EHEALTH EFFICACY IN GHANAIAN NURSING: A PILOT THEMATIC ANALYSIS ON BENEFITS AND CHALLENGES

Jacob Owusu Sarfo
Psychology Department, Faculty of Social Studies, University of Ghana
Michael Asiedu
Marketing Department, Business School, University of Ghana

Abstract

Nursing informatics serves global health care with information processing and communication functions like staff development and quality patient care services. The incorporation of computers into nursing in many developing countries though essential, has been on a decline growth. This qualitative study examined personnel and organizational factors that affect nursing informatics. A qualitative descriptive study design was employed. Respondents were registered nurses selected from the various health system levels. A total of 18 in-depth interviews were done. Interview data were analysed by using a thematic approach of qualitative analysis.Both senior and junior nursing staff had a fair knowledge of computers and some basic Microsoft applications. They both appreciated the need for immense incorporation of computers into Ghanaian nursing care although lacked organizational support. Rank, gender and age of respondents played immense role in their perception of importance computer skill acquisition and usage while lack of programmed nursing software worsened the case.These findings suggest that measures focused on incorporating computers to aid nursing care in practice must look at the personnel and organizational issues critically to attain immense achievement.

Keywords: Nursing informatics, nursing administration, computer literacy, software, health, nursing practice, Ghana, thematic analysis

1. Introduction

Historically, the evolution of nursing informatics started with Florence Nightingale who defined nursing to be composed of health services research, evidence-based practice, and nursing informatics (Longman & Longman, 1863). However, Harriet Werley pioneered this course to build nursing informatics in the 19th century at the Walter Reed Army Research Institute

with the support of some nursing professional bodies (Werley and Lang, 1987). This development was later on framed into an inventory for students to achieve adequate knowledge and skills about computers (Bryson, 1991). Following from this trend, several studies in the area of nursing informatics have been done to create a systematic curriculum across the globe (Inman, Johansen, Powlas, Timm & Turner, 2000; Rosenfeld, Salazar-Riera & Vieira, 2002).

Computers in health (ehealth) specifically in nursing have been identified as very beneficial. Nursing activities incorporated into informatics are functional from patients' admission, care planning, discharge and follow ups. Activities like cost analysis, procedure manual, drug dosage calculation, finding trends for budget purposes and nursing electronic/online learning programmes have been made possible through the advancement of ehealth (Wolford & Hughes, 2001; Yaghmaie & Jayasuriya, 2004). Gradually, nursing informatics has emerged as a global *specialty in professional nursing practice although some* developing countries are still lagging behind in this scope. Notwithstanding this gradual rate in the general acceptance and development of ehealth and nursing informatics, studies have shown that some African and Asian countries have made some headway (Jensen, 2005; Hsu, Hou, Chang & Yen, 2009; Kivuti-Bitok, 2009; Kochuthresiamma, 2002).

Ghana as a result is growing significantly with the development of ehealth in its national health care delivery. This improvement was strengthened by the World Health Organisation's (WHO) eHealth project in 2005 which proposed the incorporation of Information and Communication Technologies (ICT) into global health care systems. Substantial to this ehealth policy is directly linked to the ehealth competencies of health personnel (WHO, 2005). Owing to this need, the Ghana Investment Fund for Electronic Communication (GIFEC) and Ministry of Health's (MoH) electronic connectivity agenda for 2011 support had been channelled generally to scale up number of computers, internet services and training to all health care facilities and nursing training institutions (Ghana News Agency (GNA), 2011).

Nonetheless, some personnel and organisational factors have been observed to influence the growth or decline of ehealth in the Ghana. This in contrast is noted among developed countries like the United Kingdom (UK) and United States of America (US) with numerous advanced initiatives aimed at assimilating computer literacy into the nursing curricula and clinical practice (Alpay & Russell, 2002). Like some developing African countries struggling with ehealth development, nursing informatics is usually affected. These challenges are often affected with inadequate governmental and health institutional support since they provide a favourable environment for

employees to employ ehealth systems (Kivuti-Bitok, 2009; Yaghmaie & Jayasuriya, 2004).

This study aims at proposing a model on ehealth efficacy in developing countries with respect to nursing informatics. In addition, we focused on the specific personnel and organisational factors that influence the development of Ghanaian nursing informatics.

2. Method

Respondents

A sample of 18 respondents was interviewed. These were registered nurses selected through voluntary participation in a purposive sampling method from the various health system levels.

Table 1: Demographic characteristics of Interview respondents

	Junior Rank	Senior Rank
Female	RJF1, 24, Diploma, S.N	RSF1, 32, Diploma, S.N.O
	RJF2, 32, Diploma, S.N	RSF2, 45, Bachelor, P.N.O
	RJF3, 26, Diploma, S.S.N	RSF3, 30, Diploma, N.O
	RJF4, 24, Diploma, S.N	RSF4, 49, Bachelor, P.N.O
	RJF5, 25, Diploma, S.N	RSF5, 33, Bachelor , S.N.O
	RJF6, 28, Diploma, S.N	RSF6, 40, Bachelor, PN.O
Male	RJM1, 36, Diploma, S.S.N	RSM1, 26, Bachelor, N.O
	RJM2, 27, Diploma, S.S.N	RSM2, 31, Bachelor, N.O
	RJM3, 25, Diploma, S.N	RSM3, 31, Masters, S.N.O

Among these respondents, majority 12 of the respondents were women while were 6 forming the minority men. The respondents' ages were distributed between the age groups of 24–49 years. There was a wide range of distribution of respondents' last educational level from diploma to master's degree with only one (RSM3) having his masters.

Five (5) of the respondents were Staff Nurses (S.N) which is the entry rank for registered nurses with a diploma. This was followed by four (4) respondents who were Senior Staff Nurses (S.S.N). Additional two (2) of the respondents were Nursing Officers (N.O) which also forms the entry rank for nurses with bachelors' degree. This is usually recognised as the beginning post for senior managerial nursing ranks in most health facilities. Senior Nursing Officers (S.N.O) were three (3) with additional three (3) of respondents being ranked as Principal Nursing Officers (P.N.O).

Measures

A semi-structured interview questionnaire was used to gather the data within 20 to 30 minutes. These were done successively over a five-month period during respondents' available time. The questions included biographic details of the respondents with respect to their gender, age, rank, and educational level. The researchers also looked at the various personnel and

organisational factors affecting the usage of computers and general nursing informatics. These questions were adopted from findings in studies done by Asah (2010), Booysen (2009) and Jensen (2005). The semi-structured interview guide comprising of seven comprehensive exploratory aspects can be summarized as follows:

- Demographic data
- Importance of ehealth and nursing informatics
- Knowledge on computers and their accessories
- Level of competency…such as skills acquired past and present
- Aging and nurses' computer skills/usage
- Gender and nurses' computer skills/usage
- Ranks and nurses' computer skills/usage
- Organisational support systems and nurses' computer skills/usage
- Support of governmental/institution and nurses' computer skills/usage
- Recommendation

Following required reliability and validity of qualitative studies, verbatim transcription of the data was done.

Data Analysis

Data analysis was concurrently collected and analysed until theoretical saturation was reached. This is the point where no new themes are discovered by the researcher (Morse, 1995). Nonetheless, Morse (2007) warns researchers that this idea may only be a myth. Thus, the claim that saturation of a data has been reached could possibly be relative to a particular case setting or time frame. So for our study, thematic approach of qualitative analysis was done manually when we found that the same themes were reoccurring. The thematic analysis was simply organised from the familiarisation of the data collected to a further development of major themes. These themes were further analysed to identify sub-themes then structured to tell a comprehensive story.

Results

At theoretical saturation, three main themes generated were divided under Benefits, Personnel and Organisational challenges affecting ehealth/nursing informatics. Subthemes under benefits of ehealth/nursing informatics were further grouped under patient care and staff development. Also, the personnel challenges subthemes generated were grouped under past computer training, age, gender and ranks of nurses at work. Finally, organisational challenges' sub themes were grouped under hospital/internal institution's support system and government/external institution's support system.

Table 2: Thematic output of the summarised data on ehealth/nursing informatics

Themes	Subthemes
Benefits	• Patient Care Option • *Clinical* • *Non clinical* • Staff Development Option • *In-service training* • *Student curriculum*
Personnel Challenges	• Past Computer Training • *Formal* • *Non formal* • Age • *Young* • *Old* • Gender • *Female* • *Male* • Ranks • *Junior/Non Managerial Level* • *Senior/ Managerial Level*
Organisational Challenges	• Hospital/Internal Institution Support System • *Financial* • *Non-financial* • Government/External Institution Support System • *Financial* • *Non-financial*

One important theme noted was the fact that all the respondents described computers in health care as an important tool. Much emphasis was placed on nursing informatics as they saw it as a way of improving both patient care and staff development. Patient care was viewed into both clinical aspects like total patient care planning and non-clinical duties like record keeping and billing of patients. They also spoke about its importance in relation to staff resource development. In-service training and online distance education through ehealth were expressed as a vital resource for nurses in developing countries. Again, some of respondents however added that student curriculum should have a detail aspect of ehealth/nursing informatics. Some of these benefits to most of the respondents were expectations since they had not yet experienced it.

"I think computers in nursing are beneficial in developing my knowledge base as a nurse although I'm yet to see it happen. I wish nurses here could use them as our colleagues abroad do with time" (RJF5).

A noteworthy point is that, though all the respondents saw the benefits incorporated in ehealth/nursing informatics, past computer training among nurses was seen as an important asset among these respondents. Also, previous computer skill training whether in a school or personal learning gave the respondents much confidence and interest in utilising computers as nurses. Those who had this past computer training felt much need to incorporate computers into nursing service as compared to the rest.

"I saw the need in using computers in my ward activities after my computer course was completed. It was really insightful as I can now use programmes like Microsoft office" (RJF3, 26)

"Computer training formed part of our curriculum during my nursing training so I just needed a little training on the job to use them. Nurses really need computers at work" (RJF3, 26)

"We live in a global world and computers are common and very useful in every aspect of our work. I think most of our hospitals using it for record keeping and nursing might join soon" (RSM3)

This past training also influenced their current interest to acquire further in-service skills on computers. Generally, respondents who had some training in computers appreciated the role of nursing informatics.

Another personnel theme that showed significance during the data analysis was the age of respondents. The theme of age was believed in two ways. Older age of nurses was seen as a hindrance to learn new technological trends especially those related to computers. Nonetheless, the second view was the emphasis laid on the interest of those who are about to learn how to employ computers into their work in their old age. Some quotations are given below:

"I think age plays an important role. If you are going to learn computers in your middle adulthood, it won't be an easy process" (RSF4).

"Age really becomes a hindrance if the person is not really interested. It should not be a major problem even though young people are better with learning computers" **(**RJM1**).**

Thus, age may have a relative effect on interest but personal value and interest as expressed by (RJM1) might have some effect on this relationship.

Another significant personnel factor is the gender of respondents. Females were noted as having less interest for the learning of computers although they saw it as important. They attributed this to less technological attachment of females as compared to men. Below are some of the quotations:

"*Well females are not so much into machines and ICT, but times are changing. As majority of nurses are females, the incorporation of computers into the profession will actually need much effort*" (RSF3)

"*Males are better than females when it comes to computers. It is natural I guess. I don't believe they can't learn and use them in the wards or clinics. The only issue is that, they must be motivated extra unlike males to use them*" (RJM3)

Notably, gender was a dominant factor to a person's interest in computer learning and usage in most cases cited in the study.

Another factor was the ranks of nurses at work. These were seen among two categories, junior and senior staffs. The junior nurses described computers as a tool of status and prestige in the hospital rather than just a machine for work in relations to their superiors. However, these junior rank nurses showed much competency in many software tools than their seniors. The senior staffs however claimed that the junior nurses will mismanage the few computers in the ward as they may have little use for them.

"*Computers are only kept in the offices of the charge nurses without much use. They don't even use them often while we need them in the wards"* (RJF1).

"*I will say that the computers are kept for office use because of their numbers. They may have little use at the wards as most of the documentation done is all paper and pen/pencil"* (RSF4).

Another important major theme was organisational challenges. Hospital/Internal Institution's Support System and Government/External Institution's Support System were defined as subthemes. The respondents unanimously agreed that these two subthemes were subdivided into both financial and non-financial themes which were exemplified as lack of funding for ICT projects for nurses and lack of institutional acceptance. Below are some of the quotations:

"My hospital doesn't have enough computers for the nursing staffs to even use apart from the ones belonging to the senior staffs. How can we encourage ICT in nursing while there are few computers?" (RJM3)

"*The problem has always been the relevance of this computer software to our nursing duties. We don't have special software to assist us in making our nursing care plans or even write our nursing notes. These make the computers less useful to only writing reports and making presentations* (RSF6)

"*The government and stakeholder institutions of health although are doing well are still not enhancing this aspect. Nursing informatics is not even promoted in our hospitals by sending nurses to gain such special education. I have not come across any nursing institution which pursues it as a diploma, degree, masters or doctoral programme in this speciality…"* (RJM2)

3.0 Discussion

This research taps into the core issues affecting nursing informatics in relation the objectives. These were in view of benefits, personnel and organisational themes. Overall, the thematic analysis indicated consistent themes that offered an in-depth understanding on these factors.

Benefits of ehealth/nursing informatics

To begin with, past computer education among nurses was identified as a necessary factor to enable nurses see the import of computer tools into nurses. This served as a good basis for most of them to appraise the importance of computer skill acquisition and usage at the hospital.

Nursing informatics was observed to aid total patient care planning and non-clinical duties like record keeping and billing of patients. In addition, it was noted for helping in-service training and online distance education. These were also supported by studies (Hsu et al., 2009; Kivuti-Bitok, 2009; Kochuthresiamma, 2002; Wolford & Hughes, 2001) as importance of nursing informatics. Invariably, the ratio between developed versus developing countries with respect to nurse-computer ration (Jensen, 2005) might as well have a negative effect on the level of benefits as some respondents saw them as future hopes. However, one cannot rule them out as absent from Ghanaian nursing although respondents complained of fewer numbers of computers.

Personnel factors

Findings in the study further highlighted the age factor as a challenge. This is what we termed as the "Aged Computer Illiteracy Bias Hypothesis". The respondents generally agreed that the older a person, the lesser their ability to learn anything including computers. This supported the findings of Graveley, Lust and Fullerton (1999) as the older nurses even maintained their lack of enthusiasm to learn anything technologically inclined with time. This bias was also accepted by the younger respondents although the concept of interest or personal values was indicated to affect this bias.

In addition, gender as a subtheme also had some challenging effect on the personnel level. Here, male respondents unlike females expressed much eagerness to learn and incorporate nursing informatics into their main stream. Although all the female respondents saw the need to incorporate ICT into nursing, some of them shared lesser levels of interest. Granting that gender was an important factor, its expression as a challenge must be carefully explained as sociocultural factors might be very influential. As explained by Moody, Dee and Rogers (2001) male nurses are much likely liable to acquire and maintain computer competency. They saw this as a challenge to nursing as female gender stands out among nursing professionals.

Ranks of nurses also posed a challenge as a subtheme. Computers were mistakenly perceived as a privilege tool and a status symbol for the senior nurses by their juniors. However, junior staffs were noted to have much knowledge than the seniors although they were not allowed much privilege vis-a-vis the ward computers. This was also observed by Chiu (2000) who used the term "Luxury Ideology Hypothesis" to describe this bias against junior ranks by their nurse managers.

Organizational factors

From the study, organisational challenges were grouped into hospital/internal institution support system and government/external institution support system. These subthemes were seen in both non-financial and financial terms. Respondents spoke some non-financial aspects as a lack institutional acceptance to sponsor ICT training programmes for all staffs. In addition, the numbers of computers found in the wards were described by respondents as very few. According to the all the respondents (both junior and senior ranks), the wards apart from the offices had no available computers for ward nursing activities like documentation, planning care and so on. Hence, with no specific training and availability of specific software needed for nursing activities, nursing informatics seemed quite impossible (Asah, 2011, Yaghmaie & Jayasuriya, 2004).

Among the respondents, those who could not own a personnel computer (PC) attributed it to their high cost price. Basically, these fewer numbers of PC among nurses restricted their competency level (Kochuthresiamma, 2002, Yaghmaie & Jayasuriya, 2004). One of the greatest challenges of ehealth and nursing informatics of developing countries has been the fewer numbers of computers. Developed countries approximately stand at a ratio of 1:1 in the person to computer utilization while most developing countries in Africa stand at 1: 100 ratios (Jensen, 2005). This ratio is even worse in the rural areas (Jensen, 2005) or occurring at a very slow pace (Kochuthresiamma, 2002), predominantly in government health-care institutions (Asah, 2011).

A consequence of this fewer numbers of computers had further led to perception of computers as expensive equipment especially by some nurse managers. This was noted by the respondents who spoke about the exchange rate of some of the world trading currencies like dollars or pounds to purchase a computer after conversion. Computers varying from Desktops through to Laptops attract higher import duties and taxes from the government as respondents noted, thus, making their prices very expensive and unattractive to those who cannot afford (Jensen, 2005, Booysen, 2009). In Ghana, respondents complained of computer prices (ranging from slightly used to new) may cost from 4,00.00 to 2,000.00 Ghana Cedis ($200-$1000)

averagely. This challenge impedes the patronage of computers by majority of nurses who fell in the middle income earning class.

Implications of Findings to Research and Program Delivery

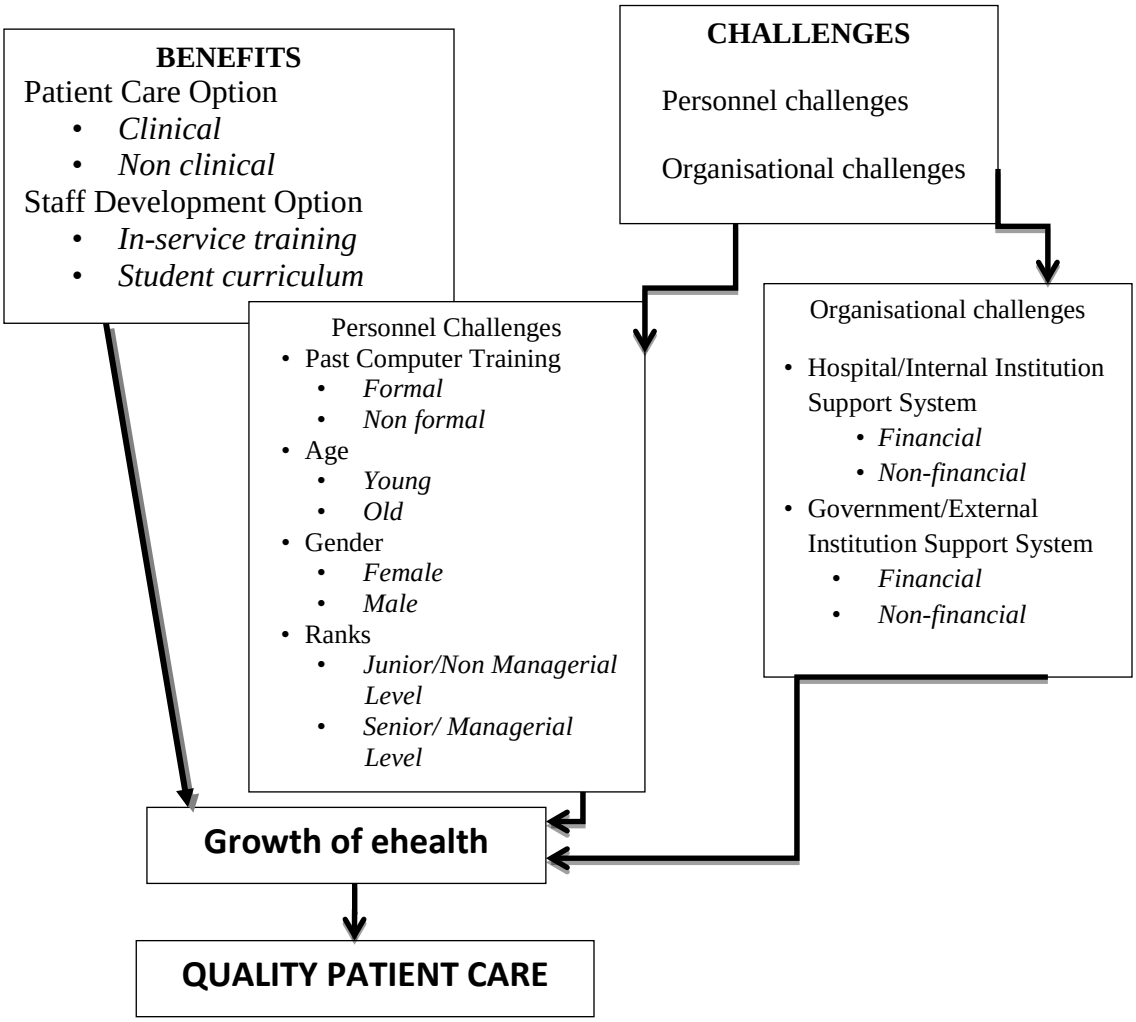
This research has a lot of implications for training, practice and regulation of nursing informatics.

1. Personnel challenges like past education, gender, age, and ranks, affects nurses interest in computer usage in their practice. These issues must be deliberated at the institutional levels to identify the level of assistance needed to support such nurses. In addition, nursing administration has to encourage in-service training of staffs to understand the importance of computers in nursing. Such training should be regulated with international nursing informatics standards.
2. Computers are seen as scares apparatus and hence a privilege. The government and health stakeholders should make computers accessible on all wards/units in the hospitals to expel this wrong ideology. This will also reduce the cost of papers incurred by the government and the Ministry of Health.
3. Computer software is not nursing-friendly in developing countries. This calls for product innovation and ehealth health product marketing for both international and local software developers. This investment opportunity should help provide programmes that incorporate local nursing activities like documentation, nursing pharmacology, dictionary, and nursing care plan with global standards.
4. Nursing informatics is not encouraged by Nursing Educators and Professional Regulatory Bodies. Training institutions of nursing should develop an interest in nursing informatics to include it in their curriculum. This will grow the scope of nursing informatics into a branch status for speciality.

Limitations

However, this study has some significant limitations. The qualitative approach in research limits the sample size recruited for the study. It is important to note that the sample size is quite small to increase the reliability of the data. Furthermore, statistical significance of relationships or causalities cannot be drawn from this study. In spite of these limitations, the results are deep and promising, offering a real picture of nursing informatics that can be researched further.

Figure 1: Proposed Model on ehealth Efficacy in Developing Countries



References:

Alpay, L., Gill, N. & Murray, P. (2000). The potential of information technology for nurses in primary care: a review of issues and trends. *Primary Health Care Research and Development*, 1, 5–13.

Asah, F. (2004). *The application of information and communication technologies in the management of health information by doctors and nurses in selected government hospitals in Yaounde, Cameroon.* MIS Thesis, University of Natal, Pietermaritzburg, South Africa.

Booysen, M. (2009). *An assessment of the computer literacy status in nurse managers in a private hospital group in the nelson mandela metropolitan area.* Master Thesis, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa.

Chiu, T. S. (2000). To promote the nursing personnel's competence in information application through the life-long learning philosophy, *VGH Nursing*, 17, 3, 248-259

Ghana News Agency (GNA), (2011). GIFEC to set up ICT centres in nurses training institutions. Accessed from: http://www.modernghana.com/news/311513/1/gifec-to-set-up-ict centres-in-nurses-tra.html. Retrieved on 04-04-2012

Graveley, E.A., Lust, B.L., & Fullerton, J.T. (1999). Undergraduate computer literacy -evaluation and intervention. *Computers in Nursing*, 17 (2), 166-170.

Hsu H., Hou Y., Chang I. & Yen C. (2009). Factors influencing computer literacy of Taiwan and South Korea nurses. Journal of Medical Systems, 33 (2), 133–139.

Inman, D., Johansen, M., Powlas, K., Timm, J. & Turner D. (2000). Microcomputer education for nursing: an approach to microcomputer education in a large tertiary care center. *J Nurses Staff Dev.* 16, 2, 73-9.

Jensen, M. (2005). *ICT in Africa: A Status Report*. Available at: http://www.share4dev.info/telecentreskb/output_view.asp?outputID=4232, accessed 30 04-12.

Kivuti-Bitok W. *(*2009*).* What do nurse managers want computerised? Need-based assessment study of middle and functional level nurse managers at kenyatta national hospital. *Kenya Health Information in Developing Countries*, 3 *(*2*),* 5–11.

Kochuthresiamma, T. (2002). Computers in nursing. *Nursing Journal of India.* Available at: http://finarticles.com/p/articles/mi-qa4036/is_200208/ai_n9120455, accessed 20-04-12.

Longman, R, & Longman G. (1863). *Nightingale F. Notes on Hospitals*, 3rd Ed. London: Longman, p. 175-6.

Moody, L. E., Dee, C. & Rogers, A. (2001). Seniors' internet use and preferences for web-based ehealth resources. Available at http://www.ehealthinternational.org/vol2num2/Vol2Num2p01.pdf. Accessed on 19th Feb 2013.

Morse, J. (1995). The significance of saturation. *Qualitative Health Research*, 5,147–49

Morse, J. M. (2007). Quantitative influences on the presentation of qualitative articles. *Qualitative Health Research*, 17, 147-148

Rosenfeld, P, Salazar-Riera, N., & Vieira, D. (2002). Piloting information literacy program for staff nurses: Lessons learned. Computers, Informatics, Nursing, 20, 6, 236-241.

Werley, H. H. & Lang, N. M. (1987). *Identification of the nursing minimum data set*. New York: Springer.

Wolford, R.A., Hughes, L. K. (2001). Using the hospital intranet to meet competency standards for nurses. *Journal for Nurses in Staff Development*, 17, 4, 182-189

World Health Organization (2005). *eHealth-Resolutions and Decisions*. The Fifty-eighth World Health Assembly, retrieved from: www.who.int/.../WHA58_28-en.pdf. Accessed on 20-04-12

Yaghmaie F. & Jayasuriya R. *(*2004*).* The Roles of Subjective Computer Training and Management Support in the Use of Information Technology in Community Health Centres. *Informatics in Primary Care,* 4 *(*12*)*, 163–170.