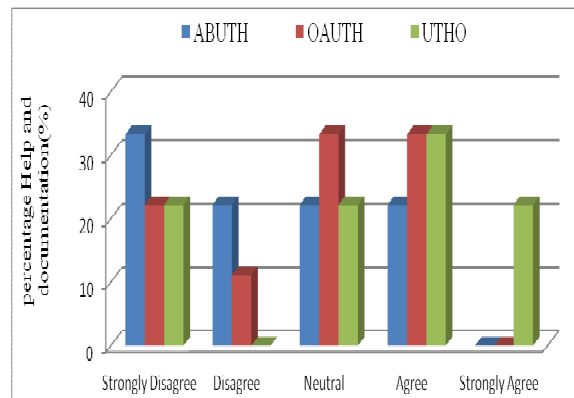


Figure 12: Percentage Help And Documentation Of The Selected Hospital Websites

**I. Simplicity of finding Hospital Website by Search Engines**

The responses of the participants based on simplicity as shown in figure 13. Generally, few participants disagreed that the accessibility of the three selected hospital websites aren't simple with the percentage of 11.11 each. Averagely, participants rated the three hospital websites as simple to access with the distribution of 33.33% for OAUTH, 44.44% for ABUTH and UTHO respectively.

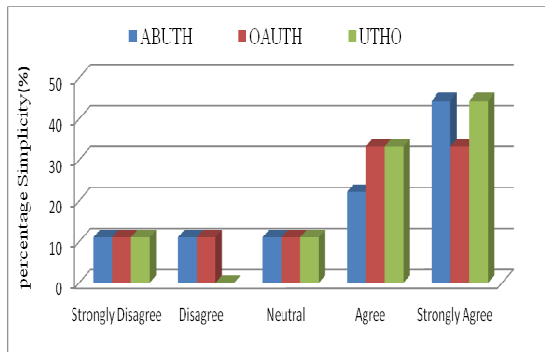


Figure 13 Percentage Simplicity Of The Selected Hospital Websites

**J. Simplicity based on Hospital Address**

The responses of participants on whether the addresses of the selected hospital websites are simple as shown in figure 14. The distribution of participants disagreeing though with a low percentage to the simplicity of the address was 11.11% for all the three selected hospital websites.

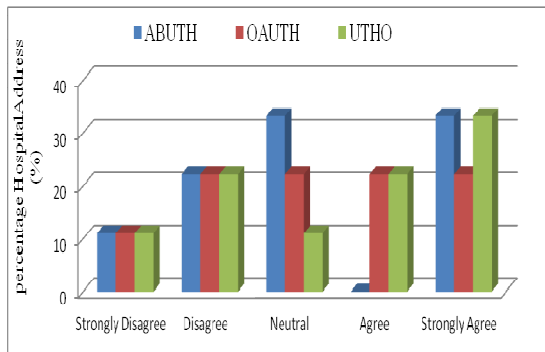


Figure 14 Percentage Hospital Address Simple

**K. Recalling of Hospital Website Address**

The responses of participants based on recalling of the three selected hospital websites as shown in figure 15. Most of the participants were neutral to whether the recalling of the hospital websites address was easy with the distribution of 33.33% for ABUTH, 44.44% each for OAUTH and UTHO respectively

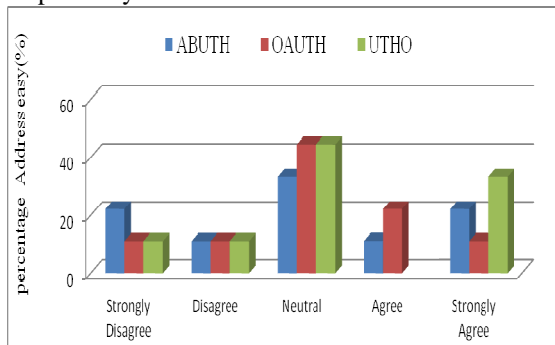


Figure 15. Percentage Hospital Address Easy To Recall

**L. Duration of Availability of Hospital Website 365days/Year**

The responses of the participants based on availability of the selected hospital websites for 365days/year as shown in figure 16. None of the participants agreed that the websites are available for 365 days and 33.33% of participants were neutral of the availability of the selected hospital websites. The same responses go for the availability of the selected hospital websites for 7days/ week and 24hrs/day as shown below in figure 17 and figure 18 respectively.

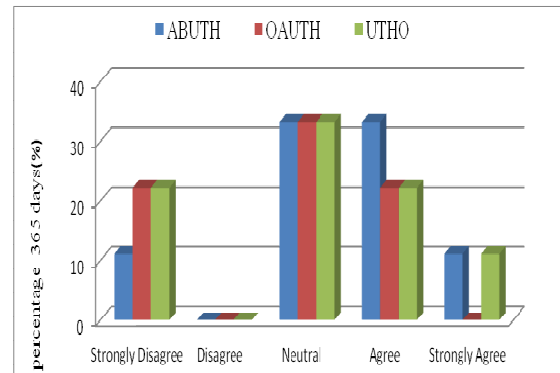


Figure 16. Percentage Availability Of Hospital Website 365days/Year

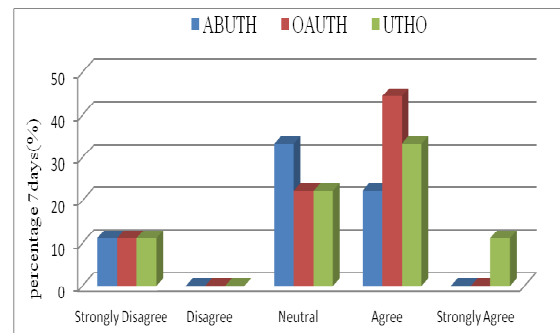


Figure 17. Percentage Availability Of Hospital Website For 7days

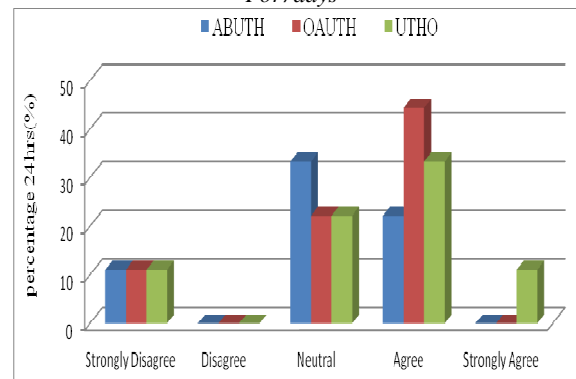


Figure 18 Percentage Availability Of Hospital Website For 24hrs.



## 5. CONCLUSION

The internet has really transformed the way many health seekers find health information. This study examined the usability and user experience of the selected hospital teaching websites. The selected websites represent the major ethnic groups. The participants who were mainly postgraduate students have high computer and internet literacy. The result of the study shows that Enugu is the most users friendly while Ahmadu Bello University Teaching Hospital is least user-friendly. Above all, the three selected websites need improvement for the effective healthcare delivery. Furthermore, since this study is a pilot study, there is room for improvement particularly considering staff members as well other tribes and gender. This research which is an ongoing research emphasizes the importance of involving end users and conducting usability testing to the success of a hospital website.

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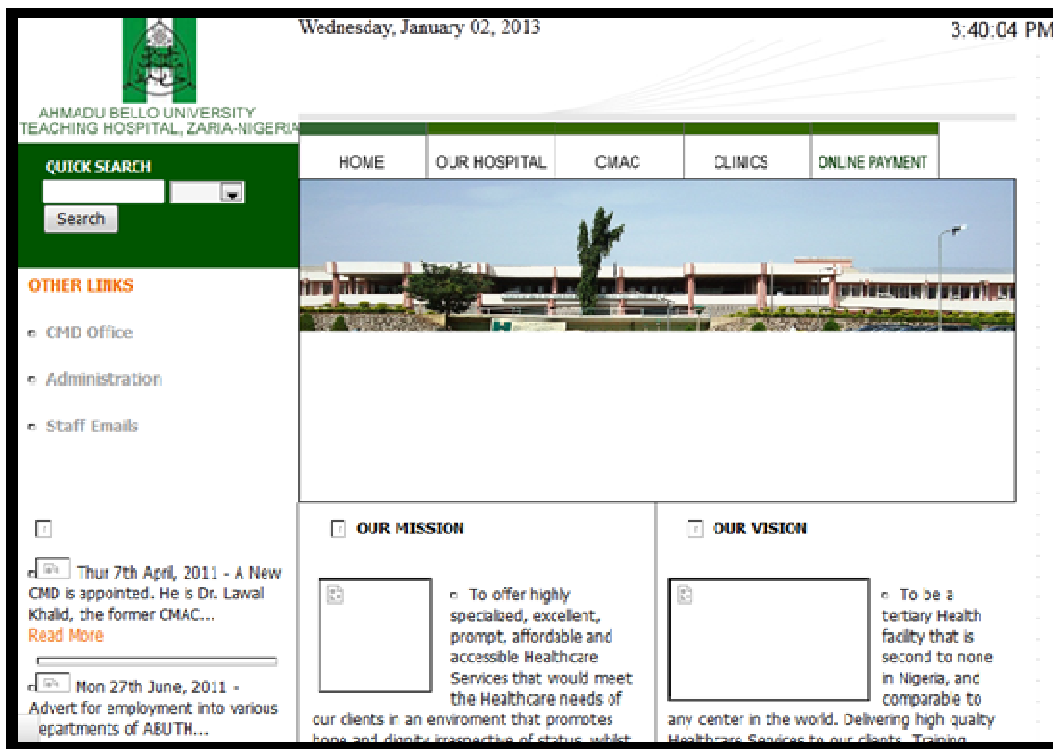


Figure 1: Website Of Ahmadu Bello University Teaching Hospital