

+ 2019

+ 2018

+ 2017

[Join as an Editor / Reviewer \(https://ijrp.org/join\)](https://ijrp.org/join)

Archive Volume 96, Issue 1, March 2022

[?The impact of bilingualism on Language and Literacy Development? \(https://ijrp.org/paper-detail/2828\)](https://ijrp.org/paper-detail/2828)

Published Online: 02 March 2022 Pages: 1-17

DOI: [10.47119/IJRP100961320222926 \(https://doi.org/10.47119/IJRP100961320222926\)](https://doi.org/10.47119/IJRP100961320222926) , Views: **271**
, Download: **178**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/110e5cf8826de8be43a0bb951fae23e2/2\)](https://ijrp.org/filePermission/fileDownlaod/4/110e5cf8826de8be43a0bb951fae23e2/2)

[A Na?ve Bayes Students? Performance Prediction Model for Decision Support System \(https://ijrp.org/paper-detail/2873\)](https://ijrp.org/paper-detail/2873)

Published Online: 02 March 2022 Pages: 18-25

DOI: [10.47119/IJRP100961320222920 \(https://doi.org/10.47119/IJRP100961320222920\)](https://doi.org/10.47119/IJRP100961320222920) , Views: **190**
, Download: **134**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/71c9944ac5231a593ea16b02d0ec422a/2\)](https://ijrp.org/filePermission/fileDownlaod/4/71c9944ac5231a593ea16b02d0ec422a/2)

[Assessment of Impact of International Financial Reporting Standards \(IFRS\) Adoption on Financial Institutions in Nigeria \(https://ijrp.org/paper-detail/2882\)](https://ijrp.org/paper-detail/2882)

Published Online: 02 March 2022 Pages: 26-40

DOI: [10.47119/IJRP100961320222919 \(https://doi.org/10.47119/IJRP100961320222919\)](https://doi.org/10.47119/IJRP100961320222919) , Views: **213**
, Download: **144**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/f11b36025b20a227624ecfd21dbcde91/2\)](https://ijrp.org/filePermission/fileDownlaod/4/f11b36025b20a227624ecfd21dbcde91/2)

[Professional Qualities and Interpersonal Skills of Grade 11 Teachers of Sangali National High School \(https://ijrp.org/paper-detail/2890\)](https://ijrp.org/paper-detail/2890)

Published Online: 02 March 2022 Pages: 41-49

DOI: [10.47119/IJRP100961320222918 \(https://doi.org/10.47119/IJRP100961320222918\)](https://doi.org/10.47119/IJRP100961320222918) , Views: **192**
, Download: **121**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/271005e8c6bc944821ea4e2be9ae7dbd/1\)](https://ijrp.org/filePermission/fileDownlaod/4/271005e8c6bc944821ea4e2be9ae7dbd/1)

Acute Limb Ischemia Secondary to Catastrophic Massive Intracardiac Thrombus in Patient with Mitral Stenosis: A Case Report and Mini Literature Review (<https://ijrp.org/paper-detail/2897>)

Published Online: 02 March 2022 Pages: 50-58

DOI: 10.47119/IJRP100961320222921 (<https://doi.org/10.47119/IJRP100961320222921>) , Views: 225 , Download: 130

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/01ab005595c8a0c826d2e551c6068631/2\)](https://ijrp.org/filePermission/fileDownlaod/4/01ab005595c8a0c826d2e551c6068631/2)

Physical Exercise Engagement: Its Impact on Mental Health to the Tertiary Students Amidst COVID-19 Pandemic (<https://ijrp.org/paper-detail/2900>)

Published Online: 02 March 2022 Pages: 59-67

DOI: 10.47119/IJRP100961320222924 (<https://doi.org/10.47119/IJRP100961320222924>) , Views: 291 , Download: 144

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/1f22f42bc7e392128f015b8492cc4861/2\)](https://ijrp.org/filePermission/fileDownlaod/4/1f22f42bc7e392128f015b8492cc4861/2)

Arrhythmia Mechanism in Acute Hyperglycemic Conditions (<https://ijrp.org/paper-detail/2904>)

Published Online: 02 March 2022 Pages: 68-73

DOI: 10.47119/IJRP100961320222925 (<https://doi.org/10.47119/IJRP100961320222925>) , Views: 253 , Download: 130

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/66eb17434c73b8d677fe50b87856c85e/1\)](https://ijrp.org/filePermission/fileDownlaod/4/66eb17434c73b8d677fe50b87856c85e/1)

The Coronary Collateral Artery: The Prognostic Importance and Functional Relevance (<https://ijrp.org/paper-detail/2905>)

Published Online: 02 March 2022 Pages: 74-90

DOI: 10.47119/IJRP100961320222927 (<https://doi.org/10.47119/IJRP100961320222927>) , Views: 259 , Download: 125

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/c7e9be2594a322fe97301560a4747a66/2\)](https://ijrp.org/filePermission/fileDownlaod/4/c7e9be2594a322fe97301560a4747a66/2)

Clinical Impact of Newly Diagnosed Right Bundle Branch Block (RBBB) in ST Segment Elevation Myocardial Infarction (STEMI) (<https://ijrp.org/paper-detail/2906>)

Published Online: 02 March 2022 Pages: 91-96

DOI: 10.47119/IJRP100961320222923 (<https://doi.org/10.47119/IJRP100961320222923>) , Views: 279 , Download: 140

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/20838244e1be6e30544ed9ab6c9ede75/2\)](https://ijrp.org/filePermission/fileDownlaod/4/20838244e1be6e30544ed9ab6c9ede75/2)

Organizational Work Scheme Protocols of Public Elementary School Teachers During the Covid-19 Pandemic (<https://ijrp.org/paper-detail/2907>)

Published Online: 02 March 2022 Pages: 97-108

DOI: 10.47119/IJRP100961320222922 (<https://doi.org/10.47119/IJRP100961320222922>) , Views: 274

, Download: 171

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/16f203734f203c242296271ec1c8b51d/2\)](https://ijrp.org/filePermission/fileDownlaod/4/16f203734f203c242296271ec1c8b51d/2)

Lymphocyte to Monocyte Ratio as a Dependent Indicator in Spine Metastasis (<https://ijrp.org/paper-detail/2881>)

Published Online: 03 March 2022 Pages: 109-115

DOI: 10.47119/IJRP100961320222935 (<https://doi.org/10.47119/IJRP100961320222935>) , Views: 177

, Download: 120

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/8c621a6a33ce059e66a0e42029164925/2\)](https://ijrp.org/filePermission/fileDownlaod/4/8c621a6a33ce059e66a0e42029164925/2)

INFLUENCE OF TEACHER'S EQUITABLE CLASSROOM PRACTICES TO THE STUDENTS' SATISFACTION IN SINUNUC NATIONAL HIGH SCHOOL: A QUANTITATIVE ANALYSIS (<https://ijrp.org/paper-detail/2892>)

Published Online: 03 March 2022 Pages: 116-123

DOI: 10.47119/IJRP100961320222934 (<https://doi.org/10.47119/IJRP100961320222934>) , Views: 209

, Download: 163

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/bbae52d7447bc778d6d13a6637ffd8ca/2\)](https://ijrp.org/filePermission/fileDownlaod/4/bbae52d7447bc778d6d13a6637ffd8ca/2)

Characteristics of Seizures in Pregnancy at RSUD dr. Soetomo Surabaya in 2016-2019 (<https://ijrp.org/paper-detail/2895>)

Published Online: 03 March 2022 Pages: 124-130

DOI: 10.47119/IJRP100961320222930 (<https://doi.org/10.47119/IJRP100961320222930>) , Views: 226

, Download: 125

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/039661f12b00191f4499dfd9c61661fc/3\)](https://ijrp.org/filePermission/fileDownlaod/4/039661f12b00191f4499dfd9c61661fc/3)

Secondary Bacterial Infection in COVID-19 Patients in the Special Isolation Intensive Care Unit at Dr. Soetomo General Hospital (<https://ijrp.org/paper-detail/2831>)

Published Online: 07 March 2022 Pages: 131-135

DOI: 10.47119/IJRP100961320222947 (<https://doi.org/10.47119/IJRP100961320222947>) , Views: 190

, Download: 107

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/a5f9ad60ae45363cdcc067a562b33edb/2\)](https://ijrp.org/filePermission/fileDownlaod/4/a5f9ad60ae45363cdcc067a562b33edb/2)

COLLECTIVE ACTIVITY STRATEGY OF CPD TO IMPROVE TEACHER PROFESSIONALISM AT ISLAMIC HIGH SCHOOL OF PESANTREN (<https://ijrp.org/paper-detail/2893>)

Published Online: 07 March 2022 Pages: 136-144

DOI: 10.47119/IJRP100961320222946 (<https://doi.org/10.47119/IJRP100961320222946>) , Views: 224

, Download: 133

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/1825647e22138df28fe6f1f7a5c842e9/4\)](https://ijrp.org/filePermission/fileDownlaod/4/1825647e22138df28fe6f1f7a5c842e9/4)

INSTRUCTIONAL COMPETENCIES OF TECHNOLOGY AND LIVELIHOOD EDUCATION (TLE) TEACHERS: BASIS FOR A COMPETENCY-BASED MODULE (<https://ijrp.org/paper-detail/2901>)

Published Online: 07 March 2022 Pages: 145-157

DOI: 10.47119/IJRP100961320222948 (<https://doi.org/10.47119/IJRP100961320222948>) , Views: 421 , Download: 594

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/7e07f658da861ee4f294456caf81ac03/2\)](https://ijrp.org/filePermission/fileDownlaod/4/7e07f658da861ee4f294456caf81ac03/2)

GRIT AND INTEREST: CORRELATES OF STUDENTS? BREAD & PASTRY PRODUCTION SKILLS

(<https://ijrp.org/paper-detail/2903>)

Published Online: 07 March 2022 Pages: 158-163

DOI: 10.47119/IJRP100961320222949 (<https://doi.org/10.47119/IJRP100961320222949>) , Views: 502 , Download: 1239

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/df5fca22a30e8ce015a2dc8bd8b8547e/2\)](https://ijrp.org/filePermission/fileDownlaod/4/df5fca22a30e8ce015a2dc8bd8b8547e/2)

Current medical education and future possibilities for simulation-based hysterectomy model

(<https://ijrp.org/paper-detail/2927>)

Published Online: 07 March 2022 Pages: 164-170

DOI: 10.47119/IJRP100961320222940 (<https://doi.org/10.47119/IJRP100961320222940>) , Views: 256 , Download: 151

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/f7fec40f5edee48b40aace62ed294eaf/3\)](https://ijrp.org/filePermission/fileDownlaod/4/f7fec40f5edee48b40aace62ed294eaf/3)

The Conundrum of Coronary Microvascular Dysfunction: A Case Report (<https://ijrp.org/paper-detail/2928>)

Published Online: 08 March 2022 Pages: 178-185

DOI: 10.47119/IJRP100961320222941 (<https://doi.org/10.47119/IJRP100961320222941>) , Views: 231 , Download: 111

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/609c0c7a3e1968aa785a0fa3d9b88233/1\)](https://ijrp.org/filePermission/fileDownlaod/4/609c0c7a3e1968aa785a0fa3d9b88233/1)

The role of modified Glasgow prognostic score in prognosing the life expectancy figures of osteosarcoma patient at general hospital H. Adam Malik (<https://ijrp.org/paper-detail/2931>)

Published Online: 08 March 2022 Pages: 186-190

DOI: 10.47119/IJRP100961320222944 (<https://doi.org/10.47119/IJRP100961320222944>) , Views: 246 , Download: 121

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/c92bbd9f0b6ce17652acfecf6292f70c/1\)](https://ijrp.org/filePermission/fileDownlaod/4/c92bbd9f0b6ce17652acfecf6292f70c/1)

Clinical Manifestations of Neonatal Sepsis and Antibiotics Management in Newborn at Dr. Soetomo General Hospital Surabaya, Indonesia (<https://ijrp.org/paper-detail/2918>)

Published Online: 10 March 2022 Pages: 191-198

DOI: 10.47119/IJRP100961320222928 (<https://doi.org/10.47119/IJRP100961320222928>) , Views: **232**
, Download: **110**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/0c804ce9eb65ecec854c75febeb7f159/2\)](https://ijrp.org/filePermission/fileDownlaod/4/0c804ce9eb65ecec854c75febeb7f159/2)

The Role of Lymphocyte-to-Monocyte Ratio (LMR) as a Prognostic Factor of Life Expectancy of Osteosarcoma Patients at H. Adam Malik Hospital Medan 2012 ? 2017 (<https://ijrp.org/paper-detail/2929>)

Published Online: 10 March 2022 Pages: 199-204

DOI: 10.47119/IJRP100961320222942 (<https://doi.org/10.47119/IJRP100961320222942>) , Views: **230**
, Download: **117**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/b68c9ce1cfa8feaea82b57179d3a00e4/2\)](https://ijrp.org/filePermission/fileDownlaod/4/b68c9ce1cfa8feaea82b57179d3a00e4/2)

Characteristic of Atopic Dermatitis in Polyclinic Dermatology Siloam Hospital Bali (<https://ijrp.org/paper-detail/2936>)

Published Online: 12 March 2022 Pages: 205-208

DOI: 10.47119/IJRP100961320222953 (<https://doi.org/10.47119/IJRP100961320222953>) , Views: **224**
, Download: **116**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/893f2495207047d3a955aeacc901784c/1\)](https://ijrp.org/filePermission/fileDownlaod/4/893f2495207047d3a955aeacc901784c/1)

Exploring Occupational Stressors of Elementary Teachers (<https://ijrp.org/paper-detail/2938>)

Published Online: 14 March 2022 Pages: 209-215

DOI: 10.47119/IJRP100961320222955 (<https://doi.org/10.47119/IJRP100961320222955>) , Views: **256**
, Download: **117**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/8905bf514ec32b019164a97dd2051a24/1\)](https://ijrp.org/filePermission/fileDownlaod/4/8905bf514ec32b019164a97dd2051a24/1)

Teachers' Work Attitudes During the Covid-19 Pandemic (<https://ijrp.org/paper-detail/2939>)

Published Online: 14 March 2022 Pages: 216-228

DOI: 10.47119/IJRP100961320222956 (<https://doi.org/10.47119/IJRP100961320222956>) , Views: **283**
, Download: **134**

 [Download PDF \(https://ijrp.org/filePermission/fileDownlaod/4/3d5d78bd6404401331def357c188deee/2\)](https://ijrp.org/filePermission/fileDownlaod/4/3d5d78bd6404401331def357c188deee/2)

All Editor:

DR. SAMIR GIRISHKUMAR

Prof Rudki Damon
Md. Amir Hossain
Deepankar Ashish
Dr.P.Sukumar
Rifky A.L.M

Dr. Luke Chinaru Nwosu

Sankaragomathi B
Dr. Jagruti Rathod
Atul Bansal
Dr.Abubkr Ahmed Elhadi
Kun Jiang
Dr P Malyadri
DR AUBID HUSSAIN PARREY

Ajay raj rajan
Dr.D.VENKADESH
Praveen Kumar Sharma
Dr. G. B. Dharma Rao
Dr. Ashish Kumar
Dr Chetan Dudhagara

Dr. Abhishek Das
Dr.A.Sasi Kumar
Bachu SRinivas
R. Poorvadevi
Dr Abhishek Shukla
Elsanosy M. Elamin
Dr Khalaf S Gaeid

Pooja Nagpal
Dr. Kshitij Shinghal
J Ashok

Dr KVNR Sai Krishna
DR DINESH CHANDRA JAIN
Dr.SUDHIR PARASKAR
SHARADA PN

Vinod Shakya
Dr. Angie Parker
Janardan Paudel
Jeffrey Manuel, Jr.

Dr. A. Sathiyaraj
Dr.Hlaing Htake Khaung Tin
Dr. Jaya Bishnu Pradhan
Nihad Khalawe Tektook

Dr. Bisweswari Sahu
ABIMBOLA IBRAHIM
J Banu Priya

Mohd Israil
KAVYACHAND YALAMUDI
Dr. Esra Sipahi
Mervin William Mahaendran
Anam Bhatti

Dr. Md. Mamun Mia
OLUWOYO JOHNSON
Dr. Rupinder Singh
Dr. Ganesh Pundlikrao

Ankit Garg

Vikrant Sharma
Dr. Balwinder Raj
Prof.Hameed miyan
Laith Ahmed Najam
Dr Kailash Chandra Sati
Dr. Boralagala Gamage Sampath Aruna
Pradeep

Ujwal Vishnupant Ramekar
Laith

Sadekur Rahman
Hamid Ali Abed AL-Asadi

Behzad

Arun Saksena

Shugan Chand Jain PhD

TERESA MAY B. BANDIOLA
Professor Rohini Chandrica Widyalandara

Dr Norizan Mohd Yasin

Prof Vivek DIXIT

Prof. Dr. Amer A. Taqa

Dr SONALI CHATURVEDI

Dr. Estari Mamidala, Ph.D, PDF (USA)

Mahavir Singh

Dr. Mohamed N. Morsy

PROF. ORPHA K. ONGITI

Dr. Simon Obwatho

Jiban Shrestha

Umut Özkaya

M SURESH BABU

Packeer Thamby Mohamed Niyas

Prof. Arup Barman

SHADAB AHMAD

T.Muthu Pandian

Aitor Garcés-Manzanera

Simanchal Panda

P.JAYA PRAKASH

Richmond U Ideozu PhD

Dr. A. Sita Madhavi

Dr. RAJ KUMAR BOORA

Phyo Wai Thaw

SIMANCHAL PANDA

Dr. N Dinesh Kumar

R.H.M Abu Hasnat Chowdhury

Punnaiah Veeraboina

Zahid Naeem Qaisrani

Dr GURUDUTT SAHNI

Mayuri Srivastava

Dr. Nilesh K. Patel

Dr. JASMEET KAUR TANDON

Dr. Manoranjan Tripathy

Dr. Okrikata Emmanuel

SARA YESMIN

NAPOLEON.D

Dr Ganesan Sivamani

Prof. Mark Gabriel Wagan Aguilar

Dr.S.RAJA
Dr.J.SENTHIL
Dr.G.DINESH KUMAR
Mr. S. Azhagu Madhavan
Dr Rajendiran Muthusamy

Dr.M.GAYATHRI
MURUGESAN R
MURUGESAN R
Prof C.Muruganandam
Prof N RUBA

Current medical education and future possibilities for simulation-based hysterectomy model

Dara Dasawulansari Syamsuri^a, Eighty Mardiyani Kurniawati^{a*}, Budi Utomo^b

^{a*} eighty-m-k@fk.unair.ac.id

^aDepartment of Obstetrics and Gynecology, Dr. Soetomo General Academic Hospital, Medical Faculty – Universitas Airlangga, Surabaya, Indonesia

^bDepartment of Public Health-Preventive Medicine, Medical Faculty, Universitas Airlangga, Surabaya, Indonesia

Abstract

Simulation is a strategy or technique for creating an experience without having to go through the actual event. Simulation provides a multidimensional safety container for learning while also opening up opportunities not available in real-world learning. Surgical education has been founded on a learning-by-doing apprenticeship approach for almost a century, with a high patient volume used to teach residents certain surgical skills step by step under various levels of supervision. This traditional paradigm is currently hampered by a number of factors: Surgical techniques have gotten increasingly difficult and specific, resulting in a decrease in the number of patients undergoing particular treatments. During the COVID-19 pandemic (Coronavirus Disease-19), there are reduction in hysterectomy surgeries. This study reviews at the impact of simulation-based hysterectomy training on the education of obstetrics and gynecology residents. The study found out that in the last ten years, simulation-based hysterectomy models, both low- and high-fidelity simulator models, from abdominal, laparoscopic, or vaginal hysterectomy simulator models, have been used in medical education to improve residents' knowledge, skills, and confidence about the instruments and procedures involved in a hysterectomy. The simulation-based hysterectomy model, when combined with a didactic lecture and real instruments for instruction, can be incorporated into the teaching curricula of Obstetrics and Gynecology residencies. In the future, we will need to develop hysterectomy simulator models and using more difficult anatomic models and simulation situations.

Keywords: Hysterectomy; Simulation training; Educational models; Medical education

1. Introduction

Simulation is a strategy or technique for creating an experience without having to go through the actual event. Simulation provides a multidimensional safety container for learning while also opening up opportunities not available in real-world learning, such as apprenticeships (So et al., 2019). Simulation can be used as an experience or an experimentation period in the experiential learning cycle, and post-simulation debriefing can be used to reflect on the experience and determine how to apply lessons gained to future clinical performance. Without threat to professional identity, simulation can provide a secure setting in which to reflect on and learn from mistakes (Rudolph et al., 2014). While healthcare simulation can be used to replace real patient contacts or other clinical settings for learning purposes, it's vital to remember that it's not the only way available, and it can be used in conjunction with other approaches to reach the education aim (So et al., 2019). Learners may not be able to grasp the dynamics of variation and adaptation to integrate or link the various components in a clinically meaningful and relevant way if they are taught in this manner. Modern

educators employ a holistic approach and authentic assignments to encourage integrated learning in order to overcome compartmentalization and fragmentation issues. Although authentic assignments are available in the real clinical setting, simulation is a beneficial supplement to learning with real patients for a variety of reasons (So et al., 2019).

Surgical education has been founded on a learning-by-doing apprenticeship approach for almost a century, with a high patient volume used to teach residents certain surgical skills step by step under various levels of supervision. This traditional paradigm is currently hampered by a number of factors: Surgical techniques have gotten increasingly difficult and specific, resulting in a decrease in the number of patients undergoing particular treatments. Moral and ethical considerations became more prominent, societal acceptance of medical errors shifted, and ultimately, financial considerations, particularly operation time, complication rate, and time and costs for surgical education, became increasingly prominent in the minds of both society and surgeons (Munro, 2012). Several research have looked into the impact of repetition of certain interventions on the surgeon's learning curve, as well as the complexity and multidimensional nature of the operative learning process. Given these considerations, it was likely that a new surgical education system would be established, which would involve a repeating step-by-step schooling of difficult surgeries under more ethical, moral, and financially acceptable conditions. (Spuntrup et al., 2018).

The hysterectomy is a common gynecological procedure. Between 1981 and 1997, the incidence of hysterectomy in women over 35 years fluctuated between 628 and 937 per 100,000, according to Health Canada statistics. In 1981-1982, 462 per 100,000 women over the age of 20 had a hysterectomy, compared to 462 per 100,000 women in 1998-1999 (Lefebvre et al., 2018). Residents reported a 40% reduction in minor procedures (38.5%), a >80% reduction in benign gynecologic surgeries (50.5%), and surgical oncology procedures (50.5%) during the COVID-19 pandemic (Coronavirus Disease-19) according to a study conducted on 240 Obstetrics and Gynecology (OB/GYN) residents' at 12 Ethiopian Universities from May to June 2020 (47.2%) (Gudu et al., 2020).

This study reviews at the impact of simulation-based hysterectomy training on the education of OB/GYN residents. This study can provide new information and references for future research.

2. Simulation-based hysterectomy model for medical education

In 2005, almost 600,000 benign hysterectomies were performed in the United States alone. The abdominal method continues to be the most popular, accounting for 51.2% of all inpatient hysterectomies, followed by laparoscopic hysterectomy (31.8%), and finally vaginal hysterectomy (16.9%). Robotic assistance was used in two-fifths of laparoscopic hysterectomies, accounting for 12.6% of all benign hysterectomies conducted, vaginal (16%), laparoscopic (8%), and robotic hysterectomy (8%) (Desai and Xu, 2015).

Although residents have typically scrubbed into cases without any hands-on preparation outside of the operating room, the surgical community has agreed that task and virtual reality simulators should be utilized before trainees perform actual surgery (Malacarne et al., 2018). The use of task trainers in a virtual environment not only allows for a more relaxed assessment of surgical skills and grasp of procedure and anatomy, but it can also help evaluators provide targeted and specific feedback by providing a standardized yet individualized evaluation technique (Gala et al., 2013).

There is summary review of simulation-based hysterectomy model in the world wide in 10 years recent study (Table 1). Several research, including abdominal, laparoscopic, and vaginal hysterectomy simulator models, are shown in this table. The results of the research themselves vary, regarding the level of knowledge, skills, and self-confidence. Participants underwent an initial assessment, then performed the aforementioned hysterectomy surgery, and finally were reassessed.

Table 1. Summary review of simulation-based hysterectomy model

Author, Year	Primary country of simulation training	Period covered	Research method	No. of study participants	Simulation model	Main results and implications		
						Knowledge	Skill	Confidence
Anand et al., 2018	Boston	November 2016	Prospective cohort study	14 (6 1 st and 2 nd year groups, 8 3 rd and 4 th year groups)	The low-fidelity VH simulator model	After the session, all residents reported improved understanding surgical anatomy of VH The 1 st and 2 nd year groups (n=6) experienced a mean improvement of 43.3% The 3 rd and 4 th year group (n=8) experienced a mean improvement of 24.4%		
Aurora et al., 2020	Columbia	April 2018 until May 2019	Prospective cohort study	68 (18 residents, 16 fellows, 15 specialists in obstetrics and gynecology, and 19 minimally invasive gynecologic surgery subspecialists)	The high-fidelity Gynesim ILH simulator model	Fellowship trained minimally invasive gynecologic surgery subspecialists achieved higher OSATS in all areas and completed all components faster. Similar performances were noted between residents, fellows, and specialists in obstetrics and gynecology in practice		
Berkowitz et al., 2018	Boston	2018	Prospective cohort study	22 (specialist obstetrics and gynecology)	The low-fidelity AH simulator model	70% of participants scored higher on the post-test		
Hong et al., 2012	Los Angeles	2010	Prospective cohort study	15 (8 2 nd year residents, 7 4 th year resident)	The low-fidelity AH simulator model	When compared to 4 th year residents, 2 nd year residents had a lower median number of hysterectomies performed as primary surgeon. In every area evaluated, both resident classes showed statistical trends or considerably increased surgical confidence.		

Malacame et al., 2018	New York	2018	Descriptive prospective study	43 (14 medical residents, 1 st and 2 nd year residents, 8 3 rd and 4 th year residents, 14 FPMRS fellow, OB/GYN attending physicians, and FPMRS attending physicians)	The low-fidelity VH simulation task trainer model	Global rating scale and PSC scores increased as experience level became more advanced: residents scored higher than students, and attendings (combined OB/GYN and FPMRS) scored significantly higher than residents Mean time to completion was not significantly different between the individual participant groups
Miyazaki et al., 2019	North Carolina	2019	Prospective cohort study	20 (10 resident, 10 expert)	The high-fidelity Miya model (VH simulator model)	Median time to procedure completion was significantly higher in the resident group, whereas median estimated blood loss was no different between groups. No significant differences were observed in the composite median OSATS or VSSI scores between groups. The interrater reliability indices for subscales and composite scores of the OSATS and VSSI were high
Stickrath and Alston, 2017	Colorado	July until September 2015	Prospective cohort study	32 (9 1 st year, 7 2 nd year, 8 3 rd year, and 8 4 th year residents)	The low-fidelity AH simulator model	100% residents demonstrated improved knowledge following the session 100% rated their confidence as increased afterwards

Note:

AH: Abdominal Hysterectomy; FPMRS: Female Pelvic Medicine and Reconstructive Surgery; OB/GYN: Obstetrics and Gynecology; OSATS: Objective Structured Assessment of Technical Skill; PSC: Procedure Specific Checklist ; TLH: Total Laparoscopic Hysterectomy; VH: Vaginal Hysterectomy; VSSI: Vaginal Surgical Skills Index

2.1 Knowledge

In the learning and teaching process, various types of simulator models can be produced. For all levels of trainees, a low-fidelity simulator demonstrated an improvement in knowledge of procedural stages and instrumentation (Stickrath and Alston, 2017). The use of a simulator can result in significant improvements in residents' real and perceived surgical anatomy knowledge. Residents not only want more model-based simulation training in their hysterectomy didactic curriculum, but as shown here, such organized, model-based simulations are also important to detect and resolve specific deficiencies in resident knowledge of surgical anatomy (Anand et al., 2018).

2.2 Skill

There was an increase in the rated surgical abilities at all levels of participants in various trials, both training-based simulations utilizing low-fidelity or high-fidelity simulator models. Simulation training is an excellent tool for complex procedures with steep learning curves, as it allows for repeated practice without jeopardizing patient safety (Miyazaki et al., 2019). In OB/GYN and other surgical specialties, identifying effective educational interventions for surgical skills central to the performance of emergency care is critical, both for established surgeons with varying practice volumes and for the newer generation of learners who may not have the same volume of muscle memory to rely on in the event of emergently indicated procedures (Berkowitz et al., 2018). A resident can execute the task incorrectly in the same amount of time it takes an expert to complete it correctly, therefore efficiency does not always equate to correctness and safety; nonetheless, the mean time to completion was not significantly different (Malacarne et al., 2018).

2.3 Confidence

One of the main goals of the low-fidelity hysterectomy simulation model is to familiarize residents with the instruments and procedures involved in a hysterectomy. The low-fidelity hysterectomy simulation model and training boosts residents' confidence in surgical abilities and knowledge, especially for those with limited surgical experience (Stickrath and Alston, 2017). This is likely due to the fact that as a surgeon's skill level improves, any potential benefit received from simulation models may be lost as experienced surgeons lose the crucial clues that a real surgery setting provides (Hong et al., 2012).

3. Conclusion

In the last ten years, simulation-based hysterectomy models, both low- and high-fidelity simulator models, from abdominal, laparoscopic, or vaginal hysterectomy simulator models, have been used in medical education to improve residents' knowledge, skills, and confidence about the instruments and procedures involved in a hysterectomy. Simulator models have been demonstrated to help people with the least experience, therefore the hysterectomy simulator model would be best suited for first- or second-year residents.

We believe that this simulation-based hysterectomy model, when combined with a didactic lecture and real instruments for instruction, can be incorporated into the teaching curricula of OB/GYN residencies to aid in the acquisition of a surgical skill set, to establish competency in its trainees, and by surgical specialty organizations as a requirement for ongoing maintenance of certification, which is critical for future generations of gynecologist.

In the future, we will need to develop hysterectomy simulator models that are high-fidelity, affordable prices, and capable of performing all hysterectomy procedures completely, much like actual surgery, and that

can be replaced every time a hysterectomy is performed. Using more difficult anatomic models and simulation situations, as well as refining the integration of expert demonstration and personalized coaching, and identifying regionally specialized surgical workshop programming, are all possible future possibilities.

Authors' Contributions

All work was done by all authors.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Funding

None

Acknowledgments

None

References

- Anand, M., Duffy, C.P., Vragovic, O., Abbasi, W., Bell, S.L., 2018. Surgical Anatomy of Vaginal Hysterectomy—Impact of a Resident-Constructed Simulation Model. *Female Pelvic Med Reconstr Surg* 24, 176–182. <https://doi.org/10.1097/SPV.0000000000000545>
- Berkowitz, L.R., James, K., Petrusa, E., York-Best, C., Kaimal, A.J., 2018. New Challenges for a Core Procedure: Development of a Faculty Workshop for Skills Maintenance for Abdominal Hysterectomy. *J. Surg. Educ.* 75, 942–946. <https://doi.org/10.1016/j.jsurg.2017.12.007>
- Desai, V.B., Xu, X., 2015. An update on inpatient hysterectomy routes in the United States. *Am. J. Obstet. Gynecol.* 213, 742–743. <https://doi.org/10.1016/j.ajog.2015.07.038>
- Gala, R., Orejuela, F., Gerten, K., Lockrow, E., Kilpatrick, C., Chohan, L., Green, C., Vaught, J., Goldberg, A., Schaffer, J., 2013. Effect of validated skills simulation on operating room performance in obstetrics and gynecology residents: A randomized controlled trial. *Obstet. Gynecol.* 121, 578–584. <https://doi.org/10.1097/AOG.0b013e318283578b>
- Gudu, W., Wondafrash, M., Bekele, D., Nigatu, B., Birrara, M., Feyessa, M.D., 2020. The Impact of COVID-19 pandemic on Obstetrics and Gynecology Residency Programs and perspectives on adaptive ways of training in Ethiopia. <https://doi.org/10.21203/rs.3.rs-35772/v1>
- Hong, A., Mullin, P.M., Al-Marayati, L., Peyre, S.E., Muderspach, L., MacDonald, H., Ouzounian, J.G., Miller, D.A., Opper, N., Lee, R.H., 2012. A low-fidelity total abdominal hysterectomy teaching model for obstetrics and gynecology residents. *Simul. Healthc.* 7, 123–126. <https://doi.org/10.1097/SIH.0b013e31823471bb>
- Lefebvre, G., Allaire, C., Jeffrey, J., Vilos, G., 2018. No. 109-Hysterectomy. *J. Obstet. Gynaecol. Canada* 40, e567–e579. <https://doi.org/10.1016/j.jogc.2018.04.031>
- Malacarne, D.R., Escobar, C.M., C.J. Lam, B., Ferrante, K.L., Szyld, D., Lerner, V.T., 2018. Teaching Vaginal Hysterectomy via Simulation: Creation and Validation of the Objective Skills Assessment Tool for Simulated Vaginal Hysterectomy on a Task Trainer and Performance Among Different Levels of Trainees. *Female Pelvic Med. Reconstr. Surg.* 00, 287–298. <https://doi.org/10.1097/SPV>
- Miyazaki, D., Matthews, C.A., Kia, M.V., El Haraki, A.S., Miyazaki, N., Chen, C.C.G., 2019. Validation of an educational simulation model for vaginal hysterectomy training: a pilot study. *Int. Urogynecol. J.* 30, 1329–1336. <https://doi.org/10.1007/s00192-018-3761-9>
- Munro, M.G., 2012. Surgical Simulation: Where Have We Come From? Where Are We Now? Where Are We Going? *J. Minim. Invasive Gynecol.* 19, 272–283. <https://doi.org/10.1016/j.jmig.2012.01.012>
- Rudolph, J.W., Raemer, D.B., Simon, R., 2014. Establishing a safe container for learning in simulation the

- role of the presimulation briefing. *Simul. Healthc.* 9, 339–349.
<https://doi.org/10.1097/SIH.0000000000000047>
- So, H.Y., Chen, P.P., Wong, G.K.C., Chan, T.T.N., 2019. Simulation in medical education. *J. R. Coll. Physicians Edinb.* 49, 52–57. <https://doi.org/10.4997/JRCPE.2019.112>
- Spuntrup, C., Banerjee, M., Spuntrup, E., 2018. Learning by Doing: How to Teach Hysterectomy, Hysterectomy: A Comprehensive Surgical Approach. Germany. <https://doi.org/10.1007/978-3-319-22497-8>
- Stickrath, E., Alston, M., 2017. A Novel Abdominal Hysterectomy Simulator and Its Impact on Obstetrics and Gynecology Residents' Surgical Confidence. *MedEdPORTAL J. Teach. Learn. Resour.* 13, 10636. https://doi.org/10.15766/mep_2374-8265.10636