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Enhancing health policymakers' capacity to use information and communication technology in Nigeria

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Abstract. Information and communication technologies (ICTs) are tools that have the potential to improve access to vital health information necessary for effective evidence-informed policy. In this study the ICT competence among health policymakers was assessed and an ICT capacity enhancement intervention training workshop was conducted for the policymakers and other stakeholders of the health sector in south-eastern Nigeria. Pre-workshop survey indicated grossly deficient ICT competence among the policymakers particularly the use of internet. The post-workshop survey indicated a significant improvement in ICT competence over the pre-workshop status. ICT training workshop can improve policymakers' capacity to acquire and apply evidence which is requisite for policymaking.

Keywords. ICT; health policy; evidence-informed; capacity

1. Introduction

In most developing countries including Nigeria, the health sector performance is grossly sub-optimal due to increased burden of underdevelopment, political instability, weak institutions, inadequately developed social sectors, scarcity of resources, and marked social inequalities [1]. In Nigeria the recognition of the importance and the necessity of the use of best available research evidence to inform health policymaking is a recent development [2,3], and previous reports have indicated a similar situation in many other developing countries [4,5]. Convincing information has been provided by numerous studies indicating that evidence from research can enhance health policy development [6-9]. This is because evidence-informed health policymaking is characterised by the systematic and transparent access to, and appraisal of, evidence as an input into the policymaking process [10].

In Nigeria, in spite of the recognition of the value of research evidence in policymaking, most policymakers and other major stakeholders in the health sector

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have not actively been employing research evidence in policymaking and practice [2,3]. One of the factors that could be responsible for this development is the grossly deficient capacity to use information and communication technology (ICT) particularly the use of computer and the internet by many individuals in policymaking positions in Nigeria [11,12]. Chetley [13] in a framework paper on the role of ICT in the health sector noted that policymakers and other stakeholders of developing countries are faced with major constraints and challenges in using ICTs effectively in the health sector. In the case of Nigeria this is not a surprise because the arrival of computer systems and technology in Nigeria preceded the availability of computer skill and knowledge in Nigeria educational system [11]. Consequently most of the policymakers who graduated from tertiary institutions before the early 1990s did not receive any training on computer or internet usage during their educational programme. Gething et al. [14], observed that in addition to the dearth of ICT and mass Internet connectivity in most African setting, there is a paucity of ICT-related knowledge and skills limiting capacities of national health management information systems (HMIS) to generate, analyze and disseminate information for use in decision-making.

ICTs have been defined as "tools that facilitate communication and the processing and transmission of information and the sharing of knowledge by electronic means encompassing the full range of electronic digital and analogue ICTs" [13]. In practice, the ICT competency problem among policymakers, namely a lack of competency using computers and the internet is a major challenge to evidence-informed policy making in Nigeria [3]. A number of previous studies have clearly demonstrated that the lack of competence (including ICT skills) among policymakers to acquire, assess, adapt and apply research evidence is a major factor hampering the uptake of research into health policy particularly in developing countries [15-17].

There is scarcity of studies that assessed the ICT competence of policymakers in developing countries. This is probably because it is presumed that anyone involved in the policymaking process should be computer literate and be able to use the internet. In reality however, this is far from what is currently obtainable especially in most low and middle income settings and the findings of Albert et al. [17] attest to this. The objectives of this study therefore were three folds. The first objective was to assess ICT competence (computer literacy and the capacity to use the internet) among health policymakers in Nigeria. The second objective was to conduct an ICT capacity enhancement training workshop for the policymakers, and the third objective was to highlight the significance of ICT capacity enhancement among policymakers for evidence-informed policymaking in Nigeria.

2. Materials and Methods

2.1 Theoretical framework underlying the study methodological approach

ICTs have been described as having a crucial role to play in improving the effectiveness of the health sector by maximizing the use of scarce knowledge and limited resources as well as bringing life-enhancing knowledge to people in ways they can use, when and where they need it [18]. ICTs have therefore greatly improved access to health information, research, literature and training materials, thereby

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supporting the health research enterprise and enabling comprehensive, evidence-based policymaking [19].

Although published information is scanty, available evidence from developed world indicates that ICTs are used to promote better health behaviour, to improve decision making, to promote information exchange among peers, for self care and professional support, and to enhance the effectiveness of health institutions [18]. These findings show that a relationship, though complex, surely exists between effective job performance of a health sector stakeholder (policymaker or service provider) and ICT use. It is based on this premise that we postulate that enhancing the individual capacity of policymakers to use ICTs through a training workshop will likely improve their uptake of evidence into the policymaking process. In an earlier study Bowen and Zwi [20] highlighted a pathway which illustrated the different types of evidence and their uses in health policymaking, and proposed that specific capacities, such as an individual's skills and experience can influence the adoption and adaptation of evidence into practice.

Our postulation that strengthening individual capacity for ICT via a workshop can improve the use of research evidence for policymaking was informed by the report of Bowen and Zwi [20]. Our position is further supported by the fact that ICT competence will not only enable policymakers to acquire and assess reliable evidence but also adapt, apply and communicate the evidence appropriately [6,19]. Chetley [13] noted that a key to strengthening health and other social systems is to improve the individual skills of the principal actors within those systems including the information technology skills. This is because reliable information and effective communication are crucial elements in health policymaking and public health practices. In Nigeria and in many other developing countries, competency problem in ICT use remains a major impediment in the process of research-policy link [3,14]. Peizer [21] in a paper on strategies to bridge the digital divide, made a case for a significant time and resource commitment to invest in training to enhance ICT competence of those involved in making health policy.

To the best of our knowledge, this investigation is the first attempt within the West African region to establish the relationship between the policymaking process and evidence informed policymaking and their link with ICTs. Because of the dearth of information on this subject, it is our intention therefore to present this investigation as an introductory exploration study of the evidence-informed policymaking and ICTs. This study was not designed to comprehensively evaluate the full spectrum of issues relating to the relationship between ICTs and evidence informed policymaking. Apart from the fact that it is well beyond the scope of the study, the United Nation ICT Task Force [22] noted that measuring the impact of ICT on health generally (including the health policymaking process) appears difficult because of the existence of many other factors that impact health. The major emphasis in this study therefore was on gaining ideas and insights which would help determine the best research design and methodology for an appropriate future definitive study.

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2.2 Study design

This study was a cross-sectional intervention study conducted in Ebonyi State south-eastern Nigeria and was divided into two phases: the pre-intervention phase and the intervention phase.

a. The pre-intervention phase: This phase involved a survey on the basic knowledge of ICT, computer literacy and use of research evidence in drafting health policy among the policymakers and other major stakeholders in the health sector at the sub-national level. The purpose of the pre-intervention survey was to determine the level of ICT competence of participants and obtain information that will guide the development of the intervention programme. The survey methods included the use of quantitative approach (via the administration of a pre-tested structured questionnaire) and qualitative approach using a focus group discussion. A one-day evidence-to-policy meeting was held at the conference hall of the Ebonyi State Ministry of Health in July 2009, and policymakers including the Health Ministry directors, managers, heads of department, project officers and senior health professionals were invited to the meeting.

The meeting was convened by the study team in conjunction with the office of the State Honourable Commissioner for Health to promote evidence-informed health policymaking. The meeting discussed the importance and need to use research evidence for policymaking and how to enhance individual capacity and skill especially ICT to accomplish this. A total of 35 individuals participated in the meeting. During the meeting the survey questionnaire was administered to participants. The pre-tested questionnaire contained questions on participant biodata, designation, level of operation, computer literacy, internet use, and training on health policy. The questionnaire was administered to each participant and was self-completed and was collected by the study team before the commencement of the focus group discussion. The focus group discussion session enabled participants to provide information on the specific aspects of ICT that improvement of their competence is most required. This information contributed to inform the design of the specific training content of the intervention phase.

b. The intervention phase: As a part of the intervention phase, a three-day ICT training workshop was conducted in November 2009 at the Ebonyi State University (EBSU) ICT Centre Abakaliki Nigeria, for the policymakers and other stakeholders in the health sector. All the policymakers who participated in the pre-intervention phase were invited along with others who fulfilled the study participant inclusion criteria described in the "Target participant" section below. The overriding goal of the ICT training workshop was to expose participants to the practical aspects of computer and internet usage and their application in acquiring, assessing, adapting and applying evidence in policymaking.

A training manual was specially developed by the EBSU ICT Centre for the purpose of the workshop which was made available to all participants. The workshop commenced with the administration of a pre-workshop pretested structured questionnaire. Using the questionnaire, an assessment was conducted on participants' knowledge and application of information/communication technology particularly in the following areas: (i). Computer appreciation; (ii). Microsoft word; (iii). Power point; and (iv). Internet use. After the questionnaire administration, the training was conducted by the Director and the lecturers of the ICT Centre. The training focused on the development of the capacity of the policymakers on computer appreciation and application. Emphasis was placed on the following: (a). Benefits of engaging ICT in

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running the health sector; (b). The search protocol for health information and policy relevant research evidence; (c). Identification of and search strategies of a wide range of electronic resources, in addition to the traditional scientific and clinical databases (eg., MEDLINE, EMBASE, Cochrane Database, Allied and Complementary Medicine, British Nursing Index, Social Policy and Practice etc); (d). Information audit to accompany search strategies. Practical sessions were held during the workshop in which each participant used an internet connected computer to practice the acquisition of research evidence from relevant electronic databases.

Before the commencement of the ICT training a pre-workshop structured questionnaire was administered to participants while a post-workshop questionnaire was administered after the training. The measurement strategies of the questionnaires include the use of the Likert scale rating of four options (1. grossly inadequate, 2. inadequate, 3. fairly adequate, 4. very adequate). Provisions were made on the questionnaire for respondents' written comments. Outcomes of both questionnaires were compared to determine the impact of the intervention.

2.3 Ethical consideration

This study was approved by the Senate Committee on Research (SCR) of Ebonyi State University Abakaliki Nigeria which provided the ethical clearance/supervision and by the Ebonyi State Ministry of Health Abakaliki Nigeria. Both approvals were granted on the basis that participation in the study would be voluntary following informed consent; participants' anonymity be maintained; and that every finding would be treated with utmost confidentiality and only for the purpose of the study. These terms were strictly adhered to in this study.

2.4 Target participants

The target participants included the following: health researchers; directors, project/programme managers, and heads of departments in the health ministry; hospital administrators; chief executive officers of health-based civil society groups including non-governmental organizations; leaders of national health-based associations and health directors/managers in uniform services. In Nigeria, these individuals are described as the key actors in the health policymaking process [2,3,23]. The invitation letters were sent to these individuals about two weeks to the date of the training workshop.

2.5 Data collection and analysis

The data collected via the questionnaire in the pre-intervention phase was expressed in percentages. The response and comments from the interactive/discussion session were noted and were analyzed based on Giorgi's phenomenological approach [24], further described by Albert et al. [17] and included: going over all the textual information to gain an overall impression, identifying all comments that appeared significant to the research, extracting these meaning units, followed by discussion and consensus. The data collected via the questionnaires was analyzed and presented as means, median and range as described by Johnson and Lavis [25].

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3. Results

3.1 Pre-intervention phase

Of the 52 individuals invited to the pre-intervention meeting, 35(67.3%) attended and participated in the meeting. The profile of the participants at the pre-intervention meeting and findings of the quantitative survey conducted during the meeting are presented in Table 1. Results indicated that over 60% of the participants have been in their present office for more than thirty months. A considerable proportion of the policy makers (45.7%) were not computer literate and of those who were computer literate only 47.4% have knowledge of basic computer application. Of all the participants only 40% of them have ever used the internet to source for information. Only 32.1% used research evidence in drafting health policy in the past. Most of the participants (74.3%) have not been involved in any health related research since they assumed their present office. All the participants agreed that it is needful to collaborate with researchers in the policymaking process.

The outcome of the focus group discussion revealed the specific areas of ICT deficiencies of the participants. More than 60% of the participants admitted they need to have an understanding of the rudimentary knowledge about information systems, information processing techniques and use of internet for acquiring and synthesizing research evidence for policymaking. They also emphasized their need to have a working knowledge of the structure and the basic principles of operating a computer particularly the use and application of Microsoft Word and PowerPoint.

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Table 1. Profiles of policymakers at pre-intervention evidence to policy meeting at Ebonyi state south-eastern Nigeria

Parameter assessed	Frequency	Percentage
Duration in present designation (months)		
≤10	6	18.2
11-21	4	12.1
21-30	2	6.1
31-40	9	27.3
≥41	12	36.4
Level of operation		
Federal	6	17.1
State	19	54.3
LGA	10	28.6
Gender		
Male	26	74.3
Female	9	25.7
Age Category		
25-34 years	3	8.6
35-44 years	24	68.6
≥45 years	8	22.9
Computer literacy		
Yes	19	54.3
No	16	45.7
If Yes, what level?		
Basic computer appreciation	10	52.6
Basic computer application	9	47.4
Do you use the internet to source for information?		
Yes	14	40.0
No	21	60.0
Do you have an e-mail address?		
Yes	23	65.7
No	12	34.3
Have you had any training on Health Policy?	15	42.9
Yes	20	57.1
No		
If Yes, under whose sponsorship?		
Self	1	6.3
Government	12	75.0
International Agency	6	37.5
In drafting policy documents did you use research findings (evidence) from any source?		
Yes	9	32.1
No	19	67.9
Have you been involved in any health related research since assumption of your present office?		
Yes	9	25.7%
No	26	74.3%
If Yes, what type(s)?		
Field survey	7	87.5%
Health laboratory-based	1	12.5%
Review/documentary research	-	-
Others	-	-
Do you think it is needful to collaborate with researchers from educational institutions in policymaking process?		
Yes		
No	35	100
	-	-

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3.2 Intervention phase

A total of 60 individuals attended and participated in the ICT training workshop out of the 78 persons invited (i.e., 76.9% response rate). The attributes of participants are shown in Table 2. Most of the participants (76.7%) were from the Ministry of Health. Individuals who were directors, chair persons or presidents in their organizations made up to 18.3% while those who were managers.

Table 2. Attributes of the health policymakers and other stakeholders at the Information and Communication Technology workshop in Ebonyi State south-eastern Nigeria.

Participant attributes	**No. (%) of participants N=60**
1. Gender	
Male	33(55.0)
Female	27(45.0)
2. Age	
25-34	14(12.8)
35-44	29(48.3)
≥45	17(28.3)
3. Type of organization	
Ministry of Health	46(76.7)
Non governmental organization	7(11.7)
Health workers association	2(3.3)
Uniform services	5(8.3)
4. Official designation	
Programme officers/Project Secretaries	24(40.0)
Managers/Heads of departments/Superintendents	25(41.7)
Directors/Chairpersons	11(18.3)
5. Years of experience in current designation (in years)	
< 3	19(31.7)
3-5	20(33.3)
5-10	19(31.7)
>10	2(3.3)
6. Highest academic qualification	
Diploma	15(25.0)
Bachelor	32(53.3)
Masters	13(21.7)
Doctorate	0(0)

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Up to 85% of the participants were able to extract relevant research evidence on various aspects of the health systems from the data bases they were introduced to and over 70% were able to synthesize the information and presented them in the forms that can be processed further for policymaking eg., in Microsoft word and PowerPoint presentations. The pre-workshop and post-workshop skill/ability of participants for computer appreciation, use of Microsoft word, use of power point and use of internet is presented in the Table 3. The pre-workshop mean rating (MNR) for computer appreciation ranged from 2.16-2.65 with the median rating (MDR) mostly at 2. While the post-workshop MNR for computer appreciation ranged from 2.95-3.43, with MDR generally at 3. For the Microsoft word use, the pre-workshop participants' skill MNR ranged from 1.81-2.21, with MDR at 2. The post-workshop MNR for Microsoft word use ranged from 3.00-3.25, with MDR at 3. In terms of the use of power point the pre-workshop participants' skill MNR ranged from 1.49-1.71, with MDR at 2; however, the post-workshop participants‟ skill MNR ranged from 2.32-3.07, with MDR at 3. The pre-workshop participant skill MNR for the use of the internet ranged from 1.57-2.44, with MDR at 2; but the post-workshop participant skill MNR for the use of the internet ranged from 2.78-3.35, with MDR at 3.

Post-workshop assessment revealed that the present ICT training workshop was the first formal ICT training programme attended by up to 64.3% of the participants. The MNR for the adequacy of the training in relation to participants' job description was 3.66, with MDR at 4. The MNR for the quality of the training was 3.55, with MDR at 4.While with respect to the impact of the training the MNR was 2.86 with MDR at 3. The post-workshop comments of some of the participants are presented in Table 4.

The outcome of the focus group discussion revealed the specific areas of ICT deficiencies of the participants. More than 60% of the participants admitted they need to have an understanding of the rudimentary knowledge about information systems, information processing techniques and use of internet for acquiring and synthesizing research evidence for policymaking. They also emphasized their need to have a working knowledge of the structure and the basic principles of operating a computer particularly the use and application of Microsoft Word and PowerPoint.

Intervention phase: A total of 60 individuals attended and participated in the ICT training workshop out of the 78 persons invited (i.e., 76.9% response rate). The attributes of participants are shown in Table 2. Most of the participants (76.7%) were from the Ministry of Health. Individuals who were directors, chair persons or presidents in their organizations made up to 18.3% while those who were managers.

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Table 3: Outcome of the pre-workshop and post-workshop assessment of policymakers' perceived competence on information and communication technology at Ebonyi state south-eastern Nigeria

Question	**Rating on a scale of 1 (*Grossly inadequate*) to 4(*Very adequate*)***			
A. Computer Appreciation		**Mean**	**Median**	**Range**
i. Rate your ability to identify the different basic components of the computer.	**Pre**§	**2.65**	**3**	**1-4**
	Post	**3.43**	**3**	**2-4**
ii. What is your level of knowledge on the functions of basic computer components?	**Pre**	**2.49**	**3**	**1-4**
	Post	**3.32**	**3**	**2-4**
iii. What is your ability to differentiate between the input and output computer devices?	**Pre**	**2.37**	**2**	**1-4**
	Post	**3.38**	**3**	**1-4**
iv. How would you describe your ability to set up a computer workplace?	**Pre**	**2.30**	**2**	**1-4**
	Post	**2.95**	**3**	**1-4**
v. What is your knowledge of basic care and safety procedures in computer handling/usage?	**Pre**	**2.64**	**3**	**1-4**
	Post	**3.41**	**3**	**1-4**
vi. Rate your present ability to identify different computer storage devices.	**Pre**	**2.45**	**2**	**1-4**
	Post	**3.20**	**3**	**1-4**
vii. How would you describe your ability to boot and shut down a computer?	**Pre**	**2.16**	**2**	**1-4**
	Post	**3.02**	**3**	**1-4**
B. Microsoft word				
i. Rate your ability to link up to MS word page from a computer window.	**Pre**	**2.17**	**2**	**1-4**
	Post	**3.05**	**3**	**2-4**
ii. What is your level of knowledge on the identification and functions of the menu/standard tool bars in an MS word page?	**Pre**	**1.96**	**2**	**1-4**
	Post	**3.00**	**3**	**2-4**
iii. How would you describe your ability to create and save MS word files and folders?	**Pre**	**2.21**	**2**	**1-4**
	Post	**3.25**	**3**	**1-4**
iv. How would you describe your ability to access/assess existing files and folders in MS word?	**Pre**	**1.93**	**2**	**1-4**
	Post	**3.11**	**3**	**2-4**
v. How would you describe your ability to type and format texts/paragraphs in MS word?	**Pre**	**1.81**	**2**	**1-4**
	Post	**3.00**	**3**	**1-4**

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C. Power point				
i. How would rate your knowledge of the following power point functions? (a). Opening and inserting slides:	**Pre**	**1.87**	**2**	**1-4**
	Post	**3.07**	**3**	**2-4**
(b). Bullet presentation:	**Pre**	**1.67**	**2**	**1-4**
	Post	**2.93**	**3**	**2-4**
(c). Copying/pasting from MS word to power point:	**Pre**	**1.71**	**2**	**1-4**
	Post	**2.83**	**3**	**1-4**
(d).Use of graphics/charts/tables in power point:	**Pre**	**1.49**	**2**	**1-4**
	Post	**2.54**	**3**	**1-4**
(e). Use of animations in power point:	**Pre**	**1.64**	**1**	**1-4**
	Post	**2.32**	**2**	**1-4**
ii. Rate your ability to use power point in conference/workshop presentations and meetings	**Pre**	**1.60**	**1**	**1-4**
	Post	**2.78**	**3**	**1-4**
iii. How would you describe your present ability to identify and apply basic devices for power point presentation?	**Pre**	**1.60**	**1**	**1-4**
	Post	**2.62**	**3**	**1-4**
D. Internet use				
i How would you describe your knowledge on the importance and benefits of the internet?	**Pre**	**2.44**	**2**	**1-4**
	Post	**3.30**	**3**	**1-4**
ii. How would you describe your ability to create and use e-mail address?	**Pre**	**2.17**	**2**	**1-4**
	Post	**2.92**	**3**	**1-4**
iii. How is your ability to locate information on the internet?	**Pre**	**2.07**	**2**	**1-4**
	Post	**3.35**	**3**	**1-4**
iv. How is your ability to locate and access websites of different organizations?	**Pre**	**1.93**	**2**	**1-4**
	Post	**2.82**	**3**	**1-4**
v. How is your level of knowledge on the types and use of major search engines?	**Pre**	**1.74**	**1**	**1-4**
	Post	**2.86**	**3**	**1-4**
vi. How is your ability to locate and access relevant databases?	**Pre**	**1.57**	**2**	**1-4**
	Post	**2.78**	**3**	**1-4**

*The values represent Likert rating of 1-4 points, where 1point=grossly inadequate; 2 points=inadequate; 3 points=fairly adequate; and 4 points=very adequate. In terms of analysis, values ranging from 1.00-2.49

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points considered low, whereas values ranging from 2.50-4.00 points considered high. Pre[§]=pre-workshop ratings, Post[¶]=post workshop ratings.

Table 4: The post-workshop written comments of some participants on the ICT training Workshop.

S/No	Participants' post-workshop comments
1.	*"Your lectures on ICT have agitated a deep seated interest in me to be ICT proficient and use computer literacy in enhancing my job."*
2.	*"The training is a wonderful and necessary exposure."*
3.	*"My knowledge on ICT has been enhanced."*
4.	*"The ICT training is very rich and delivered in an atmosphere that promotes understanding."*
5.	*"The workshop is very essential particularly the primary healthcare delivery service in the Local Government System."*
6.	*"More workshops of this type should be organized on regular basis"*
7.	*"Good job, thank you"*
8.	*"This training is very relevant to any organization that is moving with the moving time."*
9.	*"The training was too educative, the unknown was learnt today especially on the Microsoft power point."*
10.	*"I thank World Health Organization and Ebonyi State University for organizing such training for those of us working in development areas"*
11.	*"I thank you for the training, I will like the organizers to re-train us and even extend it for up to two weeks."*
12.	*"The training content is adequate but the duration was not sufficient for reasonable impact"*

4. Discussion

In most developing countries including Nigeria, there is a rising trend in ICT use and access and this is because ICT has proven to be the major catalyst for users to access and share information and knowledge resources globally. In sub-Saharan Africa for instance, the Internet which is a major component of ICT has become an important medium for social, public health, political, educational, and economic activities as well as extending knowledge resources and repositories, and enhancing access to information and knowledge sharing [26]. In line with the global ICT trend, there is a significant increase in the interventional efforts made in many developing nations including sub-Saharan African countries to enhance the ICT capacity of health professionals and other stakeholders in the health sector [27-30]. The value of ICT training as a capacity enhancement mechanism has been demonstrated in studies conducted in many developed countries. In a systematic review on interventions for promoting ICT adoption in healthcare professionals, Gagnon and colleagues [31] noted that five of the randomized controlled trial studies reviewed demonstrated considerable improvement in the ICT capacity and compliance of health professionals following training/instructional programme [32-36].

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The present interventional study which we conducted in south-eastern Nigeria among policymakers is consistent with the global ICT trend. This is the first time in Nigeria that a systematic ICT training programme is organized towards enhancing the capacity of health policymakers to acquire, assess, adapt and apply evidence in policymaking. To the best of our knowledge there is scarcity of information on the use of ICT training workshop to improve the capacity of health policymakers for evidence-to-policy link in developing countries. However there are a number of reports from parts of Asia that have demonstrated that ICT training workshops significantly improved the capacity of decision makers and government officials to access and apply relevant information for development [37-40]. The ICT training workshops were conducted in 2008 in Hyderabad, India; Incheon, Republic of Korea; Jakarta, Indonesia; and Seoul and Cheonan, Republic of Korea under the auspices of the United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development's (UN-APCICT) [37-40]. According to UN-APCICT the training programmes aimed to equip government officials with the knowledge and skills they need to fully utilize the potential of information and communication technologies (ICTs) to achieve national development goals and bridge the digital divide [37]. The post-workshop assessment of our ICT training workshop for policymakers demonstrated capacity improvement among the participants. This is consistent with the findings of the UN-APCICT following their ICT training workshops [37-40].

The need for improving the ICT competence in a low and middle income setting at policy level to enable policymakers and other major stakeholders in the health sector to access relevant information and exercise evidence-informed policymaking was very obvious from this study. Evidence that emerged from this study suggests that an ICT training workshop can serve as an intervention mechanism towards improving the ability of policymakers and other stakeholders to use ICT. We employed a training workshop because of its many strategic benefits and also because the participants in the pre-intervention phase recommended it. The importance of ICT training workshop for the improvement of skills for health information acquisition, assessment and communication was demonstrated in a number of previous studies [31,41]. It is established noted that workshops (when used as in-service training) are effective in: presenting new information to groups of people, practicing new skills and allowing health workers to share experiences and insights [42]. Methods used in the ICT training workshop conducted in the present study, including the administration of pre-workshop questionnaire and post-workshop questionnaire; group works and short presentations have been shown to be very effective in a previous study by Poulos et al. [43]. The participants in the present study were appreciative of the workshop (comments in Table 4).

The ICT training administered to the policymakers in this study was conducted as part of the strategies designed to enable policymakers to appreciate research evidence and improve their ability to acquire and assess policy relevant information and to understand and follow up the research process. According to UNESCO [44] and WHO [45], we are living in what are increasingly referred to as 'knowledge societies' which are able to harness the huge amount of information that modern technology such as computers and the Internet allow us to manipulate, store, transmit and share. The skill, therefore, lies in turning all this information into knowledge; and the great challenge is to then use that knowledge – to put it into practice [16]. Therefore the content of the ICT training in this study was based on packages (computer appreciation and

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application as well as the use of internet) which can enable the policy makers to improve their capacity to acquire, assess and translate health information into policy usable forms.

The post-workshop assessment of participants' capacities for Computer appreciation, Microsoft word use, Power point use and use of the Internet, indicated a significant improvement over their pre-workshop status. The training was a major achievement to many of the policymakers as it was the first formal ICT training programme for up to 64% of them and the quality of the training was rated as very adequate. One of the participants commented thus: *"Your lectures on ICT have agitated a deep seated interest in me to be ICT proficient and use computer literacy in enhancing my job."* Another noted that: *"The workshop was very essential particularly the primary healthcare delivery service in the Local Government System."* It is expected that following this training, the health policymaking process especially as it pertains to the use of information will no longer be a burdensome task to these policymakers and this will give a major boost to evidence-based policymaking.

An earlier report had observed that with enhanced ICT capacity and given the right policies, organisation, resources and institutions, ICTs can be powerful tools in the hands of those who make health policy and those working to improve health [46]. This probably explains the reason some of the participants in our study recommended for more ICT training as demonstrated by the following comments: *"More workshops of this type should be organized on regular basis", and "I thank you for the training, I will like the organizers to re-train us and even extend it for up to two weeks."*According to WHO, the use of ICTs in health is not merely about technology [19], but a means to reach a series of desired outcomes such as: national and local information systems supporting the development of effective, efficient and equitable health systems; governments becoming more responsive to health needs; policy makers and the public aware of health risks; people having better access to the information and knowledge they need for better health. Albert et al. [17] noted that training policy-makers to develop competencies in acquiring high-quality relevant research and adapting it for local applicability might be beneficial to the policy making process in developing countries. This could be achieved by enhancing policy makers' capacity to use ICT, since access to information has been identified as an important factor which emerged as a barrier to research utilization in a study involving four developing countries [15].

Study limitations

This study had a number of limitations. First, the ICT training workshop lasted only three days. This could be considered rather too short. A week or two training duration would have been more ideal. Second, the post-workshop assessment that was conducted may not be very adequate to evaluate the impact of the training skills acquired. A follow-up of participants to see how far they are able to use the skill acquired in the policymaking process would have provided a more excellent evaluation. Furthermore, the training was limited to basic ICT capacity such as computer appreciation and application and the use of the internet for sourcing information of health data bases. Other vital ICT components relevant to policymaking such as telemedicine and telecare services, internet-based technologies and services, and decision support tools for healthcare professionals and policymakers were not part of

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the training. These aspects are recommended in future interventional studies. Finally this study was more of an exploratory investigation as there is scarcity of similar studies that targeted the enhancement of health policymakers' capacity using ICT training workshop in developing countries.

5. Conclusion

The findings of this study have demonstrated that policymakers' ICT competence can be enhanced through training workshops as demonstrated in this study in Ebonyi State Nigeria. Interventions of this sort are relevant in low and middle income settings with similar health sector challenges as in Ebonyi State Nigeria. The need to enhance the ICT capacity of health policymakers in developing countries cannot be over emphasized. The ICT training workshop of the sort we conducted in this study is recommended as an in-house training mechanism to improve the capacity of policymakers to acquire, assess, adapt and apply evidence for policymaking. It is pertinent to state that this study did not unequivocally prove that enhancing the ICT capacity of policymakers will automatically bring about evidence-informed policy making. Nevertheless, enhancing the capacity of the policymakers to effectively use ICT is a first step towards improving their chances of carrying out evidence-informed policymaking. Further definitive studies with more complex methodological models are needed to address some of the unanswered questions associated with evidence-informed policymaking and its link to ICT use in developing countries.

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