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Competency in Informatics for Nursing Professional in India: Imbibing the Tech-culture among Nursing Professionals

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ABSTRACT

Nameless nursing informaticians have been part of the tech-culture for more than two decades imbibing it like a sponge and have muddled through the successful and not so successful initiatives in healthcare. With the changing times and recognition of efforts that nurses continue to put in digital patient care, universally nursing informatics has grown as a separate field. In India, Health Information Technology (HIT) has made the nursing fraternity to adopt digital healthcare, however the extent of percolation remains questionable until we measure it as objectively as possible. The only way to do so is educate and check the skill competencies of nursing students and practicing nursing professional including researchers, educators, administrators and clinical nurses. The article explores the nursing informatics curriculum taught to student nurses in India. The basic and advance competencies in computer application, information literacy and management have been proposed for nursing students and nursing professionals in Indian setting.

Keywords: *Nursing Informatics, Informatics Competency, Digital Health, Nurse Informaticians, Informatics curriculum*

INTRODUCTION

Nursing informatics is the knowledge, behavior, and skills required for nurses to collect, store, retrieve, and process information[1]. Nurses are learning on the job with practice the various application of Health Information Technology (HIT) in the clinical setting. Assessing and enhancing knowledge of professionals would encourage the adoption of informatics with open purview for practice[2]. From simple mobile devices to e-ICU nursing informatics has influenced the practice undoubtedly[3].

Studies have demonstrated that nurses have the right attitude to take informatics seriously[4]. Courses exclusively teaching nursing informatics do not exist in India but institutes offer real time and online courses with the dilemma whether such professionals are accepted as 'Health IT professionals' and their role definition in various settings[5]. Competency development still remains issue of concern to be explored by experts owing to large population and defining educational requirements for the task force[6].

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Blue print to Competency Development

The steps to develop informatics competency would require series of steps with the evolution of field dramatically every passing moment.

Informatics Working Group- Nurse leaders have pivotal role in competency development process[7]. Experts must work and update themselves by literature review, educational programs and interaction with professional organizations to refine the concept and implement informatics in nursing practice[8,9].

Assessment of knowledge and skills- Literature suggests use of self-assessment scales for testing informatics knowledge and competency among students and practicing nurses[10]. In addition to the competency assessment, it is critical to study knowledge and attitude

of nurses towards informatics[11].

Informatics Competency Development-Defining the competency per the role of nurses need attention as technology continues to percolate in all aspects of patient care. Competency assessment must exist at all levels to ensure in synch progress with HIT[12]. Students and nurses must be prepared to enter clinical areas to facilitate practice with lesser glitches[13].

Pilot Projects- The exchange of learning from pilot projects would be utilized for adoption in larger population to avoid bigger blunders, recognize lacunae and to understand technology applications rather than blind adoption[14]. The advent of technological advances can ease the overall adoption or may create chaos[15].

Annual Review- Amendments based on feedbacks for reflection on the current practices and for the future would be warranted. Extensive adoption has ensured organizations to emanate the progress and monitor the professional growth in the field[16].

Competency Development and Adoption

Studies indicate continued interest in competency development process in different settings across countries[17]. The literature supports imbibing informatics in all aspects of nursing actively as it is influencing patient care with wide use of patient care information systems and communication technology[18].

In India nursing education includes computer education as part of undergraduate nursing program which is positive and encouraging but pragmatic implication are still questionable[19]. The undergraduate nursing courses in India includes exposure to informatics education in B.Sc. nursing (45 hours) as well as General nursing and Midwifery (15 hours) courses. However restricted access to practical resources to both students and teachers affect their confidence when exposed to digital practice.

The Technology Informatics Guiding Educational Reform (TIGER) model was proposed to define the nursing informatics competencies for nursing students and nurses expected to provide quality patient care in a digital environment after the felt need with introduction of Electronic Health Records[20].

TIGER model was the first to define nursing informatics competency for nurses. The proposed categories included basic computer competencies, information literacy and management.

Indian nursing informatics curriculum comprises of basic computer concepts and introduction to hospital management systems lacking the competency assessment process. Students are familiar with technology but they need opportunities to understand and acquire broader applications of informatics such as clinical and public health informatics.

Informatics Competency for Nurses in India

Health professionals are expected to be oriented to computer skills, informatics skills/knowledge and information management which essentially targets the efficient use of Electronic Health Records (EHRs) with an understanding about data capture as well as other concepts of digitalization. With vast digitalization the world is now shrinking with telemedicine, e-ICUs and e-learning to reach places for quality patient care. The nursing informatics competencies in India must focus on the following domains[21].

1. Basic Computer and Information technology Skills

- Basic computer skills applied to patient care, nursing education and research
  - Desktop operating skills
  - File management
  - Software programs
- Able to use software as applied to nursing practice
  - Presentations
  - Word processing
  - Spreadsheets
  - Media player
- Able to use hardware devices as applied to nursing informatics
  - Printout
  - Scanner
  - Microphone
  - Digital camera
  - Pen drive

- CD
- External ports

• Use operating system

- Use application software
- Microsoft office/ Libre office

• Utilize multimedia elements including text, image, audio, video and animation as applied to nursing education, research, administration and practice

• Utilize internet for nursing education, research and practice

- Review educational material
- Use blogs and social media to connect professionally e.g. YouTube, Facebook
- Use professionals websites e.g. LinkedIn, Twylah
- Use mobile applications for professional connections e.g. WhatsApp, Viber, Skype, Zoom

• Use email for personal and professional correspondence

• Understands application of statistical packages applied to nursing research

• Understand and use nursing database management system e.g. CINAHL, Ovid, PubMed

• Understands standards relevant to digital health as applied to nursing practice and patient care e.g.

- North American Nursing Diagnosis Association (NANDA)
- SNOMED CT
- ICD

2. Advance Computer and Informatics Skills

• Utilizes advance computer and information skills as defined by bloom's taxonomy to the level of 'analyzing', 'evaluating' and 'creating' level.

• Able to use software as applied to nursing practice

- Advance Presentations
- Advance Word processing
- Advance Spreadsheets
- Advance database

• Able to edit and use multimedia elements including text, image, audio, video, computer aided design and animation as applied to nursing education, research, administration and practice

• Utilize internet to collaborate with professionals in nursing education, research and practice

• Understands and participates in software development process (EHR, patient care devices, telenursing) and testing

• Participates in software selection and use of nursing standardized language such as NANDA

• Trains professional to use informatics in patient care and tracks the competency of others nursing professionals

• Use statistical packages applied to nursing research

• Understands and demonstrate use of standardized clinical terminology including SNOMED CT, ICD classification as applied to clinical practice

• Utilize computer aided teaching techniques

- Simulation
- Standardized patients

• Synchronous/asynchronous e-learning, ICT in health

3. Basic Information Literacy Skills

• Information identification applied to nursing practice

- Able to retrieve information from the system
- Able to locate and retrieve relevant information through system navigation

• Evaluate information and act per patient requirement

- Understands the function of digital information stored in the system
- Utilizes the information available in nursing practice and patient care
- Understands concept of data security and authentication at organizational level

• Ethical and Legal Implications

- Aware of ethical and legal implications of sharing patient information via digital platforms e.g. EHR, email, mobile applications, social websites

- Understands self-limitation to access patient information

4. Advance Information Literacy Skills

- Information identification applied to nursing practice
  - Defines the role of nursing professionals in digital health at organizational level
  - Able to analyze and evaluate the information from the system
- Evaluate information and act per patient requirement
  - Utilizes digital information stored in the system available in nursing practice and patient care
  - Checks and updates data security and authentication procedure as applied to nursing at organizational level
- Ethical and Legal Implications
  - Educates others about ethical and legal implications of sharing patient information via digital platforms e.g. EHR, email, mobile applications, social websites
- Participation in issues related to ethical and legal problems related to digital care

5. Basic Information Application Skills

- Understands and demonstrates use of devices related to nursing care
  - Cardiac monitor
  - Glucometer
  - Mechanical ventilator
  - Mobile devices
  - Simulation devices
  - Other devices as per setting e.g. dialysis machines, RFID devices, Telehealth, e-ICU, public health informatics, Artificial intelligence and automation technology
- Use Electronic Health Record
  - Understands role of nurse in software development and contributes in digital health initiatives
  - Understands and able to use EHR
  - Able to manage EHR information

a. Nursing documentation-

i. Assess, inform and digitally document patient progress

ii. Nursing care plan

iii. Vital signs and clinical parameters entry

iv. Documentation as per Standard operating procedures (SOP)/ Clinical decision support system (CSSD)

v. Consent and procedural information

vi. Patient discharge, transfers and referral

vii. Medication administration, reaction, allergic reaction

viii. Adverse event documentation

ix. Lab and diagnostic tests

b. Understands the relevance of interoperability of system and its limitation.

- Big Data Analytics
  - Understands the impact of data for efficient nursing care
- Telehealth
  - Understands use of various telecommunication technologies in patient care
  - Able to explain the benefits and limitations of Telehealth
- Cloud Computing in Health
  - Understands the concepts of cloud computing
  - Able to demonstrate cloud computing applications at organizational level
- Understands and explains ethical and legal aspects of digital health

6. Advance Information Application Skills

- Educates professionals and updates self about patient care devices
  - Cardiac monitor
  - Glucometer
  - Mechanical ventilator
  - Mobile devices
  - Simulation devices
  - Other devices as per setting e.g. dialysis machines, RFID devices, Telehealth, e-ICU, public health informatics, Artificial intelligence and automation technology

- Use Electronic Health Record
  - Participates in software development and contributes in digital health initiatives
  - Updates and educates to new features of EHR Able to manage EHR information

a. Nursing documentation-

i. Analyze and utilizes digital patient progress contributing to quality improvements

ii. Evaluates and improves the documentation process related to nursing care plan

iii. Utilizes patient information and clinical parameters in improving nursing care

iv. Updates and pilots Standard operating procedures (SOP)/ Clinical decision support system (CSSD)

v. Updates consent and procedural information on digital platform

vi. Works in collaboration with quality team to focus on events documented digitally

- Demonstrate use of standardized clinical terminology including SNOMED CT, ICD classification as applied to clinical practice
- Collaborates at national level about interoperability of system
- Big Data Analytics
  - Interpret and utilize data for efficient nursing care
  - Analyze and interpret data; collaborates with health professionals for enhancing quality patient care
- Telehealth
  - Updates, contribute and educates about the use of telecommunication technologies in patient care
  - Explores and participates in development of Telehealth technologies in quality care
- Cloud Computing in Health
  - Updates self and educates about concept of cloud computing
  - Demonstrate use of cloud computing applications at organizational level
- Updates and educates about ethical and legal aspects of digital health

The categories define the competency skills that would be necessary for nursing professionals to deliver patient care effortlessly and also empower nursing students to enter in clinical environment glyph by glyph without feeling flustered. Students and nurses are at present practicing many of the skills set learnt on their own or trained by professionals as and when need arises. It is time that nurses stood up and worked towards adding standardized nursing language such as North American Nursing Diagnosis Association (NANDA) in EHR which had been proposed and continued to be emphasized in the revised EHR standards for India which are acceptable but no further steps have been taken to incorporate it in the system yet.[22,23]

CONCLUSION

Radical changes in healthcare in India is driving health professionals towards prompt adoption of Information and Communication Technology (ICT) as it is bound to enhance practice, reach to far-out places and ease the ways to provide healthcare to the second largest populated country of the world. Nurses can choose to swim with the tide or against it but the option to adopt ICT would be inevitable in future. Nurses would have to work with ICT applications unceasingly in any setting[24]. The scope of informatics competency skills for nursing professionals needs to remain flexible as it will keep intensifying with information technology dynamically presenting the novel face of healthcare day by day[5].

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REFERENCES

1. Greer H. Nursing Informatics Competencies: Implications for Safe and Effective Practice. Honors [Thesis]. Michigan: Western Michigan University; 2012.
2. Moody L, Slocumb E, Berg B, Jackson D. Electronic Health Records Documentation in Nursing: Nurses' Perceptions, Attitudes, and Preferences. CIN [Internet]. 2017 [cited 8 October

2017]; Volume 22(Issue 6): 337–344. Available from: https://goo.gl/srGXRq

3. Mamta. Nursing informatics: the future now. Nurs J India [Internet]. 2014 [cited 20 November 2017];105(5):198-9. Available from: https://goo.gl/DodX5F
4. Fang YW, Wang MH, Hsieh CH, Hiseh PL. The development of competencies for informatics nurse: Survey of nursing educators' perception. Computing and Convergence Technology (ICCCT), 2012 7th International Conference on [Internet]. IEEE; 2012 [cited 20 November 2017]. Available from: http://ieeexplore.ieee.org/document/6530309/?reload=true
5. Sarbadhikari S, Gogia S. An overview of education and training of medical informatics in India. Year Med Inform [Internet]. 2010 [cited 20 November 2017]; 106(8). Available from: https://www.ncbi.nlm.nih.gov/pubmed/20938581
6. Kumar M, Ebrahim S, Taylor FC, Chokshi M, Gabbay J. Health technology assessment in India: the potential for improved healthcare decision-making. Natl Med J India [Internet]. 2014 May-Jun [cited 20 November 2017];27(3):159-63. Available from: https://www.ncbi.nlm.nih.gov/pubmed/25668089
7. Singh B, Muthuswamy P. Factors Affecting the Adoption of Electronic Health Records by Nurses. World Applied Sciences Journal [Internet]. 2013[cited 2018 May 1]: 28 (11); 1531-1535. Available from: https://pdfs.semanticscholar.org/afe2/f4f88a9885fa9e9a688abecd783208073f1c.pdf
8. McCartney PR. Leadership in Nursing Informatics. Journal of Obstetrics, Gynecological and Neonatal Nursinh [Internet]. 2006 March 9 [cited 2018 July 4]; 33 (3): 371-380. Available from: https://onlinelibrary.wiley.com/doi/pdf/10.1177/0884217504265094
9. Willmer M. How nursing leadership and management interventions could facilitate the effective use of ICT by student nurses. J NursManag [Internet]. 2007 Mar [cited 2018 Mar 28]: 15(2); 207-13. Available from: https://www.ncbi.nlm.nih.gov/pubmed/17352704
10. Choi J. Comparative Assessment of Informatics Competencies in Three Undergraduate Programs. Online Journal of Nursing Informatics [Internet]. 2012 June [cited 2018 Mar 23]: 16 (2); 1700. Available from: ojni.org/issues/?p=1700
11. Choi J, Zucker DM. Nursing Informatics Competencies Among Nursing Students and Their Relationship to Patient Safety Competencies: Knowledge, Attitude, and Skills. Comput Inform Nurs[Internet]. 2015 Nov [cited 2018 April 25]:33(11); 509-14. Available from: https://www.ncbi.nlm.nih.gov/pubmed/26524185
12. Greer H. Nursing Informatics Competencies: Implications for Safe and Effective Practice. Western Michigan University [Thesis]. Michigan (USA): Western Michigan University; 2012. Available from: https://scholarworks.wmich.edu/cgi/ viewcontent.cgi?referer=https://www.google.co.in/& httpsredir= 1& article=2806& context=honors_theses
13. Lee TT. Nurses' experiences using a nursing information system: early stage of technology implementation. Comput Inform Nurs [Internet]. 2007 Sep-Oct [cited 2018 July 26]: 25(5); 294-300. Available from: https://www.ncbi.nlm.nih.gov/pubmed/17827993
14. Bégin M, Eggertson L, Macdonald N. A country of perpetual pilot projects. CMAJ [Internet]. 2009 [cited 2018 July 26]: 180(1185):E88–E89. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2691427/
15. Quinn JB. Managing Innnvoation: Controlled Chaos. Harvard Buisness Review [Internet]. 1985 May [cited 2018 July 26]. Available from: https://hbr.org/1985/05/managing-innovation-controlled-chaos
16. Zadvinskis IM, Smith JG, Yin Yen P. Nurses' Experience with Health Information Technology: Longitudinal Qualitative Study. JMIR Med Inform [Internet]. 2018 Apr-Jun [cited 2018 July 26]: 6(2); e38. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6043728/
17. Chang J, Poynton MR, Gassert CA. Staggers N. Nursing informatics competencies required of nurses in Taiwan. Int J Med Inform [Internet]. 2011 [cited 2018 July 26]: 80; 332–340. Available from:

https://www.ncbi.nlm.nih.gov/pubmed/21420902

18. Schleyer R, Burch C, Schoessler, M. Defining and integrating informatics competencies into a hospital nursing department. Comput Inform Nurs[Internet]. . 2011 Mar [cited 2018 July 27]: 29(3); 67-73. Available from: https://www.ncbi.nlm.nih.gov/pubmed/20975546
19. Kavitha B. Nursing Informatics in India. Health Informatics Discussion Forum [Internet]. 2014 Dec 9 [cited 2018 July 30]. Available from: http://www.healthinformaticsforum.com/forum/topics/nursing-informatics-in-india
20. Gugerty B, Delaney C. Technology Informatics Guiding Educational Reform (TIGER) [document on the Internet]. TIGER Informatics Competencies Collaborative (TICC) Final Report; 2009 August [cited 2018 Aug 2]. Available from: https://tigercompetencies.pbworks.com/f/TICC_Final.pdf
21. Westra BL, PhD, Delaney CW. Informatics Competencies for Nursing and Healthcare Leaders. AMIA AnnuSymp Proc [Internet]. 2008 [cited 2018 July 30]; 804–808. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2655955/
22. Government of India, Ministry of Health & Family Welfare, e-Health Division. Electronic health record (EHR) standards for India 2016. Government of India, Ministry of Health & Family Welfare [Internet]. 2016 Dec 30 [cited 2018 Sept 1]; 39. Available from: https://mohfw.gov.in/sites/default/files/17739294021483341357.pdf
23. Shaw T, Blake R, Hübner U, Anderson C, Wangia-Anderson V, Elias B. The Evolution of TIGER Competencies and Informatics Resources. HIMMS [Internet]. 2017 [cited 2018 Sept 1]; 5. Available from: https://www.himss.org/library/evolution-tiger-competencies-and-informatics-resources
24 . Smedley A. The importance of informatics competencies in nursing: an Australian perspective. Comput Inform Nurs[Internet]. 2005 Mar-Apr[cited 2018 Aug 30]: 23(2); 106-10. Available from: https://www.ncbi.nlm.nih.gov/pubmed/15772512