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Quality of Patient Care by the Tech-Savvy Informatic-Nurses Humanizing Care- A Global Perspective

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Abstract

The concept of humanizing and quality care remain a matter of concern with technology entering different facets of healthcare. Nurses bearing the weight of patient care in all phases are experiencing ambivalence in terms of acceptability of technology into patient care. The concern of missing out on the human component as we progress to adopt informatics in all aspects of care, it is essential that the experts incorporate and pay heed towards humanizing health informatics. Nurses have traditionally been the flag bearers of holistic care and the concern about IT affecting the "core component" is genuine. The realization of tailored patient care is long been appreciated by nurses and now introduced in medicine by the name "Precision medicine". The article would discuss the impact of current and future technological advances in healthcare, its implications in healthcare and contribution towards humanizing informatics care in various aspects of care.

Keywords- *Nursing Informatics, Quality patient care, Health Information technology, Humanized Informatics, Precision Medicine*

Introduction

"May our philosophies keep pace with our technologies, may our compassion keep pace with our powers. And may love, not fear, be the engine of change"

Dan Brown, Origin[1]

The word of healthcare remains enthralled with rapid contribution of Information and Communication Technology (ICT) or wisely called the Health Information Technology (HIT). Informatic nurses can comprehend and utilize systems wherever they work very easily such as nursing information system for several purposes like risk assessment, identify challenges and promoting care; understanding the relevance in terms of time, objectivity in assessment and improving safety with such systems[2]. But the key area of focus now is to involve "patients or the general public" as partners in care.

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Humanized Informatics

The term "Humanized Informatics" might not be used officially as per this day and age but time is not far away when it will be acknowledged. As Healthcare professionals we deal with human beings everyday whether prevention, treatment or palliative, a human component is always appreciated.

The term "humanized informatics care" involves "all the efforts" that are mobilized towards "overall wellbeing of patient using technology".

Nursing Informatics and Quality patient care

The contemporary technologies that compose the major chunk of nursing informatics practices include the following:

I. Electronic Health Records- Electronic Health Records (EHRs) today focus on early diagnosis, assessments, reduction in errors through clinical alerts, reminders on quality patient care, big data analytics of patient information, holistic care with relevant inputs at one place, support in diagnostic as well therapeutic decision making, promotion of evidence based decisions at point of care, alerts for adverse events, use of built-in

system against prescribing treatments to prevent adverse events, promotion of tracking, monitoring of clinical quality[3]. With time nurses have become comfortable and are displaying positive attitude towards EHRs and other technologies[4].

Humanized care with EHRs- EHRs are bound to provide efficient and more coordinated patient care as evident by many studies[5,6]. For starters, the EHRs once in final adoption phases the overall documentation time is effectively decreased and nurses can spend more time with patients[7]. Using EHRs also promotes use of data to promote quality patient care to improve patient care experience such as root cause analysis for errors and patient overall stay in the hospital.

Interestingly introduction of EHRs is causing concern among nurses about how much time they spent with patients, with a fear that electronic documentation might hog all the limelight. Contrarily it has drawn us one step closer to the humanized care as more concerns are raised about how and where nurses spend time in patient care which evidently shows no compromise in overall patient care time and positive attitude towards electronic documentation[8,9].

II. Patient care systems and devices- monitoring devices such as cardiac monitor, glucometer, ventilators, smart beds, mobile devices, smart TVs, simulation technology, radio frequency identification (RFID) devices and advance technologies like PET scans, nuclear medicine to name a few, have revolutionized patient care for better. The patient monitoring systems have eased the life of both health professionals as well as patients with benefits like early diagnosis leading to quick actions, more reliable objective assessments, lesser chances of clinical errors to better and more assertive communication among health professionals.

Humanized care with Patient care systems- Monitoring systems are ironing many creases, to help focus health professionals on other patient needs such as communication and ability to explain many things happening around them[10]. However there are reservations about fewer nursing visits and interactions if the patient condition becomes stable. Though devices like smart TVs can help patients to be informed and be engaged about care as well what to expect next. Such devices can elaborate and coordinate overall care of the patient including ability to report pain or send non-clinical request like a meal[11,12]. Such monitoring systems are changing the face of home healthcare monitoring as the patient and nurse interaction can become really easy as health professionals can track relevant health conditions through personal health records (PHRs). Additionally these monitoring systems when planned well as public health informatics tool can provide a means of more flexible and clear line of communication among patients and health professionals which would provide effortless more humanized patient care with more strong interactions.

III. Telehealth- it allows nurses to reach population, monitor condition and interact using audio and visual technologies. Patient monitoring systems installed and connected logically through public health informatics can contribute towards patient wellness, monitoring and educational sessions.

Humanizing Telehealth- Telehealth has been utilized fully by many centers with interaction among professionals globally. Revolutionary steps are happening with many private and government organizations to reach patients through telehealth. Telehealth is focusing not only in rural but urban population as well and has several advantages. It is connecting remote patients to various health professionals which saves patient travel and time for basic checkups to seeking second opinions. Many startups are applying the concept of telehealth to expand the use of simple technologies like apps such as WhatsApp, telephone or video calling[13]. These systems will control the factors that might lead to burnout among health professionals like exhaustion thus able to continue efficiently in countries like India where health professionals to patient ratio is significantly tilted. The overall potential to retain rural health professionals is a challenge today and it would be sorted leading to rationale distribution of resources. Patient overall care would be enhanced as many factors like costs, consultation with expert and follow up will become easy[14]. Better coordination among private and public health resources in telehealth could ensure quality as well as local issues such as abuse of medicines by quacks or insecurity among patients where to go when sick.

Case Studies in use of technology for safe and quality patient care , , ,

1. Electronic Health Record

Intervention

- Bibliographic data from hospital sources obtained.
- Contact with vendors were made
- Twenty hospitals with successful system
- Globally adoption rate in countries was China (96%), Brazil (92%), France (85%), and Russia (93%)

Benefits to Patients

- Patient information obtained securely and shared anywhere any time
- Nurses able to make the direct entry, reduced transcription cost.
- Quality documentation
- Reduced prescription errors
- Improved cure outcomes.
- Data available for clinical decision support system.

2. Patient care systems

Intervention

- Monitoring system evaluated for 40 individuals using wearable sensors while holding an Android device such as smartphone under supervision of the experts.
- Could monitor multiple parameters including heart rate, blood pressure, and body and skin temperature at the same time
- System found to be reliable and helpful due to high speed

Benefits to Patients

- Monitoring system found convenient and reliable to use
- Ensured data security at low cost
- System generated warning messages to doctor and patient under critical circumstances

3. **Telehealth**

Intervention

- Prospective observational study carried over 6-month at level I trauma Center in New Delhi, India.
- Patients called the call centre and nurses answered calls
- Call transferred if unable to respond to senior residents

Benefits to Patients

- Saved time
- Prevented visit to hospital
- Patient satisfaction
- Early intervention

4. Artificial Intelligence

Intervention

- Schneck Medical Center needed strategy to address high number of chronic obstructive pulmonary disease (COPD) patients and reduce associated readmissions
- Care Discovery (Watson) used to identify increased readmission rate

Benefits to Patients

- Data available via solution helped to focus on efforts to improve care for COPD patients
- Reduction in COPD readmission
- Significant amount of cost savings

Other technologies entering healthcare

Artificial Intelligence (AI) - it is a branch of computer science that aims to create intelligent machines to perform cognitive tasks like thinking, perceiving, learning, problem solving and decision making[19]. The concept of artificial intelligence is relatively new to nursing but has entered the healthcare with bigger IT giants such as IBM (Watson) and Samsung to name a few. The use of AI is highlighted across the globe including India and recent discussion by NITI AYOG, 2018 vouch for the same by focusing its use in increased access and affordability of quality healthcare. AI is been looked upon AI driven diagnostics, personalized treatment, early identification of potential pandemics, training and imaging diagnostics[20]. AI is the novice technology encouraging to look for overall health of the patient with objective assessments, focusing on wellness, early diagnosis, education and early interventions.

V. Internet of Things (IoT)/Internet of Medical Things (IoMT) - Internet of things (IoT) describes the idea of connecting everyday physical objects to the internet and the ability to identify themselves to other devices[21]. Internet of Medical Things (IoMT) or healthcare IoT refers to all the medical devices and applications connected to healthcare IT systems through online computer networks. Such medical

devices equipped with Wi-Fi allow the machine to machine communication that is the basis of IoMT. IoMT devices are linked to cloud platforms such as Amazon Web Services, on which captured data can be stored and analyzed. IoMT is surrounding patient care in great many ways including patient wearable devices, monitors, infusion set connected to analytics dashboards, RFID tags that share information with IT systems[22]. *IoMT* is targeting preventive care, advance patient care, improve patient satisfaction, enhance population health, patient care management and utilize data analytics constructively in overall health management[23].

VI. Genomic medicine- it involves using genomic information about an individual as part of their clinical care including diagnostic as well as therapeutic decision-making and health outcomes. Nurses being the bridging professionals have great responsibility to help at community level to counsel parents and significant others about genetics and genomics as we move towards precision medicine. Nursing professionals must invest resources into researching about basic, clinical and translational genomics which will ensure primordial, primary and secondary prevention of many disease conditions[24].

VII. 3-D printing- also referred to as additive manufacturing is a process of making three dimensional solid objects from a digital file[25]. It is expected to be part of healthcare sooner to personalize patient care as the organs and body parts can be created with use of precise measurements of the patients using devices such as CT scans. Use of biological gelatin ink is pushing the limits to create three-dimensional replicas of biological organs as well as prosthetics by these devices. Nurses would be part of the translation process with focus on patient care and education so nurses must be prepared to see significant changes in their work environment in terms of personalized patient care[26]. Use of 3-D printing has been experimented with and used for patients with cranial surgery, maxillofacial, spinal as well as orthopedic surgery; printed parts have good accuracy and improved medical outcomes however the technology remains expensive for now[27].

Conclusion

Humanizing care is a challenge with increased percolation from basic EHRs or use of high end technologies such as Artificial Intelligence; Technology must be seen as "facilitator" however on the contrary if not planned well, it can pose threat to health professionals subsequently affecting their contribution to overall patient care.[28,29]. Therefore a careful balance is required for what to use when and where. To conclude the tech-savvy professionals need to be open and flexible enough to consider the need of fellow professionals[30]. The technology when not seen as hindrance but as facilitators would ensure humanized informatics care. Our machines are learning and if they are learning themselves lets ensure they learn the "human" component every time novel changes are devised by the developer "The Human Being".

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IoMT-Internet-of-Medical-Things

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