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eHEALTH IN CARING: What are the Competences it Demands from Nurses

A Literature Review

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Abstract

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| <p>EHealth is a term which encompasses the use of different electronical technologies in healthcare with the main aim being to improve the quality of life and health of patients. The purpose of this literature review is to describe what competences are required in the usage of eHealth in caring. The aim is to promote and improve the effective usage of eHealth in nursing practice. The study question: What are the competences eHealth demands from nurses?</p> <p>Electronical database search was conducted in two different databases and a total of twelve (n=12) articles were selected for review. Six articles were systematically selected from Cinahl (EBSCO) and Medline (Ovid) databases and six more articles were retrieved manually from the bibliographies of the articles used. The selected articles were analysed using the principles of inductive content analysis.</p> <p>The findings were then grouped into four categories, skills, knowledge, individual factors (such as attitude, interest and motivation), education and training. The overall conclusion is that more consistent education and training is needed to maintain acquired skills in an up-to-date manner thus promoting confidence and self-efficacy in the utilization of eHealth in nursing practice. Such approach could help to motivate the nurses to have a positive attitude which will eventually facilitate the learning process in becoming competent in the use of eHealth in caring. There is a need for conducting more concrete and precise research on this topic in order to clearly outline the necessary competency requirements for nurses. This list of requirements can then be incorporated into the curricula used for education and training.</p> | |
| Keywords | eHealth, caring, nursing, competence, telecare, ICT |

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| <p>EHealth-termillä tarkoitetaan erilaisen sähköisen tekniikan käyttöä terveydenhuollossa tarkoituksena parantaa potilaiden terveyttä ja elämänlaatua. Tämän katsauksen tarkoituksena on kuvailla millaiset taidot ja tiedot ovat tarpeellisia kun eHealthinä käytetään hoitotyössä. Tavoitteena on tukea ja parantaa eHealthin tehokasta käyttöä hoitoalan harjoittelussa. Tutkimuskysymys: Millaisia taitoja eHealth vaatii hoitajalta?</p> <p>Sähköisen tietokannan haku tehtiin kahdessa eri tietokannassa ja 12 artikkelia tuli valituksi tähän katsaukseen. Kuusi artikkelia valittiin järjestelmällisesti Cinahl:sta (EBSCO) ja Medline (OVID) tietokannasta ja kuusi muuta artikkelia haettiin käytettyjen artikkeleiden lähdeluetteloista manuaalisesti. Valitut artikkelit analysoitiin induktiivisen sisällön periaatteella.</p> <p>Löydöt ryhmiteltiin neljään kategoriaan, taidot, tiedot, persoonakohtaiset tekijät (asenne, kiinnostuksenkohteet, motivaatio), koulutus ja harjoittelu. Lopputuloksena on, että johdonmukaista koulutusta ja harjoittelua tarvitaan enemmän ylläpitämään saavutettua tietotaitoa ajantasalla olevissa työtavoissa, kuten tukemaan itseluottamusta ja osaamisentunnetta eHealth:n käytössä hoitotyön harjoittelussa. Tällainen lähestyminen voisi motivoida hoitajia saamaan positiivisemmän asenteen, mikä lopulta helpottaa oppimisprosessia tulla ammattitaitoisemmaksi eHealth:n käyttäjäksi hoitotyössä. Aiheesta tarvitaan konkreettisempaa ja tarkempaa tutkimusta hahmottamaan selkeästi tarvittavia pätevyysvaatimuksia hoitajille. Tämän mahdollisten vaatimusten listan voisi tällöin sisällyttää opiskelun ja harjoittelun opetusohjelmaan.</p> | |
| Avainsanat | eHealth, välittäminen, hoitotyö, pätevyys, telecare, ICT |

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1 Introduction

EHealth is a relatively new concept in caring which has risen from the development of technology. As Nahm et al. (2008: 464) refer in their research; eHealth can be described as a combination of several electronic healthcare technologies, such as Telemonitoring, Telecare, telehealth, internet-based support and education facilities. Craswell, Moxham, and Broadbent (2013: 12) briefly define eHealth as “any electronic exchange of data used in the delivery of healthcare”. eHealth is nowadays considered to be a medium for patient care delivery, health promotion and education as well as a medium for developing professional practice (Atkinson 2007: 612). Such delivered information is aimed at empowering its target audience such as patient groups so as to promote and improve their self-management skills hence helping them to obtain more healthier and independent lifestyles (Ian 2013: 222).

The lack of proper education, training and motivation may mean that nurses are not sufficiently skilled in using eHealth technology as required or nursing as a profession does not evolve with eHealth innovation (Craswell et al. 2013: 12). Considering the fact that use of eHealth is continuously integrated nowadays into caring, it is very important for nurses to understand how they can be used safely, effectively and ethically. Of great interest is to seek for the different factors that may obstruct the effective usage of eHealth in patient care delivery and health promotion processes by nurses. (Cashen, Dykes & Gerber 2004: 209; Koivunen et al. 2007: 463.) Such factors which could include computer literacy, access to technology, language, knowledge about cultural differences, willingness, motivation and interest to learn new things (Cashen et al. 2004: 210) can then be used as target goals when educating nurses so that they can become competent professionals in using ICT tools.

This written work represents the Final project topic “eHealth in Caring: What are the Competences it Demands from Nurses”. The paper points out the main purpose of the project work, provides recommended background knowledge on the topic, how the research process was conducted and it clearly states out the research question. In this final project, we view eHealth as the utilization of Electronic Technologies (ICT and IT) in the delivery of patient care and health promotion. eHealth discussed in this paper does not refer to the usage of different electronic means in health system management or the different ET devices available.

2 Background

The utilization of eHealth technologies in patient care and promoting self-efficacy of patients living with long-term conditions may be beneficial. However, this requires involving patients, their hopes and information needs in design, as well as, researching patients' willingness to use eHealth technologies. Nahm et al. (2008: 463) conducted a study to find what type of services over middle aged heart failure patients would want to have and how willing they would be to use the internet and telemonitoring services. It was found out that they would want to use eHealth learning programs if training to usage is available even though not all had access to the Internet. Moreover, the possibility for e-mail contact with health care providers was raised as a way to improve patient experience.

Internet access and basic computer skills are essentially linked when considering how eHealth programs could be conducted efficiently without excluding those with little or no familiarity to use any Internet based services. Chaffin and Maddux (2007: 7) wanted to find out what type of effect could be achieved by modifying Website for the needs of elderly population, whilst comparing user experiences to younger age groups. They concluded that paying attention to styling the layout of page for usability had significant effect on how users felt the page to be useful. This trend was found in all age groups and modifying the page was especially beneficial for the elderly who were finding the non-tailored pages more difficult to use than other age groups.

The Internet is already full of health-related websites and most people search health issues on the Internet. Therefore it is important to note that people receive information from pages of varying quality and as health care providers, we must be able to inform patients and family members about webpages that offer reliable and up-to-date information. Orłowski, Oermann and Shaw-Kokot (2013: 200) researched the quality of Webpages providing information on cardiac heart failure by evaluating their credibility, readability and content. It was concluded that nurses, who educate patients and family members, should be knowledgeable of the criteria that makes a webpage credible and reliable. (Orłowski et al. 2013: 200.)

Information technologies can offer a path to reach better patient populations who otherwise might be difficult to get involved in promoting their health, such as adolescents with chronic diseases. Whitemore et al. (2012: 396) compared the effect of two Internet programs for adolescent patients with type 1 diabetes (TD1). One was

coping skill intervention and the other was educational intervention. There was a little difference between the groups after 6-months. The positive findings in both groups, included: improved social competence, better coping skills, improved diabetes quality of life and decreased stress. This indicates that Internet might be the appropriate way to improve the skills of adolescents with TD1 so that can be able to manage with the disease and find solutions to the problems. Thus promoting the quality of life by reaching this population group and providing information and support in context this age group is familiar to use. (Whittemore 2012: 400.) Even though the strength of eHealth services is its adaptability to individuals' needs and situations, still one of its big challenges lies on not being suitable for some individuals, resulting in dropping out of the programs.

The strengths and weaknesses of using eHealth technology need to be considered in order to improve the interventions. Im and Chang (2013: 95) conducted a study to evaluate the trends on Internet-based nursing interventions by reviewing studies. It was found that the assets of Internet interventions were their ability to be used in various different contexts, adaptability to one's learning needs, anonymity provided and consistency. The weaknesses included the exclusion of part of the target population by providing services for a set group within it and the lack of ability to control whether or not the participants use the intervention properly or even complete it. Economically the development of eHealth interventions is costly but implementation low-cost.

The effective use of eHealth technologies in care is dependent on tailored design to fit a specific patient group without excluding those with less computer skills. Nguyen et al. (2004: 206) discovered the internet to be a suitable way to deliver peer support and patient education to cardiac recovery patients thus promoting their recovery. However, they also noted that the use of eHealth technologies requires tailoring and targeting the groups who could benefit from the internet-based intervention. Furthermore, eHealth might not be appropriate for usage in all patient groups due to poor technological skills or Internet literacy.

2.1 eHealth and caring

Caring means providing care and support through variety of skills and competency. Caring gives emphasis on promoting the welfare and health of others by the use of moral, ethical actions and practices (Bailey 2009: 28). Brilowski and Wendler (2005:

648) describe relationship, action, attitude, acceptance, and unpredictability to be the main characteristic of caring in context of nursing practise. In this matter, caring refers to essential concepts which define nursing practice and competence. The duty of a nurse is to provide care to those in need and such care is aimed at promoting health, preventing illness or alleviating suffering. The provision of care is also facilitated by the use of eHealth technologies since they serve as a medium through which information can be exchanged. According to Hope - European Hospital and Healthcare Federation (2009), healthcare institutions and its professionals have developed different means of continuity in the delivery of care through the use of IT tools and eHealth applications.

The term eHealth has different definitions depending on the context in which it is used. Cashen et al. (2004: 209) describe eHealth as “not only a technical development, but also a state-of mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology”. It is explained that eHealth nowadays facilitates communication, health and wellbeing, monitoring of patients and at the same time improves and develops professional competence in practice. Ian (2013: 222) further emphasizes that eHealth can promote patient empowerment which eventually allows them to be in good control of their health.

The wide range of technologies used in eHealth usually has specific targets which could include health professionals, managers and consumers. Examples include electronic health records, telemedicine, mobile health, health information systems, decision support systems, virtual health care systems, decision support systems and the use of cyberspace (Laakso & Tandy 2011: 40). Some technologies can help nurses to update their knowledge on particular diseases and at same time promoting the health and well-being of patients (Koivunen et al. 2007: 463). Other examples of eHealth technologies listed out by Fraser (2011); RCN (2012) in Ian (2013: 224) include:

- An interview or conversation through the use of a telephone between clients and health practitioner with the main aim of patient education
- Appointment reminders and information about health promotion through the use of telephone
- Consultation through video conferencing by a patient
- An internet-based support group with a chat room for sharing information among each other.

The above mentioned examples of eHealth tools are also included in this literature review. Documentation or record keeping aspects of eHealth tools were excluded.

eHealth can be used as a tool to improve patients experience and to develop patient education and communication methods used in nursing. According to Nahm et al. (2008: 469), incorporating eHealth into care can provide new ways through which nurses can offer a more comprehensive patient education and promote quality of care. This can only be achieved by the use of technology in health care process. Information and support provided through eHealth services does not only benefit health care providers and patients, but also caregivers and significant others who have concerns and need for trustable facts. In order to provide eHealth services, nurses need to be willing to familiarize themselves with how to deliver care and education other than traditional face-to-face method.

In this final project, as stated earlier, eHealth is considered as a phenomenon where Electronic Technologies (ICT and IT tools) are used in nursing to deliver patient care and to promote health. eHealth has a very wide interpretation since it involves the usage of different information and communication technology based tools such as computers, cell phones and cell phone towers, televisions, video conferencing softwares, wearable an portable health systems in disease prevention, diagnosis, treatment, monitoring and education. Its definition also includes the usage of a number of specific Information technology tools such as telehealth, telecare, telemonitoring and health informatics. (Payne 2013: 3.) IT is an extended synonym of ICT and both of them are Electronic Technology tools used in health promotion and patient care delivery. Hence, the terms ICT and Telecare are directly related to eHealth. This explains why the terms eHealth, ICT and Telecare were used as search terms during our database search.

2.2 Competence

Competence refers to having knowledge, understanding and ability to perform a skill, a function or a task efficiently and successfully (Skills for Health 2011; Oxford Dictionaries 2013). In relation to nursing, some crucial aspects of competence are communicational skills, expertise, critical thinking, caring, and ability to apply knowledge into practice (Smith 2012: 181). The effective usage of the available eHealth technologies in patient care delivery requires nurses to have good knowledge,

understanding of how to use them and also how to put the knowledge into practice. This will help to facilitate appropriate and adequate care delivery. According to Atzori (2012: 11), there is a great need for customized solutions which can respond to an eHealth user's needs, expectations, abilities and limitations so that they can gain competency in its usage.

Competence is a complex term itself and it is in many occasions incorrectly referred in nursing research (Smith 2012: 176). Applying competence as a key word itself would not be productive to find out what competencies are required for effective usage of eHealth in nursing practice. Instead, looking for the evidence of different aspects of competence such as skills, knowledge and practical utilization from the articles will lead to information about the competences demanded from nurses.

In this final project, competence is described as having sufficient knowledge, training, skills, education, behaviour and attitude in using Electronic Technology (ICT and IT) tools in patient care delivery and health promotion. More so, acquiring the above mentioned criteria will enable the nurse to work efficiently and confidently in nursing care situations where the use of eHealth tools is involved.

3 Purpose, aim and study question

The purpose of this final project is to describe what competences are required in the usage of eHealth in caring.

The aim of this final project is to promote and improve the effective usage of eHealth in nursing practice.

The study question: What are the competences eHealth demands from nurses?

4 Method, data collection and analysis

4.1 Literature review

The main purpose of a literature review is to actually present to the reader a strong and existing knowledge of what is known and unknown about the topic of interest. The methodology used in this final project is a qualitative literature review based on database search (LoBiondo-Wood and Haber 2006: 79-87.) Since we are searching for the evidence of a specific study question, the process and approach of systematic literature review can be applied when defining the scope of articles for the review in this final project (Siu & Comerasamy 2013: 47). In a literature review, a clear definition of the study question serves as a framework for the development of inclusion criteria and other latter stages of the review process (The EPPI Centre 2007: 11).

4.2 Data collection

The initial synthesis of data needs to have descriptive information of the studies, results, as well as their methodology (The EPPI-Centre 2007: 11). This will assist in further synthesis of data extraction. Systematic data synthesis requires equal presentation of different studies and their settings. Data collection includes critical appraisal, an assessment to evaluate the limitations and strength of each study involved in the review. (Maltby et al. 2010: 240.) Siu and Comerasamy (2013: 48) describe assessing the quality of studies by application of critical appraisal as an essential step of literature review. In this final project, only peer reviewed studies from academic journals were included in the review to ensure their quality.

The inclusion criteria needs to be specific enough and must be applied in a consistent manner in order to avoid bias (The EPPI-Centre 2007: 4). In this literature review, the selection criteria included peer reviewed research articles which were published in English from 2008 to 2013 and these articles must be relevant to the study question: "What are the competences eHealth demands from nurses". Articles which were not available in full text and which needed payment were excluded.

The use of information and communication technologies in different forums has developed tremendously especially over the years. Due to this consideration, the year range for the chosen research articles in the literature review was set to include only those from the 21st century (2008 to 2013).

After identifying the selection criteria, a concrete search and selection was carried out. The selection process of the research articles is shown in Table 1 below. The first search strategy included conducting searches on both Cinahl (EBSCO) and Medline (Ovid) databases with same search terms. The used search terms were obtained from the main concepts of our topic and they included eHealth AND (nursing OR caring), Telecare AND (nursing OR caring) and ICT AND (nursing OR caring). A second search was carried out manually since there was a need for more accurate articles

Table 1. Database search

| Key words* | Cinahl (Ebsco) | | | | Medline (Ovid) | | | |
|----------------------------------|----------------|--------------------------|----------|-------------------|----------------|-----------------------------|----------|------------------------------------|
| | No. of hits | No. of relevant articles | | Articles selected | No. of hits | Number of relevant articles | | Articles selected |
| | | Title | Abstract | | | Title | Abstract | |
| eHealth AND (nursing OR caring) | 11 | 7 | 4 | 0 | 17 | 9 | 6 | 1 |
| telecare AND (nursing OR caring) | 18 | 4 | 1 | 0 | 18 | 6 | 2 | 1 |
| ICT AND (nursing OR caring) | 29 | 9 | 6 | 4 | 25 | 11 | 7 | 4 (duplicates - same as in Cinahl) |
| In total | 58 | 20 | 11 | 4 | 60 | 26 | 15 | 6 |
| Selected | | | | 4 | | | | 2 |
| Manual search | 6 | | | | | | | |

Searches were made on 17.01.2014 & 26.2.2014

Limitations 2008-2013, English language, peer reviewed

The choice of articles was based on three solid criteria: Title, reading of abstracts and reading of the whole publication. First selection was based on whether the title is relevant to the topic. The selected articles were again re-evaluated based on their abstract. In the third and final stage, the articles were chosen for review if their contents

were found to be relevant to the topic. In addition duplicates in database searches were excluded. Synthesis of the articles grid (Appendix 1)

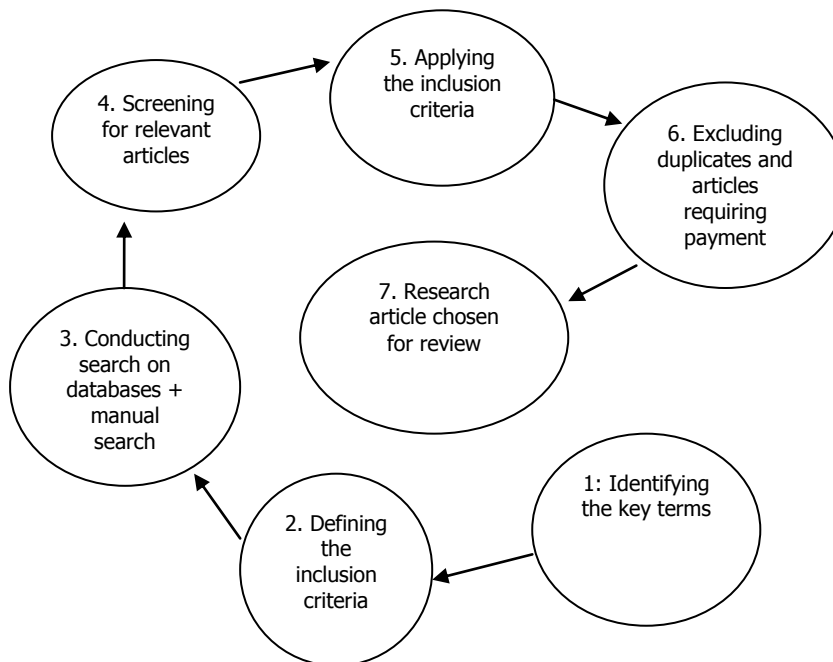


Fig .1 The process of selecting articles

4.3 Data analysis

In this final project content analysis was used since the data collection method is literature view and eHealth is rather a new concept and phenomenon (LoBiondo-Wood and Haber 2006: 79-87). Looking superficially at the different findings of articles conducted in different environments, content analysis is the most applicable data analysis method (Maltby et al. 2010: 145). In content analysis, articles are searched and the prominent themes, patterns and linkages between them are established (Polit & Beck 2006: 404; Silverman 2013: 443). There is limited amount of research done on the phenomenon of eHealth and no theory to base analysis on. Furthermore, the prior knowledge of the phenomenon is fragmented, especially related to the nursing role in implementation. Taking these aspects into consideration as stated by Elo and Kyngäs (2007: 113), the inductive approach to content analysis is applicable.

The first step which is the preparatory phase of the inductive content analysis process (Fig 2) involves defining the data of the articles. In these articles, the results/findings and a part of discussion, where authors were reflecting their own findings and ideas (not referencing others) and the narratives of the participants involved were considered as data material. The second step is the preparatory phase in which the collected data was then subject to open coding and further organising. In open coding, the texts were re-read and parts which indicated to be relevant to the topic were recognised until all prominent meaning units were found. (Elo & Kyngäs 2007: 109.) As stated by Graneheim & Lundman (2004: 106), meaning units are such as phrases, words, parts of sentences relating to the study question, eHealth and competence. In inductive content analysis meaning units are furthermore processed to condensed meaning units (referring to aspects of the meaning units which were related to the topic) (Graneheim & Lundman 2004: 106).

Moreso, the process was followed by the categorization of the different codes derived from the meaning units based on their similarity and dissimilarity (Elo & Kyngäs 2007: 109; Graneheim & Lundman 2004: 108). In this final project, the sub-categories were generated directly from the condensed meaning units; hence the codes were used as sub-categories (Appendix 2). Furthermore, categories were derived from sub-categories and were given describing names. It was structured in such a way that, each category had sub-categories which belonged to a particular group. The grouping was done this way to make comparison of the different categories easier. The hierarchy between the levels was also distinguished (Elo & Kyngäs 2007: 111.) The last phase known as the reporting phase is characterised by describing the results with the use of a conceptual map (Fig 3). A table which presents a summary of the sub-categories and categories was then created as indicated (Appendix 3).

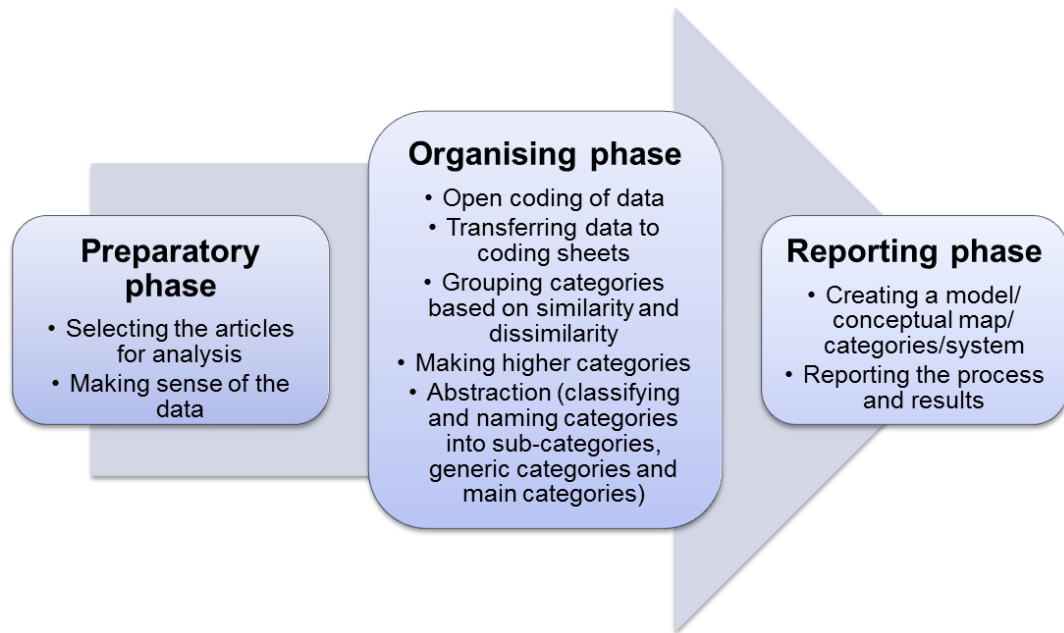


Fig.2 The process of inductive content analysis (adapted from Elo & Kyngäs 2007: 110)

5 Results

After analysing 12 articles, the results were then grouped into four categories: Skills, knowledge, individual factors and education and training as indicated in the diagram below.

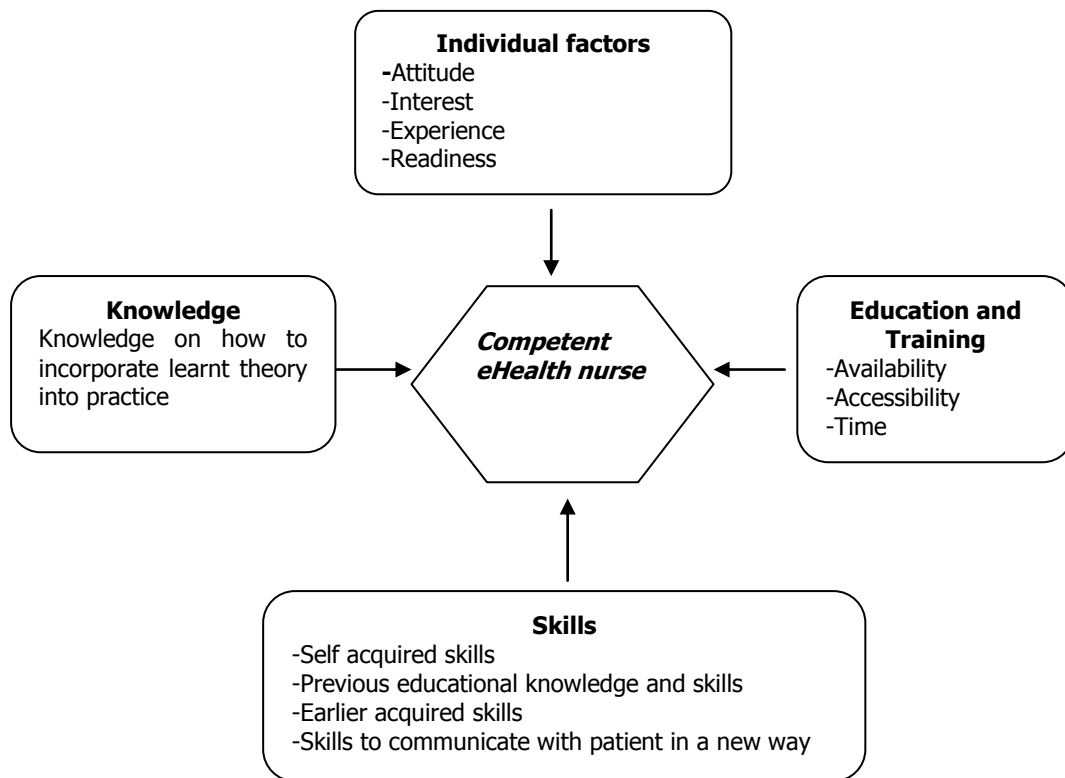


Fig. 3 Conceptual framework for competences required by nurses in the use of eHealth

5.1 Skills

The required skills needed for the effective use of Electronic Technology (ET) tools by nurses was found to be a very crucial factor in some of the reviewed articles. These included self-directed acquired skills, previous educational knowledge and skills, earlier acquired skills, skills to access information and skills to communicate with patient in a new way. Some participants who had sufficient skills listed above accompanied by flexibility could use ET tools at any time (Johansson et al. 2011). Participants who were lacking skills faced a lot of difficulties and were unable to use ET tools (Hudson and Buell, 2011). Fetter (2009) found out from his research that, participants with earlier

acquired skills or who had some previous training showed more readiness and motivation in ET use and it was much easier for them to learn how to use new technologies effectively. Some other participants who had acquired skills through a self-directed manner explained that, they could handle some ET tools by themselves effectively. Hence their previous skills helped them to find their way out. (Bembridge, 2011.)

5.2 Knowledge

The ability to integrate acquired knowledge into practice was found to be lacking by participants in some of the reviewed articles. Such incapability actually serves as a limitation since the nurse is unable to use the needed tool. One could understand that, participants who had the access to ET tools such as student nurses in university (Bembridge et al. 2011), were not informed about the clinical relevance of such practices and their transferability into working life. They only realized when they were at work that they could not remember how to use ET tools. The explanation was that, no one told them how significant they were and how important it is for them to keep it updated. Some of the graduate nurses actually had no knowledge on how to incorporate theory on the use of ET tools into nursing practice due to lack of adequate information (Engström et al. 2009; MacCall et al. 2008).

5.3 Individual factors

The need for an open mind, motivation and the readiness to learn new technologies was reported by some participants to be very beneficial. The readiness to new ways, new technologies and the readiness to be more accessible to ET usage can greatly affect the level of competence in ET usage by nurses. (Johansson et al. 2001; Nilsson, 2010; Ward et al. 2008.) Participants from the review reported that, those who showed some interest and favourable attitude were quick to adapt and could easily learn how to use new technologies (Engström et al. 2009; Ward et al. 2008). Nurses who lacked experience in using ET tools showed no confidence at all. Hence, experience helps to promote self-efficacy and competency. (Eley et al. 2008b.)

5.4 Education and training

Some participants emphasized the need for more training opportunities. This was due to the fact that, the training they had before could not meet up with the demands of nowadays technologies. (Doran et al. 2010; Eley et al. 2008a.) Ward et al. (2008) found out that there was a great need for enough time for education so as to keep the necessary skills and knowledge up-to-date. Some nurses complained about too much workload at work, no time for extra training and education (Fetter, 2009) and no time to use the different available ET tools at work (Doran et al. 2010. It was also found out by Engström et al. (2009) that, most of the participants pointed out the need for more education because they felt that they had insufficient knowledge.

Participants further explained that, they had no access to computers due to different reasons including unavailability (Bembridge et al. 2011; Fetter, 2009), delays in repairs (Bembridge, 2011), inadequate resources (Ridgway, 2011) and below Registered nurse level 3 (Eley et al. 2008b).

6 Discussion

6.1 Discussion of results

Some of the reviewed articles mentioned the importance of previously acquired skills in nursing practice. The teaching method used in training did not really matter but with adequate skills, the difficulties encountered would be lower and such participants would easily be adapted in learning how to use new technologies. (Bembridge, 2011; Fetter, 2009; Johansson et al. 2011.) This explains the importance of ET education and training at all levels of education in the nursing field especially at university level. In this light, it can be suggested that ET education should be included in the curricula as a separate course on its own and not embedded into another course. This should be implemented in such a way that more emphasis is placed on the significance or relevance in nursing practice and working life. Hence there is the need for more opportunities to computer and information literacy for workers. Some participants

explained how knowledge was limited during earlier education and this made them not to utilize and practice the little skills they had obtained before getting into working life Engstrom et al (2009). This is in line with a research carried out by Orłowski et al. (2013: 200). They elucidated that the nurses should be knowledgeable so that they can effectively deliver patient care.

Many graduate nurses expressed the need for more education and training as a result of insufficient knowledge and the evolvement of new ET technologies. It is obvious that if skills and knowledge are not updated, there will be the inability to perform effectively. (Engström et al. 2009; MacCall et al. 2008.) Hence hospitals and other responsible organizations should help to offer both individual and group opportunities to regular education and training for workers and newly graduate nurses at work. This can help them to maintain the required skills and knowledge. Some workers complained of limited time for education and training due to too much workload (Fetter, 2009) and delays in repairs of instruments (Bembridge, 2011). It will be of great importance if some rescheduling of work routines is done and more ET tools made available to those in need. It was also interesting to find out that, some nurses had no access to computers because they were below some particular level (RN level 3). It brings new opinions and questions to why such rules are being made to those groups of nurses. (Eley et al. 2008b.)

Nurses from the review reported that motivation, positive attitude and readiness actually helped them to facilitate their learning process. The idea of being positive is a very important issue since it actually speeds up the interest in learning and thus aids in the understanding process. (Johansson et al. 2001; Nilsson, 2010; Ward et al. 2008.) This is in line with a research carried out by Craswell et al. (2013). They found out that, attitudes, beliefs, confidence and motivation were necessary for a successful integration into the usage of new eHealth systems. Nurses with these criteria acquire the necessary knowledge and skills at a faster rate than those who do not possess them. Participants from the review also mentioned how their previous experiences helped them (Eley et al. 2008b.). Those who had come across some of the ET tools were more confident and self-efficient and this points out clearly the significance of incorporating ET education and training in school and work settings.

Findings from the review also indicated the need for more than one criterion for the effective use of eHealth in nursing practice. It was easy to understand that some of the criteria are linked to each other in different ways. The lack of skills was as a result of no

education and training (Hudson & Buell, 2011). Some prior acquired skills were insufficient because there were no opportunities such as access to computers and no extra time for education and training at work. The quality of education and training offered was also important since it reflected the skills acquired. This explains why some nurses felt that they had little knowledge about usage and transferability into nursing practice. Hence, considering the fact that eHealth is a relatively new concept in nursing, consistent up-to-date education and training is therefore necessary.

6.2 Discussion of ethics

The ethical point of view is a very essential part of a research process. This can be less visible to the eye in literature review than in study designs where participants for example are present (Siu & Comerasamy 2013: 88). Siu and Comerasamy (2013: 88) proposed to integrate relevant ethical concepts of integrity, transparency and accountability in relation to how well enough and how they are applied in studies. Furthermore, Siu and Comerasamy (2013: 89) explain that transparency in all stages of a study process is a key factor to ensure the accuracy of results and the project itself. During the review process, only the actual narratives and discussions of participants were used in making the required meaning codes.

To ensure the quality of this final project, the highlighted ethical principles in conducting a literature review which include honesty, fairness and truthfulness in reporting and describing the works of others were considered. More so, it is essential to be accountable for own work, as well as own decisions and actions during the process. Thus, the essential ethical concepts of nursing practice which are accountability and responsibility (Fry & Johnstone 2008: 41) are well represented in this study.

6.3 Discussion of validity

According to Silverman (2013: 286), data collection and analysis in studies is always to some degree selected, refined and interpreted. Therefore, no study type is free of bias completely. The term used to describe the credibility of these interpretations and the extent to which the tools used in study present issues and factors that it is supposed to, is validity (Maltby et al. 2010: 245; Silverman 2013: 285). In order to promote the

validity and reliability of this study, it is important to present the results equally and not to persuasively include only issues and evidence supporting one particular view of the topic (Silverman 2013: 285). The formation of meaning units and categories are critical stages for the credibility of content analysis due to their scope and subjective nature (Graneheim & Lundman 2004: 110). Therefore, it is important to pay attention to the implementation and reporting in this final project.

The applied data analysis method was inductive data analysis hence, it is important to show not only what the data (the articles) was but also how the process of analysis was conducted. According to Elo and Kyngäs (2007: 112), it is of great importance to provide appendices and tables which show the different stages of content analysis and results to increase the reliability and validity. This will provide a demonstration of what occurred between data and result. In this literature review appendix 3 and 4 shows the different stages of contents analysis and the results.

It can be viewed that this literature review is based on a variety of different articles conducted within diverse environments and covering many aspects of the same phenomenon, eHealth. The competences in eHealth for nurses are not tied only to a certain setting or country since different information and communication technologies are present worldwide these days. Thus, there is variation of the articles' background setting which improves the external validity, referring to how much the results of the study can be generalized to other environment or sample groups (Maltby et al. 2010: 245). During this literature review, the selected articles were shared equally and their codes developed. They were further combined together and compared to ensure that the content analysis method was efficiently applied in the process.

7 Conclusion

Based on the findings, it is evident that criteria such as skills, knowledge, individual factors and education and training are necessary for the effective use of eHealth by nurses in nursing practice. The overall impression from participants was the need for more education and training to keep their skills up-to-date thus promoting confidence and self-efficacy in the utilization of eHealth in nursing practice. In addition, the finding indicates the need for more consistent training and education regarding the effective

usage of Electronic Technology tools in the delivery of patient care and health promotion. Such approach could help to motivate the nurses to have a positive attitude and approach which will eventually facilitate the learning process in becoming competent in the use of eHealth in caring. Through the research process, it became clear that there is limited research done regarding the necessary requirements for nurses to implement eHealth efficiently in nursing practice. Therefore, there is need for more concrete and precise research to be conducted on this topic; eHealth in caring: What are the Competences it Demands from Nurses. Such requirements can then be included into the curricula which is used for education and training for nurses.

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Appendix 1

Synthesis of research articles

| Author, year, title and publication | Purpose/aim | Sample and settings | Type of study | Data collection and analysis | Main findings |
|--|---|--|--|---|---|
| Bembridge, Levett-Jones and Jeong (2011) The transferability of information and communication technology skills from university to the workplace: A qualitative descriptive study. <i>Nurse Education Today</i> , 31 (3) Australia | This study was conducted to describe if there ICT skills acquired during studies transfer to nursing practise. | 8 nurses working in acute hospital in Australia | Qualitative descriptive study | Semi-structured interviews with open ended questions Thematic analysis of the data | Educational factors, individual characteristics and attitude of a work place influence the ability to acquire ICT skills during studies and implement them in clinical practise after graduation The management factors affect to the accessibility of ICT to utilize in one's work Successful transferring of skills improved patient outcomes and satisfaction to the work place |
| Doran et al. (2010) Supporting Evidence-Based Practice for Nurses through Information Technologies. <i>Worldviews on Evidence-Based Nursing</i> . First Quarter Canada | Purpose was to assess the usability of mobile information tools (PDA and table) and to increase nurses' access to information sources, as well as, explore relation between PDA and Tablet information resources and outcomes | 488 registered nurses and registered practical nurses Altogether 29 acute care hospitals. home care nursing services, primary care and long term care facilities, which were participating in PDA Initiative | Longitudinal pre-post-test design, survey method | Set of adapted, modelled and author-developed questionnaires and surveys. Data collected over 12 month period | Half of nurses used PDA/Tablet PC at least every few days Primary care nurses and long term care nurses were using them most frequently Around fourth of nurses did never or almost never use these devices Reasons varied from technical issues, (poor network, battery problems, slow system, device in repair), inconveniency, preference to use desktop, normal keyboard, inadequate training, workload overwhelming, to computer shyness There were no significant differences with satisfaction or ease of use between PDA and Tablet PC systems There was no differences between nurses working in different sectors regarding how usability of devices was experienced |

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| <p>Eley, Fallon, Soar, Buikstra and Hegney (2008a) The status of training and education in information and computer technology of Australian nurses: a national survey. <i>Journal of Clinical Nursing</i> 17 (20)</p> | <p>A study was undertaken of the current knowledge and future training requirements of nurses in information and computer technology to inform policy to meet national goals for health.</p> | <p>A 78-item questionnaire was distributed to 10,000 Australian Nursing Federation members residing throughout Australia</p> | <p>A Self-administered postal survey</p> | <p>Quantitative data were entered using TeleForm and analysis was undertaken using SPSS version 12</p> | <p>It was accepted that training would increase the use of ICT by nurses. Workload issues such as time and lack of relief staff were identified by the majority of respondents as being the major barriers to training.</p> |
| <p>Eley, Fallon, Soar, Buikstra and Hegney (2008b) Nurses' confidence and experience in using information technology. <i>Australian Journal of Advanced Nursing</i>, 25 (3)</p> | <p>To support policy planning for by surveying nurses in Australia in order to determine their current use of information technology and barriers to that use.</p> | <p>Questionnaire was mailed to 10,000 members of the Australian Nursing Federation residing throughout Australia</p> | <p>A self-administered postal survey</p> | <p>The study used a mixed-method approach to collect both quantitative and qualitative data. Data were analysed by SPSS version 12</p> | <p>Results varied by level of nurse, their age, and length of time in nursing Assistants in nursing and enrolled nurses had significantly lower experience and confidence than registered nurses, while younger nurses and those with the least time in nursing were more experienced and confident.</p> |
| <p>Engström, Linqvist, Ljunggren and Carlsson (2009) Staff members' perceptions of a ICT support package in dementia care during the process of implementation.</p> | <p>The aim of this study was to describe staff members' perceptions to usage of ICT tools, which were introduced in practice.</p> | <p>Convenience sample, 15 staff members of a residential home for people with dementia</p> | <p>Interviews (interview guide was used -semi-structured)</p> | <p>Data was collected by four group interviews (one prior to new ICT, two during the implementation and once later on) Data analysis method was qualitative content analysis.</p> | <p>Two major themes where: transition from losing control to perception of increased control and security and struggle to function with malfunctioning systems</p> |

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| <i>Journal of Nursing Administration</i> 17 Sweden | | | | | |
| Fetter (2009) Graduating nurses' self-evaluation of information technology competencies. <i>Journal of Nursing Education</i> , 48 (2) USA | This report describes how one college of nursing pilot tested student evaluation using established informatics competencies to benchmark its graduates' performance | 42 graduating seniors participated (52% response rate) at Villanova University, College of Nursing | Survey | The Stagers, Gassert and Curran (2001) articulation of 43 novice nurse competencies serving as the foundation for the ANA's Nursing Informatics: Scope and Standards of Practice (2001) served as the foundation for the project and survey instrument. Open-ended question were used | Numerous recommendations for enhancing IT integration were elicited. These included Improving faculty knowledge, skills, attitudes, and behaviours; standardizing and documenting student and faculty competency expectations and attainment; Enhancing access to hardware, software, references Support in agencies and colleges; improving privacy and security policies and instruction; Mandating specific hardware and software, such as laptops PDAs |
| Hudson and Buell (2011) Empowering a safer practice: PDAs are integral tools for nursing and health care. <i>Journal of Nursing Management</i> 19 USA | To evaluate the features of implementing PDA usage in both clinical and studies for baccalaureate student nurses. | Purposive sample, initial sample of 105 nurse students Three campuses | Longitudinal study with questionnaire | Collecting data through three times survey/questionnaire regarding PDA usage in studies and in clinical setting. First time after initiation of PDA usage, few months later and the last over a year after beginning of PDA usage. | First semester of using PDA the reported learning style of 46% was personal trial and error, 17% unsure, 15% through live demonstration, 13% from written hand-outs, 9% group tutorial, 8% one-to-one tutorial At the end of studies before graduation majority of 60% reported that they were not using PDA Those who were using PDA were using it mainly for purpose of drug reference, patient teaching and laboratory guide 84% of students did not think that use of PDA would compromise reasoning skills and lead to dependence on the PDAs 80% of nurse students did not feel overwhelmed by features of PDA Over half of the students were not using PDAs in clinical practice |
| Johansson, Petersson and Nilsson (2011) Experience of | Aim: to describe the experience of one nurse using a personal digital assistant (PDA) in practice | 1 newly graduated nurse | Single case study | Open-ended interview by two authors Taped-recording and transcription | Multifunctional in usage Self-support View of time allocation More functions needed of PDA to be efficient in |

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| <p>using a personal digital assistant in nursing practice – a single case study. <i>Journal of Nursing Management</i> 19 Sweden</p> | <p>Study questions: How newly graduated nurse experiences the use of PDA and How PDAs could benefit nursing practise</p> | | | <p>Content analysis</p> | <p>practise, double work Could be utilized as communication tool Took time to learn how various functions work (for person having basic ICT skills) Increases confidence when ability to check uncertain issues quickly Multitasking able to be available and access needed info at the same time</p> |
| <p>McCall et al. (2008) Perceptions of the use of a remote monitoring system in patients receiving palliative care at home. <i>International Journal Of Palliative Nursing</i>, 14 (9) Scotland</p> | <p>This study aimed to describe the perceptions of patients and health care professionals about the acceptability and usability of remote monitoring system (aSYmsP)</p> | <p>Patients (n=21) who were receiving palliative care at home and health care professionals (n=9) taking care of them. Some of the participating patient died during the time span of study.</p> | <p>Explorative descriptive design</p> | <p>Data was collected by using questionnaires (pre/post-study) and semi-structured interviews (post-study) For data analysis of questionnaires statistical software package (SPSS) was used. Interviews were transcribed and investigated by using thematic analysis method.</p> | <p>Before the study all health care professionals felt that using the remote monitoring system would be helpful. They also felt confident that it could improve detection of problems of a patient and change the process of communication with patients After the study the majority of professionals felt positive about usage of remote monitoring system to management and assessment of symptoms. Possibility to improve patient care even with current lack of staff. Patient reported empowering experience to be able to report via system their symptoms rather than 'disturb the health care professionals via phone for nothing'</p> |

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| <p>Nilsson, Skär, and Söderberg (2010) Swedish District Nurses' experiences on the use of information and communication technology for supporting people with serious chronic illness living at home – a case study. <i>Scandinavian Journal of Caring Sciences</i> 24</p> | <p>To describe district nurses experiences of utilizing ICT tools to enhance communication with clients who had serious chronic illness and were living at home.</p> | <p>2 district nurses (DN) working in home care were selected by the head of two healthcare centres.</p> | <p>Qualitative case study</p> | <p>Three semi-structured interviews over time period of 5 months. Data was analysed by using thematic content analysis</p> | <p>Implementation of messaging program helped to feel more accessible in between brief visits that many times felt insufficient to deliver the support to the client. Both DNs developed incorporated into their daily routines a set times for visiting messaging program. DNs saw ICT tools as possibility to potentially increase resources in home care practice since not all issues require a home visit, mere a medium through which clients can reach nurses. DNs did not appreciate the technical problems associated with mobile phone with Internet and messaging program access. More feeling of control over one's work was gained after learning to use ICT tool in practice.</p> |
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| <p>Ridgway, Mitchell and Sheean (2011) Information and communication technology (ICT) use in child and family nursing: What do we know and where to now? <i>Contemporary Nurse</i> 40(1) Australia</p> | <p>The purpose of this study was describe how ICT is used and gather baseline information of current availability of 'ICT for nurses in the Maternal and Child Health Service in Victoria (Australia)</p> | <p>606 nurses working in MCHN services (either universal MCH service or in health centres) replied to questionnaire. Sample covered 2/3 of workforce.</p> | | <p>Data collection method was questionnaire (adapted instrument) Quantitative data was pre-coded and analysed with Intercooled Stata statistical package. Thematic analysis was applied open-ended questions.</p> | <p>80% had received training to ICT usage in practice place. Most found themselves very confident or confident in using basic functions in computer: electronic patient records (EHR), email and Internet In daily frequency most did not access Internet sources other than email. In frequently (weekly or monthly) internet was used by nurses for information search for clients literature searching and drug information Unsuitable or malfunctioning ICT devices do not enhance the need for access to appropriate resources in nursing practice in MCH facilities. In open-ended questions nurses proposed for improvement to unify the systems and make them user-friendlier (better screen view, easier navigation within the application/system, incorporation between different devices and applications)</p> |
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| <p>Ward, Stevens, Brentnall and Briddon (2008) The attitudes of health care staff to information technology: a comprehensive review of the research literature. <i>Health Information and Libraries Journal</i> 25 (2) UK</p> | <p>What does the publicly available literature tell us about the attitudes of health care staff to the development of information technology in practice, including the factors which influence them and the factors which may be used to change these attitudes?</p> | <p>79 papers included for data extraction</p> | <p>Literature review</p> | <p>Twelve databases were searched for literature published between 2000 and 2005 that identified research related to information technology (IT), health professionals and attitude.</p> | <p>The attitudes of health care professionals can be a significant factor in The acceptance and efficiency of use of IT in practice</p> |
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Appendix 2

Coding sheet

| Meaning unit | Condensed meaning unit | Sub-categories |
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| Article 1) Most of the skills gained were not part of a particular course or formally taught, but were embedded in the course content | Skills gained were learned in a self-directed manner | Self-directed acquired skills |
| The inability to identify acquired skills in the university and their usefulness in working life | Lack of recognition of the clinical relevance of the acquired ICT skills and their transferability to the work force | Ability to transfer skills into practice |
| Lack of access to ICT software, unavailability of ICT hardware and delays in repairing faculty equipment | Lack of access, unavailability to ICT and delays in repairs | Accessibility and availability of ICT tools |
| Having formal ICT education prior to studying nursing to no experience in using ICT | Prior educational knowledge and skills of ICT | Previous educational knowledge and skills |
| The use of positive re-enforcement encouraged participants to share the knowledge and skills that they gained from using ICT | Encouragement in sharing gained knowledge and skills | Support from colleagues |
| Article 2) Reasons included, technical issues, time restriction, Overload, training and learning, device unavailable | Lack of time, too much workload, unavailability and insufficient training | Lack of time, unavailability, workload and training |
| Article 3) My bachelor of nursing degree offered no training | There is a need for training | Training |
| Need for flexibility in working hours and availability of continuing IT education | Need of time for extra education | Time for education |
| Never enough money to train nurses who are eager to increase ICT knowledge | Lack of financial support | Financial Support |
| Article 4) Over half the nurses below RN level 3 do not have sole access to computer at work | No access to computers | Accessibility to computers |
| Experience was low and there were clear differences in response related to level of job | Lack of experience | Experience |

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| Use of computer was at home due to insufficient time or facilities at workplace | Insufficient time at work | Use of ICT at work |
| Article 5) Some of the staff members were not interested in the new technology | Lack of interest | Interest |
| However, some staff members showed a more “wait and see” yet positive attitude | Positive attitude | Attitude |
| Some staff members said they had insufficient knowledge about computers and expressed difficulties in handling them | Insufficient knowledge | Knowledge |
| Article 6) The need for earlier mastery of skills | Earlier mastery of skills | Earlier acquired skills |
| They noted their need for more help evaluating websites | Educational support in the use of websites | Educational support |
| Educationally disadvantaged students lack intranet and internet access | Lack of internet and intranet access | Lack of internet access |
| Article 7) learning to use a PDA was like learning any new skill (the more you practise, the better you become) | Learning process in use a PDA was similar to learning of other skills | Perceiving use of technologies |
| Complicated, hard to find information | Difficulties in accessing information | Skills to access information |
| Time saver with critical information | When knowing how to use saves time (resources) | Knowledge of how to efficiently apply in practise |
| Article 8) provides excellent access to information at any time and place | Flexible way to access information | Skills to access information |

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| limitations in terms of its content and functionality | Implementation requires functionality and adaptability to a specific nursing environment | Ability to adjust to limitations of device, as well as, evaluate them |
| it took some time to learn | Learning new skills to use technology takes time and effort | Resources (time) to learn skills |
| is much easier to keep in contact with the patient | Helped in having contact with the patient and being more accessible | Readiness to new ways nurse-patient contact |
| Article 9) early detection of symptoms problems and enable timely interventions | Possibility to enhance practise and patients' quality of care | Ability to incorporate telecare in nursing practise |
| hopefully patients will feel more confident about reporting symptoms without feeling some of these symptoms are too trivial to bother anyone with | Enabling the patient to better communicate with the nurse | Skills to communicate with patient/client in new way |
| it helped patients and carers fell more of a partner in care, rather than having things done to them or being told what is happening | Way of involving the patient and family to care, rather than traditional role of doing for patients | Ability to deliver patient and family-centred nursing care |
| Article 10) experienced more direct communication with the ill person by using ICT | Use of ICT offered alternative method which enhanced communication with the patient | Capability to utilize alternative methods of communication |
| routines, such as visiting the messaging program at fixed times | Incorporating new communication technology into one's work routine | Ability to integrate ICT into existing work routines |
| possible solution to increasing accessibility to care for ill people | Increase the accessibility of nurses to the patients/clients | Readiness to be more accessible |

| Article 11) nurses indicated high level of confidence using computer | Confidence associates to usage | Confidence |
|--|--|---|
| having received training in the use of computers electronic recourses... the equipment may be used without sufficient training: - self-taught which is not a good idea | Training for use better option than self-taught learning | Support/training in learning to use |
| difficulties were due to lack of knowledge regarding accessing information | Lack of knowledge hinders accessing information resources | Knowledge of how to access needed information |
| lack of accessibility due to inadequate resources | Need of adequate resources to apply skills in practise | Resources to utilise skills in accessing information |
| Article 12) Compatibility with an individual's work style and skills was associated strongly with satisfaction and continue use of the system | Compatibility with work style and skills leads to better usage of the system | Ability to suit a system/tool with one's working style and skill |
| nurses with expertise in computer use, 80% had a more favourable attitude | Favourable attitude is associated with expertise in usage | Favourable attitude goes along with expertise |
| Computer skills were significantly and positively correlated with both computer knowledge and computer attitudes | Computer knowledge and attitudes correlates positively with skills | Knowledge and attitude effects on skill level |
| Nurses' interest in IT was limited because of concerns about inconvenient access to computers; reduced work efficiency | Poor access and reduced work efficiency make nurses doubtful in the use new technologies | Ability to recognise problems with integrating system to practise |
| Barriers they perceived to making changes each appear to explain more variance in nurses' attitudes toward computers than user security | Nurses' attitudes have an effect on adapting to new technology | Open attitude for change of technologies |
| Perceived usefulness was a strong determinant of intention to use | Technology needs to be felt useful to be applied in practise. | Perception of technology being useful in the practise |
| The implementation strategy depended on the experience, skills, beliefs and motivation | Experience, skills, beliefs and motivation affect the implementation | Expertise and motivation play a role |
| Would be beneficial but lack of adequate information | Need for information of how to implement in practise | Knowledge and skills to implementation |
| Need for more computer literacy, information literacy and research education | Ability utilize IT requires computer and information literacy, as well as knowledge of research | Computer and information literacy and research knowledge |
| Ability to communicate anywhere – leading to health care professionals working together | Ability to apply communication competence (in distant electronic usage) improves multi-professional teamwork | Competence in communication |

Appendix 3

Sub-categories and categories from content analysis of narratives about the use eHealth in nursing practice

| Competences required by nurses for the effective use of eHealth in nursing practice | | | | | |
|--|--|--|--|---|---|
| Categories | Individual factors | Skills | Education and training | | Knowledge |
| Sub-categories | <ul style="list-style-type: none"> - Readiness - Confidence - Proper preparation - Experience - Interest - Favourable attitude goes along with expertise - Open attitude for change - Perceiving use of technologies | <ul style="list-style-type: none"> - Self-directed acquired skills - Previous educational knowledge and skills - Earlier acquired skills - Skills to access information - Skills to communicate with patient in a new way | <ul style="list-style-type: none"> - Accessibility and availability of ICT tools - Accessibility to computers - Lack of internet access - Ability to access information and gain knowledge - The use of ICT at work and in school - Resources to utilize skills in accessing information - Capability to utilize alternative methods of communication | <ul style="list-style-type: none"> - Support from colleagues - Educational support - Financial support - Supporting training in learning and use - Workload - Time for extra training and education | <ul style="list-style-type: none"> - Ability to transfer skills into practice - Ability to intergrade ICT into existing work routines - Ability to suit a tool with ones working style and skill - Knowledge and skills to implementation - Ability to recognise problems with integrating system to practise - Ability to incorporate telecare in nursing practise - Knowledge of how to efficiently apply in practise - Knowledge of how to access needed information |

