IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

APPLICATION OF ARTIFICIAL INTELLIGENCE IN MIDWIFERY CARE/NURSING

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Abstract

Artificial Intelligence (AI) in midwifery practice has the potential to present novel opportunities that could completely transform the provision of healthcare. Maternal health pertains to the health status of women throughout their prenatal, intranatal, and postpartum periods. Application of AI tools in midwifery and obstetrics is common in many areas. This includes risk assessment during pregnancy, implantation outcome in invitro fertilisation (IVF), sperm classification, embryo selection, estimated vaginal birth of twins, cervical cancer, vaginal birth, postpartum haemorrhage control, monitoring of uterine contractions, antenatal care and foetal monitoring. This help in reducing maternal and foetal mortality and morbidity.

Keywords: Artificial Intelligence, Midwifery, Nursing

Introduction:

An important indication of a nation's health is the health of its mothers and children. Health care systems still face difficulties despite decades of progress, particularly in certain underdeveloped nations. Artificial Intelligence (AI) in midwifery practice has the potential to present novel opportunities that could completely transform the provision of healthcare. The purpose of this review is to find evidence of the application of AI to improve midwifery practice and lower maternal morbidity and death.

Integration of AI in Midwifery Care to Reduce Maternal Morbidity and Mortality:

Maternal health pertains to the health status of women throughout their prenatal, intranatal, and postpartum periods. During these three phases, midwives work collaboratively with the pregnant family to safeguard the health of the woman and child. The midwife utilizes her knowledge and skills and work collaboratively with other members of the health team to reduce maternal and neonatal morbidity and mortality. Maternal mortality and morbidity are public health issues that range from non-life-threatening diseases to the most severe situations where the mother survived a pregnancy complication or near-death experience.

Few papers discussed the integration of AI in midwifery care, despite the literature being replete with information on its use to lower maternal morbidity and death in medical practice. The lack of resources, such as enough midwives to provide high-quality midwifery care, jeopardizes mother and child health services and, consequently, entire nations. Sensor-based technologies can enhance capacities to deliver care and monitor patients. AI can discover pre-existing health issues that put women at risk for difficulties by analyzing data more quickly. Digital devices are used to perform complex tasks and analyze clinical, medication, environmental and behavioural data. Other applications of AI in healthcare include sperm cell selection for oocyte quality evaluation.[1] Artificial intelligence (AI) is helping with activities like sperm analysis, embryo selection, and even determining the best times to retrieve eggs. This enables fertility clinics to customize therapies and make better-informed decisions. [2]

The Involvement of Midwives in the Development of AI Tools:

Traditional midwives in Guatemala used smart phones to collect data during patient wellness visits as part of a low-cost technology initiative to lower the rate of perinatal mortality. The smart phone is attached to a doppler transducer, which enables fetal monitoring. The signals generated accurately estimated gestational age as well as foetal heart rate. It is believed that midwives must have the necessary abilities to recognize pregnancy and delivery difficulties due to the vital role they play in mother and child health.

To aid the midwives of India and ultimately midwives in low resourced countries, to acquire necessary skills, a safe delivery App was developed by the International Maternity Foundation and Neuvo Inc. Nurses and midwives generate large volumes of data. They should be familiar with the data generated and the technologies they are using. In order to ensure that AI technologies are in line with the finest evidence-based midwifery practice, it is now important to obtain the bare minimum of competencies to validate algorithms. A systematic review concluded that the use of AI in obstetrics and midwifery has predictive capabilities to identify pregnancy complications and to monitor fetal well-being when compared with traditional methods. However, further noted limitations such as biased with the algorithms and the need for standardized integration in clinical practice.[3]

Exploring the frontiers of Artificial Intelligence in nursing/midwifery education:

Rapid advancements in artificial intelligence (AI) in recent years are beginning to change how higher education is delivered, including how professionals and students in nursing and midwifery are trained, as well as how clinical mentors and nurse educators operate.

Artificial intelligence will have an impact on midwifery education, just like it will on other healthcare occupations. Educational criteria must be modified to prepare midwives for a future in which artificial intelligence (AI) plays a major role in healthcare. This scoping review aims to outline the current state of research regarding the impact of AI on midwifery education. As these advanced computational techniques start to become more embedded in everyday technologies from social media, to mobile apps, and learning technologies, and generative AI tools proliferate that can create written, video, audio and other digital content at the touch of a button, it is an important time to take stock and capture the AI trends that could radically change the design, delivery, and evaluation of teaching, learning and assessment in the nursing and midwifery professions. Even if digital pedagogy is becoming more and more popular, there are complicated problems with AI methods and technologies, like algorithmic bias, opaque deep learning models, data privacy, and copyright, to mention a few. These can have unintended consequences on students and educators that are nationally important and internationally relevant.

AI research in healthcare education has grown rapidly over the last decade, particularly in the context of higher education. Previous research has mainly focused on the disciplines of medicine, nursing, and on AI in higher education in general. AI has, and will have, a major impact on higher education across all disciplines, ranging from social impacts, such as those on teaching and learning, to legal issues.[4]

Artificial Intelligence (AI) offering new ways to enhance patient care:

Artificial Intelligence (AI) is reshaping the healthcare industry by offering new ways to enhance patient care, optimize operations, and improve the work-life balance of healthcare professionals, particularly nurses. To understand AI's full impact in these areas, it is crucial to define what AI means in healthcare, explore its specific applications, and assess the considerable advantages it brings to the healthcare field. AI is used in healthcare to analyse large data sets, generate predictive insights, and assist in clinical decision-making by utilising state-of-the-art algorithms and machine learning techniques. This technology includes powerful data analytics and a range of tools that mimic human cognitive processes, such as text and image analysis. The primary goal of AI in healthcare is to equip medical professionals with actionable, data-driven insights and resources that enhance patient care and operational efficiency.[5]

There is growing interest in the use of artificial intelligence in midwifery and obstetrics. The use of artificial intelligence in midwifery and obstetrics is common in many areas. This includes risk assessment during pregnancy, implantation outcome in in vitro fertilisation (IVF), sperm classification, embryo selection, estimated vaginal birth of twins, cervical cancer, vaginal birth, postpartum haemorrhage control, monitoring of uterine contractions, antenatal care and foetal monitoring. AI holds great promise for solving many health problems, such as predicting dystocia and successful vaginal births in pregnant women. Nonetheless, most people agree that it is a useful tool at the physician decision support stage. Because the majority of research on the application of AI in obstetrics and midwifery fails to specifically identify the AI team.

It is generally believed that artificial intelligence tools will facilitate and improve human work and will not replace the work of doctors and other healthcare professionals such as nurses and midwives. Today, artificial intelligence offers ways to reduce healthcare costs and increase the efficiency of healthcare services.[6]

Relevance for clinical practice:

In order to ascertain the clinical effectiveness of AI-based technologies in professional practice as well as their ethical, legal, and social implications in healthcare, midwives, adult, paediatric, mental health, and learning disability nurses should play a more active role in rigorous, interdisciplinary research. Digital health datasets should be put in place to support the testing, use, and evaluation of AI in nursing and midwifery. Curricula need to be developed to educate the professions about AI, so they can lead and participate in these digital initiatives in healthcare.[7]

AI, virtual, augmented and mixed reality, digital multimedia presentations, and global communication are increasingly becoming integral to the modern educational process today. This allows the use of a variety of dynamic information formats, including text, photos, animation, audio and video, virtual simulations, and AI applications. Rapidly developing information and communication technologies are dynamically transforming the training models for healthcare specialists, with digital technologies as part of interactive communications becoming preferred by students as an innovative practice.[8]

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