CLINICAL SIMULATION A NEW FRONTIER FOR INTERNATIONAL HEALTH

«A SHIFTING PARADIGM FOR SUSTAINABLE CLINICAL PROFICIENCY OF THE 21ST. CENTURY PHYSICIAN, NURSE PRACTITIONER AND HEALTHCARE PROVIDERS»

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• Nothing To Disclose
WHAT SIMULATION MEANS?

- The word simulation comes from the Latin "simulare", meaning to represent something, pretending or imitating what it is not, and this same definition has been adopted by the New Webster's Dictionary.

- Simulation has been formally incorporated into the curricula of health faculties for more or less sixty years at McMaster and Maastricht Universities.

New Wester’s Dictionary and Thesaurus of the English Language. Lexicon publication, Danburg, CT 1.993.
HISTORY OF SIMULATION IN COLOMBIA

- In Colombia we started clinical simulation 25 years ago in the Medicine Faculty at El Bosque University.

- 58 medical schools with simulation laboratories.

- The Colombian Assoc. of Simulation with 220 members, and 150 university and non-university institutions.

- One international and two national Conferences have been held. The next International event in simulation will be in September 2013, in Bogota.

At El Bosque University in Bogotá, we began using simulation at undergraduate level, firstly on semiology and physio-pathology courses and then in the internal medicine, general surgery, pediatrics, gynecology-obstetrics, basic sciences and family medicine.

Simulation was then gradually incorporated into postgraduate courses in virtually all specialist areas.

Clinical level: internal med-general surgery, etc
The Dentistry and Nursing faculties introduced simulation later. We follow the bio-psychosocial and community curriculum.

We also have microsurgery and laparoscopic laboratories.

Three texts have been written about simulation by myself.
SIMULATION AT EL BOSQUE UNIVERSITY

- We provided advice and preparation for other laboratories at around 35 medicine faculties in the country, with the result that it is considered to be a pioneer in the field of simulation in Colombia.

- It has also offered advice to a number of medicine faculties in other countries, such as Panama, Venezuela, Argentina Ecuador, Brazil, Bolivia and Chile.
The University uses standardized patients, who are suffering the illness like Parkinson, etc. They come to the hospital to be interviewed and examined by students.

Simulation with actors ends up being expensive.
SIMULATION IN LATIN AMERICA

- Panama
- Mexico
- Costa Rica
- Brasil
- Colombia
- Chile
- Argentina
- Ecuador
- Peru

- In most of them there are simulation associations
Simulation is thus a new paradigm that can be used as a method for teaching not only medicine but also many other sciences.

Simulation does all it can to create a learning environment and guarantee patient safety by separating the training of students from the real clinical encounter.
ACCREDITATION IN SIMULATION

- The number of medical errors in healthcare is a source of great concern!!

- The American Medical Education Accreditation Council has changed the approach to education to skills teaching as a learning experience.

- The Harvard Medical School evaluated the future of medical education with the American Academy of Arts and Sciences. It considered incorporating simulation progressively into it.

- The Association of American Medical Colleges asked for Clinical Skills Centers to be established that would integrate simulation.
ACCREDITATION IN SIMULATION

- Simulation is becoming the starting point for innovation in medical education throughout the world, and will alter international health or global health.

- The American College of Surgeons (ACS) has begun to accredit Training Centers, in order to ensure education quality.

- In short, not only is simulation approved and recommended, according to Dr. Ziv, "simulation is an ethical imperative in health schools".

Simulation has been said to "forgive errors". What it does is teach people to learn from errors so they don't make those same mistakes in the future with their real patients.

It is recognized that errors should be viewed as learning experiences provided they happen during simulation exercise.

Mistakes should become a formative experience for the student, because they improve student skills and help solve ethical problems.

ADVANTAGES OF SIMULATION

- The student gets immediate feedback, not only from his teachers but also from his watching colleagues, and this teaches him to use self-reflection and self-instruction as part of a team and the teacher becomes more of a tutor.

- The student also learns at his own pace.

It should be made perfectly clear that simulation is one further teaching method, but that it can never replace the patient.!!
BRIEF HISTORY OF SIMULATION

- Simulation is older than man, and the animals who preceded him, in fact used mimicry or camouflage to protect themselves from other species or to trap their prey.

- Virtually all the Books in the Bible talk of simulation (Genesis, for example); also the history of Greece and its main characters as referred to by Hippocrates and Galen.

Bible. The Creation- Genesis.
Genesis 31, 34-35; Samuel Old Testament II, 13, 5-6
HISTORY OF SIMULATION

- In the Middle Ages simulation was employed frequently as a means of avoiding going to war and was a tool that was used for getting money, begging in public for charity or avoiding the death penalty.

- The first monograph to be published about simulation appeared in 1594, and was written by M. Silvaticus on "illnesses without apparent symptoms, provoked illnesses and simulated illnesses".

- In 1657, Zacchias, the founder of legal medicine devoted whole chapters to simulation and described techniques for exposing them.

Hippocrates. [www.egs.edu/library/hippocrates/biography](http://www.egs.edu/library/hippocrates/biography). Galen-Wikipedia, the free encyclopedia
The history of simulation as a modern concept is closely associated with Edwin A. Link, who designed the first flight simulator with more modern models after the Second World War.

Link, E.A. Jnr, U.S. Patent 1.825.462 filed 1.930
PROBLEM

“Good morning. I’m your captain and I just completed a three day program to fly this plane”
MODERN HISTORY OF SIMULATION

- American physicist and mathematician Norbert Wiener (1894 - 1964) is considered to be the founder of Cybernetic Simulation.

- He was involved with anti-aircraft defense techniques and became interested in automatic calculation and the feedback theory.

The science of cybernetics is the relationship between control and communication systems, whereby information is transformed into the desired action. This forms the basis of the simulation principle.
According to Thomas Friedman, it was David Rothkopf who first coined the word "globalization", to describe the establishment of bilateral relations between governments and large companies.

The word has come to have a much wider use today, however, as it refers to the creation of new models of socialization, politics and understanding between countries which impact on the way the world behaves and relates.

Thomas Friedman, describes in his book "The Earth is Flat", the story of the globalized world.
GLOBALIZATION AND MEDICAL EDUCATION

- Education, and particularly health education, has also been included in the *globalization movement* as a result of the free access to information, which is one of the ten forces, according to Thomas Friedman, that have flattened the Earth.

- New didactic techniques can be introduced into the teaching of medicine: simulation and telemedicine using the communication and technology information.

Friedman T. : The world is flat. Ediciones Martinez 2005
THE CRISIS IN MEDICINE TEACHING

- The crisis in medicine teaching has crossed all frontiers and permeated international health, and we therefore need to face up to this and imagine a different, more open form of education.

- People don't change when they should, but rather when they see that others have changed.
THE CRISIS IN MEDICINE

- Friedman quotes Paul Romer as saying that a crisis is something that can't be wasted!

- Simulation is a new paradigm: we shouldn't let ourselves be affected by paradigm paralysis!

- To help us understand the importance of clinical simulation, I would like to quote Dr. Richard Satava Professor at the Washington University Department of Surgery

Friedman T. : The world is flat. Ediciones Martinez 2005
Dr. Richard Satava, one of the pioneers of simulation, who wrote in the prologue to the book by Dr. Richard Kyle JR. and W. Bosseau Murray that he considered the first significant change in medical education to have been the Flexner Reform of 1910.

He goes on to say “that a hundred years after, the second great reform has been simulation”

“And that we will probably need another hundred years before a further new change takes place (the 22nd century”).

The 18th century poet Alexander Pope was the first to state, in his "Essay on Criticism", that "To err is human, to forgive divine, and he goes on to say that to rectify is the work of wise men".

Although we all accept that to "err is human", I have added in my book 'Cybernetic Simulation' that in medicine, "to err is inhuman and, moreover, can be fatal".

MEDICAL ERRORS IN US

- United States Institute of Medicine statistics show that between 44,000 and 98,000 deaths occur each year (that's 270 every day) due to medical errors which could have been prevented, and that most of these errors are not due to inadequate medical knowledge but rather to problems getting knowledge across, especially with respect to critical actions in real patient care conditions.

MEDICAL ERRORS IN US

- Working in multi-professional and multi-disciplinary teams requires coordination and communication skills that are generally not taught in medical schools with traditional curricula.

- However simulation methodology does take them into account.

THE INTERNATIONAL HEALTH CONCEPT

- Before defining international health, permit me to define public health

- Public health, is "the global and local organized effort to preserve and protect people's health and reduce iniquities in health". This refers to the health of a given population group (country or state).

INTERNATIONAL HEALTH

- **International health** has been defined as the field of research into and knowledge and interdisciplinary practice of phenomena, links, actions and interactions in the health-illness process which occurs between members and in international health territories.

- It includes the field of health, international relations, diplomacy and international law through an inter-frontier research-action activity.

- The willingness of states to cooperate in the solving of common problems.

GLOBAL HEALTH

- Global health is a new concept, and does not mean the same as international health. Rather, it gives the latter a new awareness of health;

- “It is a new strategic approach to international health, set in the context of the globalization movement but never something that serves the globalized economy, according to Castineira”.

GLOBAL HEALTH

- It is based on the principle of equality, fairness, and universal and human rights, with an altruistic philosophy and adhering to universal political and ethical rights.

- It takes into account specific health phenomena such as: the effects of climate change, poverty, unemployment, the exclusion of certain groups and the enrichment of a few, the explosion of knowledge, forced displacement, migrations, social problems associated with health, illicit drug- and arms-trafficking and great natural catastrophes.

GLOBAL HEALTH

- The search for fairness with the poorest population groups and the consideration of values and new players in the field of public health.

- Global health adopts a new bio-psychosocial curriculum for training the principal public health agent: the physician.

WHY SHOULD GLOBALISED HEALTH BE CONSIDERED MORE THAN INTERNATIONAL HEALTH?

- The international health has been dominated by the biologist or biomedical curriculum.

- This model aims primarily to control the illness, places greater emphasis on treating the illness than on maintaining health, and looks at the illness rather than the patient and the symptoms rather than the causes.

- Efforts concentrate solely on the “noxa” and no thought is given to the environment, which can also make people sick, or the patient's family, social and community environment.

BIOLOGICAL VS PSYCO SOCIAL MODEL

- Consideration should be given to the fact that both health and sickness should take psychological, social and community aspects into account.

- George Engel said, with respect to the biologist curriculum, that "all medicine is in crisis, because people adhere to a sickness model that does not fit scientific subjects and the great responsibilities facing medicine".

WHY SIMULATION?

- Simulation helps to make medicine more human for the student, the patient, and to improve health systems.

- At the same time, it fosters patient safety by maintaining the "first does no damage" (*primum non nocere*) aphorism.

- Health concerns everyone equally, and it should not be managed virtually exclusively by international medical bureaucracy.

THE CURRICULUM IN HEALTH SCIENCES

- It is impossible to try and devise a curriculum by adding all medical knowledge in biological areas that even a PhD student would sometimes find hard to cover, because the result will be something that students will find indigestible.

- The time when student and doctor had to be a databank has passed.

- We should not ask ourselves what we have taught our students, but rather whether they have learned.
I taught Bidu to talk

But I can’t hear him talk

I said I taught him, not that he learned

TRADITIONAL HEALTH SCIENCE TEACHING: OBSOLETE METHOD
THE CURRICULA IN HEALTH SCIENCES

- The curricula of most health science faculties could be criticized for their lack of coherence and encyclopedic nature.

- Furthermore, they rely on the most antiquated and least effective teaching method of all, namely teacher-centered rather than student-centered teaching.
PROBLEMS RELATED TO MEDICAL CURRICULA

- This explains why many of our health science students seek psychiatric care because of emotional disorders, divorce or abuse of prohibited substances and, very often, commit suicide.

The doctor-teacher is unfortunately not well prepared in the field of teaching and education, and we could say, without fear of being mistaken, that on occasions he is not prepared at all.

The university professor has generally not received any training in teaching techniques.

We have very often become professors because it has been a family tradition, because of influences, by chance, or out of need.

WHAT MAKES A GOOD TEACHER?

- To be a good teacher it is not enough to be an expert; in other words, knowledge is required, but knowledge is not enough on its own to guarantee good teaching.

- Simulation has altered health education, educational knowledge, the curriculum, teaching methods, research processes and evaluation mechanisms, and new didactic technologies to be used by teachers.

THE MEDICAL TEACHERS

- Most medical teachers are perhaps "highly expert" but offer very little in terms of being mentors or facilitators for their students.

- Moreover, medical practice is improved and its excellence enriched when responsibility for teaching is taken on.
ADVANTAGES OF SIMULATION IN HEALTH SCIENCE FACULTIES

- Simulated practice has no risk to the patient or the student.

- Work is done in critical situations in order to acquire expertise in circumstances where quick answers are required due to pressure of time, stress, or emergency situations.

- Work is done in a team environment, where leadership, communication and synchronized efforts are required. The student therefore learns to deal with the respective resources so he can handle crises in medicine.
ADVANTAGES OF SIMULATION IN HEALTH SCIENCE FACULTIES

- Key points of crisis management resources can be applied, in line with the article by Marcus Rall and Peter Dieckmann of the European Anesthesiology Society and their adaptation of the article by Gaba for anesthetics and critical care.

- There is a virtual hospital where work can be done on ordinary cases or ones that occur less frequently at a given time in the hospital where the student is rotating, and so he might not come across them in the course of his normal duties around the hospital or if the patient is not hospitalized at that time.

- The possibility exists of self-correction and self-instruction.
ADVANTAGES OF SIMULATION IN HEALTH SCIENCE FACULTIES

- Training can be carried out in a safe environment for the operator that is free of risks due to errors or omissions.

- Procedures can be updated and repeated for acquiring expertise. Errors can be made, although hopefully not.

- Errors can be exploited as a way to learn.

- The student develops communication and dialogue techniques for talking with his patient or relatives.
ADVANTAGES OF SIMULATION IN HEALTH SCIENCE FACULTIES

- Standardization of teaching and harmonization of the curriculum in the different specialist areas.

- Simulation provides a further step in how medicine is learned.

- A change from theory to practicing procedures that the student will have to perform in the future on his own patients.

- The student works ethically with the patient, who is neither abused nor mistreated with repetitive tests.
ADVANTAGES OF SIMULATION IN HEALTH SCIENCE FACULTIES

- The student can be prepared for future contact with his patients through virtual, mechanical or computerized models, which naturally increase his expertise.

- Simulation can be introduced at any undergraduate or postgraduate level, enabling the learning process to be improved and also allowing the teaching activity and the teacher-student relationship to be evaluated.

- The student can practice, and this is made easier by virtue of having standardized patients with the illness or ones who simulate it.
ADVANTAGES OF SIMULATION IN HEALTH SCIENCE FACULTIES

- We should nevertheless remember that simulation has both strengths and weaknesses, and is an additional method for teaching medicine, one which shows students how things would be done in a real situation.

- In other words, we use simulation to generate an experience that should be evaluated, thereby establishing a framework for analyzing and reflecting on thought processes, skills and emotional states in order to improve their performance in the future.

- We should do debriefing for the evaluation process.
BARRIERS TO THE DEVELOPMENT OF SIMULATION

- It can cause stress, as the student feels he is being watched, and very often recorded as well.

- High costs and economic and technological support place demands on the faculty and its directors.

- The teacher may not have facilities for developing expertise, or simply not have received the necessary training.

- Bringing simulation into line with curriculum development.
BARRIERS TO THE DEVELOPMENT OF SIMULATION

- Occasionally the preparation that both teacher and student require for interacting with the advanced technology is not available.

- Not trained in teamwork or for handling working tools.

- Data overload at a given time for analysis.
BARRIERS TO THE DEVELOPMENT OF SIMULATION

- No preparation for dealing with the crisis situations that are simulated.

- Lack of attention or care when performing the different procedures.

- The teaching staff don't like simulation at first, and reject it.
CONCLUSIONS

- There is concern in the world at the number of medical errors in healthcare.

- Medical education based on simulation is a great help in improving patient safety and in the quality of clinical medical education.

- In simulation, students and professionals can learn from the mistakes they make without patient safety being affected in their future clinical practice.

- In simulation, the student learns from the experience gained from his errors.
CONCLUSIONS

- Simulation centers teaching around the student rather than the teacher.

- In simulation, the student receives constructive or immediate feedback on his successes or his mistakes from his fellow students or his teachers, which leads to self-reflection and builds responsibility and continuous self-learning.

- The simulation environment provides opportunities for teamwork and multi-disciplinary care, which contributes even more to patient safety.
CONCLUSIONS

- Simulation makes an immediate evaluation of the student or his clinical skills or performance possible, for undertaking a formative evaluation of him. It also helps with the additional constructive exercise of debriefing.

- Recent changes in modern medicine have forced changes to be made in traditional international health schemes, with a move towards global health, and the simulation methodology has helped this new education culture.
CONCLUSIONS

- The number of medical schools, and hence of students, coupled to the restriction on training personnel, has reduced areas for practice and the possibilities of practicing medical procedures on patients.

- The bio-psychosocial curriculum assumes that the student will spend more time in his community than at the level three university hospital, thereby losing the chance of exposure to patients and meaning that appropriate clinical practice alternatives have to be sought.

- The restriction on experimenting on animals has meant that this practice is no longer possible in vivo, but nowadays it can be done using training simulators, high-technology simulation, and hybrid models which augment the virtual reality of procedures.
CONCLUSIONS

- Health science faculties and other worldwide accreditation bodies have adopted simulation as an evaluation method for perfecting training and for authorizing safe medical practice at the undergraduate and postgraduate training.

- Simulation has become an ethical imperative which benefits the patient, the student and the health system, and it offers greater safety in medical practice in general and makes it more human.

- Simulation has therefore been considered to be the second great reform in education, after the Flexner Reform.
CONCLUSIONS

- Hospital are being closed rather frequently decreasing the possibility of training places.

- Simulation does not set out to swap patients for dummies or for standardized patients. Simulation is an excellent tool in our line of work, where areas for practice and patients are needed. It should be set against clinical practice.

- Train the trainers or facilitated debriefing is also imperative!
CONCLUSIONS

- We need more research in order to show that simulation really is more useful.

- We need cooperative studies in all health science faculties that use simulation to demonstrate its superiority over traditional teaching methods.
Thank You,

Hernando Matiz