



E-ISSN: 2664-2301
P-ISSN: 2664-2298
IJOGN 2022; 4(2): 75-78
Received: 08-09-2022
Accepted: 13-10-2022

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Emerging trend of artificial intelligence in OBG nursing

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Abstract

Artificial Intelligence (AI) is evolving technology which is transforming the whole healthcare industry globally. The World Health Organization and global healthcare systems had recognized the use of artificial intelligence technologies to address 'system gaps' and automate the more difficult tasks to optimize clinical services and reduce inequalities in the health care industry. Nurses are the heart of the health care team, who can manage the health care crisis because they are the vital link between patient and other health care team members. AI has great influence in nursing field by overcoming diagnostic challenges, decrease bias in patient care, improving treatment modalities, reducing workload and there by promote wellness in patient outcome. Also, AI brings a paradigm shift in the field of obstetrics and gynecological nursing. AI will augment knowledge and assist nurses for decision making in various areas of obstetrics and gynecological field such as fetal heart monitoring and pregnancy surveillance, predicting preterm labor, *in vitro* fertilization, gynecological surgery, screening of cervical and ovarian cancers and screening for gestational diabetes mellitus. The nurse will be the health coach, the main element of the delivery of human compassion. A nurse's experience and knowledge teamed with their skill will only transition into new ways of processing data and the nurse will evolve into the data integrator. The article concluded that AI is going to revolutionize the nurse's time spent for delivering patient care but the need for nurses will not be eliminated.

Keywords: Artificial intelligence, nursing, obstetrics and gynecological nursing

Introduction

Health care system plays a major role in day to day life. Health care has improved rapidly with more structural, transformational and revolutionary changes with Artificial intelligence. AI will play significant role in assisting the health care team such as doctors, nurses and other health care team members by delivering more efficient patient care and quality patient outcome.

Nurses are an integral part of the healthcare team who collaborates doctors, other health care personnel to provide comprehensive patient care. It is essential for Nurses to have a basic understanding of AI concepts, since AI is utilized in optimize patient care, ensure efficient use of limited resources and improve health-economic models. The uses of the AI technology in healthcare include accelerating innovation, improving decision-making, automating and speeding up processes and saving overall costs. In healthcare, AI is seen as a potential solution for handling massive increases in complex medical data, but only 15% to 20% of end users are using it to drive changes in the delivery of patient care.

In nursing practice, clinical information was very vast, complex, constantly changing and requires a refined skill set for practical application during patient care. So high-quality nursing care was required for instantaneous processing and decisive action when interacting with abundant clinical data. Therefore the continual demand for real-time analysis, consumption and action against volumes of clinical information has become a new standard in nursing care with artificial intelligence (AI), which offers a promising quality nursing care transformation. Artificial intelligence (AI) is growing exponentially in obstetrics and gynecological nursing fields also. In obstetrics and gynecological nursing, AI tool include clinical decision support, mobile health and sensor based technologies, voice assistants and robotics was used to interpret fetal heart rate (FHR) and cardiotocography (CTG) to aid in the detection of preterm labor, pregnancy complications, *in vitro* fertilization, gynecological surgery, screening of cervical and ovarian cancers, screening for gestational diabetes mellitus and review discrepancies in its interpretation between nurses to reduce maternal and infant morbidity and mortality.

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Artificial intelligence

Artificial intelligence (AI) is defined as type of digital computer system that parallels the way the human brain processes information and is used for complex algorithms in order for machines to reason and perform cognitive functions, including problem solving and decision making. AI comprising of four essential core elements such as machine learning (ML), natural language processing, artificial neural networks (ANNs) and computer vision.

Artificial intelligence tools used in nursing

AI tool includes clinical decision support, mobile health and sensor based technologies, visual recognition, machine learning, expert system, virtual reality, voice assistants and robotics

Clinical decision support

Clinical decision support tools like electronic health record [EHR], clinical practice guidelines, and reports which enhance nurses' ability to make clinical decisions. When coupled with AI, clinical decision support can offer predictions and suggestions with accuracy and specificity beyond human capacity. AI's potential in decision support includes helping nurses advocate for patients and identify care gaps and challenges.

Mobile health and sensor-based technologies

Mobile health (mHealth) and sensor-based technologies provide opportunities to reshape the nurse's ability to deliver care and monitor patients, particularly with limited resources and staffing. Mobile health technologies such as smartphones, smartphone apps, and wearable technologies help to manage chronic illnesses by receiving and sending data directly between patients and providers, creating a comprehensive picture of the dynamic state of a patient's health in their daily life.

Voice assistants and robotics

Nurses use voice assistants to identify the most relevant information for the moment such as set timers and reminders for nursing care tasks. Robots with AI interact with the elderly to combat loneliness and social isolation and also are capable of serving, fetching, communicating and offering emotional comfort.

Nurses have frequently interacted remotely with patients via voice assistants and robots to reduce personal protective

equipment use during repeated exposure with infected patients. These technologies also may reduce the nurses time spend for data collection and documentation during each patient visit.

Visual recognition

Nurses' use computed physical images and streamed videos to identify and diagnose the conditions such as assessing skin and wound integrity following obstetrics and gynaecological surgery, monitor the activity of fetus inside the womb and identify non-verbal cues for pain, anxiety or depression of patients.

Machine learning

It initiates and completes tasks automatically by scheduling followup appointments to patients and also sending the results to health care team members who need to be notified.

Expert system

It solves the complex problems by reasoning through multiple sources for decision making, as accurate and quicker than human experts. It can anticipate the risk areas of patients such as falls, sepsis, readmission and predict the length of stay in the hospital and cost of care for the treatment.

Virtual reality

It is a computer generated image, environment or experience to interact with a seeming real way. It is used in nursing education as simulators for mock learning exercises.

Role of AI in Obstetrics and Gynaecological field

Fetal heart monitoring

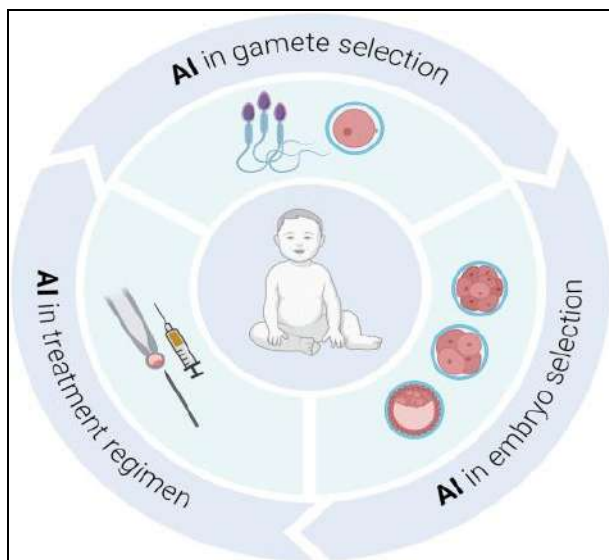
AI is used to monitor the fetal heart rate and helps to decrease the discrepancies between different nurses interpretation during intrapartum period which provides a more reliable and replicable output, thereby reduce the perinatal and maternal complications. Artificial intelligence systems can also provide supporting evidence in cases of unpredictable poor outcomes that can potentially result in litigation. The application of AI in FHR reading help nurses in interpreting, decision-making and decrease the burden. Also AI technology could be used for outpatient care in the form of home monitors that can adequately provide surveillance of high-risk patients. It provides a warning system that informs the patient of dangerous FHR readings and signals them to notify the nurses, to decide on further care according to the in-home AI analysis.

Parturition

AI technology used to identify the Gene responsible for myometrial events during pregnancy, to achieve a better comprehension of the molecular mechanisms that regulate labor. AI algorithms also help to develop risk-prediction model which consist of information pertinent to patients and used to predict individualized risks during labour process and thereby reduce adverse birth outcomes.

Predicting preterm labor

During pregnancy, AI is used to identify the presence of metabolomics in amniotic fluid which is responsible for preterm labour. It also used to improve the accuracy and predictive value of women at risk of poor outcomes.



***In vitro* fertilization**

AI is used in the *In vitro* Fertilisation (IVF) which includes prediction of ovum and semen quality, sperm detection and selection for assisted reproductive technology (ART) and Embryo selection which will lead to increase success rate of pregnancy and result in a healthy, live-birth.

Gynecological surgery

AI is used in gynecological surgery by providing better imaging before and during surgery. Also AI helps to decrease operative time and increases accuracy, which subsequently prevents operative complications.

Screening of cervical and ovarian cancers

AI is used in the early detection of malignancies in reproductive system by measuring micro RNAs from a serum sample which will help to prompt treatment and better prognosis. AI technologies based on deep learning algorithms used to intelligent recognition of medical images which enables automatic diagnosis and tests in identifying lesions or diseases.

Gestational diabetes mellitus (GDM)

AI used to screen the risk factors associated with GDM such as high blood pressure, hyperlipidemia, smoking, over weight and ethnicity, which has higher efficacy, less expensive than the standard screening test and are user-friendly. AI calculator GDM screening, an artificial neuronal network (ANN) is more convenient screening test which was used to reduce the rate of cesarean deliveries.

Principles of AI

- Protecting Human Autonomy
- Promoting Human wellbeing and safety and the public interest
- Ensuring transparency, explainability and intelligibility.
- Fostering responsibility and accountability.
- Ensuring inclusiveness and equity.
- Promoting responsiveness and sustainability

Benefits of AI

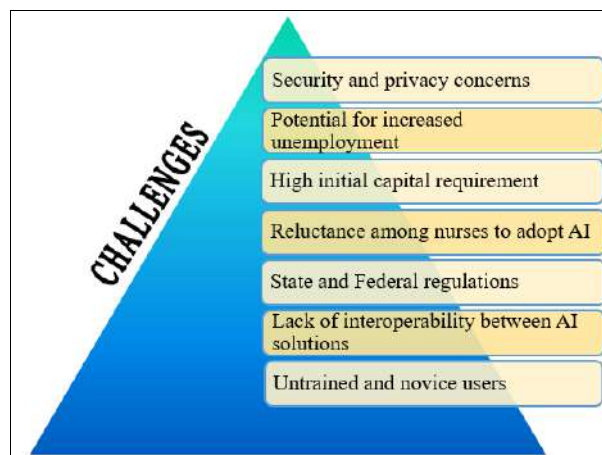
- Reduce the perinatal and maternal complications and mortality
- Get more reliable and replicable output
- Reduce the cost of medical care by screening and

diagnosing at earlier

- More accurate diagnosis of symptoms and treatments.
- Prevent hazardous consequences for both mother and baby
- To save time
- To avoid unnecessary walk to hospital for minor ailments
- To avoid excessive physical burden
- To provide specialist based care
- To avoid misguidance
- To provide necessary care to the needed one
- To use e-referral system
 - Helps in appropriate Decision-making for quality patient care
 - Helps in early detection of diseases like cancer
 - To assist in the End-of-life care
 - Used in drug research to streamline discovery and repurposing operations.
 - To prepare nurses with naturalistic simulations for all kinds of scenarios.
 - To gather information for comprehensive care plan.

Limitations of AI

- Cost incurred in development, maintenance and repair
- Lack of Human touch
- Lack of own creativity
- Lack of common sense
- Nurses abilities may diminish
- Wrong handling cause destruction



Conclusion

The innovation of artificial intelligence in the healthcare system provides a better future in obstetrics and gynecological nursing field. AI technology help nurses to have a better data-driven decision, increase disease diagnosis efficiency, monitoring and caring the patients efficiently and accurately, integrate information, reduce unnecessary hospital visits and create time-saving administrative duties. AI is a decision engine that can exponentially increase the effectiveness and efficiencies of nursing care delivery system. AI cannot replace Nurses in obstetrical and gynecological area, but nurses can create wonders through AI.

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