

The Future of Robot-Assisted Nursing Care

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Objectives

- Discuss the definition of a robot
- Discuss the use of robots in healthcare
- Discuss robots in nursing
- Discuss nursing and robotics state-of-the science
- Discuss the robot revolution and why now
- Discuss ethical considerations
- Discuss current research
- Encourage keeping an open mind

Robots

Strong Reactions



What are Robots?

- Industries in the US have used robots since the 1960's
- Healthcare use of robots started in the 1980's
- By 2025 \$13 Billion industry
- Robotics uses knowledge from mathematics, physics and engineering
- Robotics defined as an activated, programmable mechanism that is autonomous

What is artificial intelligence?



« The capacity given by humans to machines to memorize and learn from experience, to think and create, to speak, to judge and make decisions »

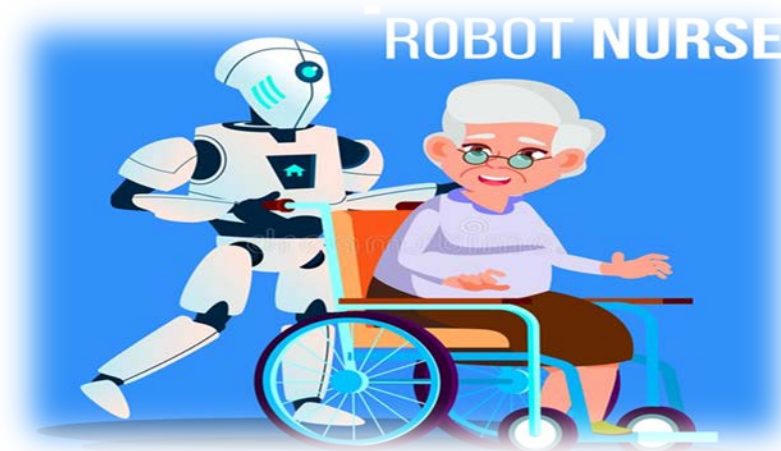




- AI coupled with robots will radically change nursing practice
- Robots can move safely navigate indoors around people

What are Robots?

- International Organization for Standardization (ISO) definition adds “can modify their behavior base on what they sense in the environment”
- Performs tasks based on how it is programed, without human intervention



Categories of Robots

- Categorized by the types of services they provide



Robots

Background in Nursing

- “Pearl” (2002)
- Nursebot
- Mobile robotic assistants for the elderly
- Successful project but introduced the fear that nurses could be replaced by robots



Moxi

Background in Nursing



- Moxi a service robot
- Pilot study at three Texas hospitals
- Key findings
 - Robots can support and augment nursing care
 - Support quality and safety initiatives
 - Improves nurse productivity
- “AI with a heart”

Robots

Why should nursing care?

- Early personal assistants
 - Palm Pilot
- Then came the Blackberry and iPhone!
- Nursing cannot be late-adopters to robotic technology



Robots in Nursing

- Current robotic technology fast becoming part of patient care process but not a disruptive force
- Robotics will revolutionize care
- Will robots pose an existential threat to nursing?
- Healthcare facilities pressured to be more efficient with their operations
- Nursing must become early adopters of robotic technology
- **THIS IS OUR WORK!**

Robots in Nursing

Adoptions Factors

- Safety & reliability
- Capability and function
- Cost-effectiveness
- Clinical effectiveness
- Usability and acceptability



Robots in Nursing

Barriers to Adoption

- Professionals and patients must want the technology
- Appearance of the robot and associated expectations and concerns nurses may have
- Disruption in the workflow
- New ethical questions

*Nursing perceptions and attitudes will be a decisive factor in the future and impact of robot-assistive nursing care

Robots in Nursing

Barriers to Adoption

- Nurses need to care for patients and not the robot
- Robots are designed in labs by non-clinicians
- Nurses and robotic experts lack understanding of each others work and language
- Robots struggle with quick-moving, chaotic environments
- Robots limited dexterity



Robots in Nursing

Ethical Considerations

- What are the ethical implications of nursing practice at the dawn of the fourth industrial revolution?
- Robots drive a dehumanization of healthcare
- Forecasted decline in demand for nursing services provided by real nurses
- Virginia Henderson in her *Nature of Nursing* calls for nurses to ‘get inside the patient’s skin and supplement his strength..according to his needs’.
- Safety of care: who is responsible for a ‘crazy robot’
- This is nursing’s work to address these issues

Robots

Current State of the Science

- Limited nursing research on robotics in nursing care delivery.
- Belief that robots will be beneficial to nurses in a variety of areas
- Current areas of robotic use include:
 - Elderly care
 - Delivery of medications
 - Monitor patients
 - Certain treatments such as infusions and hygiene



- Nursing shortage that is worsening unsustainable
- Nurses are burned-out mentally and physically
- Two choices
 - Sit back and hope things will get better
 - Try innovative, thoughtful solutions such as robotics

Innovative Solutions

- Houston Methodist solutions
 - Acute Care Telenursing
 - BioIntelliSense
 - Ambient Intelligence



Nursing

Innovative Solutions



- Active nursing research
 - Virtual reality
 - Nurse's attitudes toward robots
 - Robot assisted nursing during dressing changes
 - Bringing nurses together with robotic experts to build robots



Jean Watson (2022)

“There’s nothing wrong with technology, but if we don’t have the mindset to sustain the human-to-human caring connection, we’ve lost our way and not fulfilled our reason for being here. We have to critique technology with our new mindset.”



Center for Nursing Research, Education and Practice

*References available upon
request