WHO / B

Experimentation methods associated with the development of medicinal and therapeutic resources and their repercussion

INTRODUCTION

Over the past several years, society has become aware of discrepancies presented in the system in charge of the regulation and the protection of human subjects involved in medicine experimentations. This awareness has reached a significant pitch, creating tension between sectors such as: the federal government, sponsors, investigators, academic institutions, research subjects and their families, media, and the general public.

Medicine has evolved rapidly due to medical research, seeking for knowledge that improves human health. However, there has been great criticism towards the regulations of the research and the measures in order to protect the interests of research participants due to the archaic system that was established thirty years ago and can't longer be effective in a changed research environment. The rising of biotech healthcare is going through what every emerging scientific discipline goes through, defining its ethical boundaries.

Biotechnology is the creation of technology by manipulating through genetic engineering, living organisms or its components. One of the main disciplines biotech healthcare requires is genetics. Genetics is the study of the patterns of inheritance of certain traits related to genes and genetic information. Currently researchers are using this discipline to find solutions for certain diseases in which genes play a significant role such as Pallister-Hall syndrome, Attention Deficit Hyperactivity Disorder, Joubert syndrome, among others. Since 1997, cloning has been a topic of public debate due to the cloning of the sheep Dolly. The cloning of animals may be used in order to have the same specimens for drug testing and therefore the results will not be affected by different organisms. Although clinical research in biotech, genetics or cloning has promised to yield enormous improvement in life quality, the ethical boundaries need to be specified in order to avoid conflicts.

Clinical trials are part of human history since ancient times bringing with it medical advances but also controversy. The greatest modern representation of human subjugates abuse occurred during World War II with the cruel experiments carried out in humans in name of science. The experiments resulted in trauma, death, disfigurement and permanent disability. Knowing the history of medical research and its past errors will prevent future mistakes.

Worldwide, about 60% of the total active commercial clinical trial sites are concentrated in just 5 countries, leaving the remaining 40% to 135 countries. The United States had 39% (134,000) of active clinical trial sites, making it the largest market for clinical trials. Germany is the second largest market with over 22,000 active clinical trial sites followed by Japan which has the second largest pharmaceutical market in the world. Despite the fatal clinical trial on January 2015 that sparked questions regarding safety in clinical trials, France is in 4th place with under 15,000 sites. Spain occupies 5th place followed by the UK (10,566), Italy (9,944), Canada (9,722), Poland (7,136) and Russia (6,994).
The leading countries regarding clinical trials are developed countries that have large resources to undergo an investigation. Almost all the leading countries according to the OECD, spend more money in health than the average. The US spends 7.5% more GDP than the average, Germany 2.1%, Japan 1.3%, France 2.2%. The only country which spends less than the average of 8.9% of the country's GDP is Spain, devoting 8.8% of its GDP.

Pharmaceutical research is highly supported by the majority of the countries. Across OECD countries, the expenditure of this research reached USD 800 billion in 2013. This expenditure makes the 20% of health expenditure. new high-cost medicines targeting small populations have emerged bringing with it new debate on the long term sustainability and efficiency of pharmaceutical spending. All of this new drugs will push up pharmaceutical spending unless policy adapts.

HISTORICAL BACKGROUND

Clinical research has always been an important aspect of modern medicine, having its starting point in the late nineteenth throughout the early twentieth centuries. It was during this lapse when well-intentioned physicians often “experimented” with new approaches to illness and disease .

1939-1945
The occurrence of World War II brought along horrible things, amidst them are illness, disease, and trauma presented by soldiers overseas, This dreadful events also created an urgent need for medical research to examine the most effective approaches to saving lives and maintaining a healthy fighting force.
An example of this was the Stateville Penitentiary Malaria Study which was conducted by the Department of Medicine at the University of Chicago in affiliation with the United States Army and the State Department, this experiment later one was used by Nazi doctors as defense when confronted about their own experimentation methods.

1950
Prisoners and mentally ill patients were the most vulnerable subjects of clinical experimentation among researchers. This was a movement that began right after infamous doctor Jonas Salk infected mental patients and convicts that later on lead to the invention of the polio vaccine
Another example of this was a study that took place in the 1950’s when Dr. Joseph Stokes from the University of Pennsylvania deliberately infected 200 female prisoners with viral hepatitis.

1960
Between the years of 1960 and 1971, the Department of Defense funded non-consensual whole body radiation experiments on poor, black cancer patients. The patients who were not told the procedure that was being held, instead they were told that the new “treatment” that will be used might cure their cancer. However this study was only created to determine the effects of high levels of radiation on the human body to later on create the most common treatment for cancer: chemotherapy.

In fact, this irradiation experiments became so important to modern medicine that Dr. Eugene Saenger with the financial help of the Defense Atomic Support Agency, performed whole body radiation experiments on more than 90 patients of advanced stage cancer with inoperable tumors at the University of Cincinnati Medical Center.

1966
Project MKUltra, also known as CIA's mind control program, was a series of experiments on human subjects designed and undertaken by the United States Central Intelligence Agency. During this program experiments on humans were intended to identify and develop drugs and procedures to be used in interrogations and torture, in order to weaken the individual to force confessions through mind control.
MKUltra used numerous methodologies to manipulate people's mental states and alter brain functions, including the surreptitious administration of drugs such as LSD. Other experimentation methods were hypnosis, sensory deprivation, isolation and verbal abuse.

1972
The Associated Press published a story about the Tuskegee syphilis experiment, creating a public outcry. The study, which was called "Tuskegee Study of Untreated Syphilis in the Negro Male," was conducted by the Public Health Service and the Tuskegee Institute beginning in 1932. The researchers had not informed the men of the study or its real purpose, nor had they offered the men penicillin after it became the standard treatment in 1947.

1981
Human Subjects Research Regulations Revised in U.S.
The U.S. Department of Health and Human Services (HHS) and the Food and Drug Administration (FDA) revised the regulations governing human subjects research. These revisions were intended to make the regulations more consistent with the recommendations in the Belmont Report.

CURRENT RELEVANCE

Biotechnology has helped us to solve or decrease some problems such as developing bio-friendly fuels, the creation of pharmaceutical products, medicines, vaccines and human therapy. It has helped us realize one of the important problems humanity has, the excessive use of natural resources. Also, the usage of this technology has been used to culture tissues and cells and modified for human purposes like agriculture, resulting in increases in the crop productions making them more efficient.

The gene therapy is an example of the success biotechnology has achieved, curing aids and cancer. This trial helped 10 out of 11 patients, resulting in a very effective trial and life-saving. An hematopoietic stem cell gene therapy in which 29 out 40 patients did not have to enter to a replacement therapy in 2014.

Some people are not comfortable in particular practices because of their religious and cultural beliefs. Practices such as organ transplants, manipulating human embryos or animals in research can be very offensive for some groups. The government has helped the practice of some of these examples, but there are some regulations that have to follow and respect in order to be efficient and precautions.

Artificial wombs are our future, scientists said that can help premature babies to grow naturally and with no side effects, it is designed to support critical premature babies and has been successful in animals, but using artificial wombs for ectogenesis can be very controversial, raising a fetus outside the human body can be dangerous.

Dr. Helen Hung-Ching Liu and her team succeed in growing a mouse embryo in an artificial womb, and in 10 days she managed to grow a human embryo. There are some feminists that are still thinking that this trial is horrendous and non-ethical.

Scientists claimed that artificial wombs can be a solution for premature babies who were born at 22 weeks due to their chance of survival is close to zero, but can be improved using the artificial wombs. At 23 weeks the chance of survival increase at 15% but still suffer severe health problems as a result of their early birth. Artificial wombs can handle a baby until their reach the 25 weeks because the chance of survival is about 80%. Albeit it is effective, the ethics of this practice is still on debate.

INTERNATIONAL ACTIONS

U.S. Food and Drug Administration (FDA)

Clinical trials are organized and systematic exposure of patients to an intervention of some kind (drug, surgical procedure, dietary change), these experimental intervention include the testing of new drugs for clinical use, however these trials can cause drug disasters. In order to control and regulate drug experimentation international organizations have include programs and guidance for this problematic.

An example of these organizations is The U.S. Food and Drug Administration, which has unfold as one of the world's most important institutional authorities for conducting and evaluating controlled clinical drug trials. In the year of 2000 the FDA issued a draft Guidance for Industry document, which provided recommendations for researchers submitting information to ClinicalTrials.gov. A final guidance document that incorporated comments from the public was issued in 2002.

International Committee of Medical Journal Editors (ICMJE)

The ICMJE is a small group of general medical journal editors and collaborators of specialized organizations working together to improve the quality of medical science and its reporting. Regarding unethical Clinical Trials The International Committee of Medical Journal Editors (ICMJE) believes there is an obligation to responsibly share data generated by interventional clinical trials given that trial subjects are putting themselves in a certain risk.

The international organization has been working towards maximizing the knowledge gained from the efforts and sacrifices of clinical trial participants. In January 2016 the ICMJE published a proposal aimed to help and create an environment in which the sharing of clinical experimentation data becomes a norm.

ClinicalTrials.gov

With the help from FDA and other organizations, the NIH National Library of Medicine (NLM) developed ClinicalTrials.gov. ClinicalTrials.gov is a registry and results database of publicly and privately supported clinical studies of human participants conducted around the world.
This platform allows people to inform themselves a trial's purpose, who may participate, locations, and phone numbers for more details. This information helps clinical trials to be safe by being constantly revised by the database platform.

The Common Technical Document

The agreement to assemble all the Quality, Safety and Efficacy information in a common format (called CTD - Common Technical Document) has revolutionised the regulatory process of all clinical experimentations. For industries the CTD has eliminated the need to reformat the information for submission to the different ICH regulatory authorities.

The CTD is organised into five modules. Module 1 is region specific and Modules 2, 3, 4 and 5 are intended to be common for all regions. In July 2003, the CTD became the mandatory format for new drug applications in the EU and Japan, and the strongly recommended format of choice for NDAs submitted to the FDA, US.

UN ACTIONS

United Nations Secretary General's High-level Panel on Access to Medicines

Regarding the Sustainable Development Goals of 2030, in 2016 the High-Panel yielded several recommendations regarding medical development. The first one aimed Biomedical private sector companies in which, as part of their annual report, they must address the actions they have taken that promote access to health technologies, a publicly available policy that states general and specific objectives with timeframes. In addition, governments should demand that all unidentified data on completed and discontinued clinical trials be publicly and easily available operated by the WHO Clinical Trials Registry Platform regardless if the results are positive, negative or neutral.

Clinical Studies Registration Law established by WHO

The mission of this global initiative is to ensure a complete view of research is available to those involved in health care and set standards globally. This will safeguard transparency, strengthening the value and validity of the evidence acquired. The registration of all trials involving human beings is a moral, ethical and scientific responsibility. The ICTRP is in charge of a web site and database that gives access to anyone for free to data results of clinical trials registries around the world. This platform is also in charge of a forum in which registries can exchange information and work together to establish the best measures for clinical trials. The ICTRP also has the power to support regions and countries that want to establish clinical trial registries or policies.

POINTS TO DISCUSS

- The influence of scientific improvements in the medical area related to biotechnology and genetics.
- Society's reaction regarding innovative medical process.
- Ethics function and accomplishment status respecting recent medical methods and procedures.
- positive and negative effects of the new research techniques on the world's politics and economics.
- Government's role in research regulation on applied sciences and medicine
- The ethical, social and economical boundaries of experimentation.

REFERENCES

Istvan Z. (2014). July 7 2017. Artificial Wombs Are Coming, but the Controversy Is Already Here from Motherboard Web Site: https://motherboard.vice.com/en_us/article/8qx8kk/artificial-wombs-are-coming-and-the-controversys-already-here

Dreifuss R., Gontebanye F.(2016). July 7 2017. Report of the UNITED NATIONS SECRETARY-GENERAL'S HIGH-LEVEL PANEL ON ACCESS TO MEDICINES from United Nations High-panel Web Site: http://www.politico.eu/wp-content/uploads/2016/09/HLP-Report-FINAL-Sept-2016.pdf

n.a. (2010). July 2 2017. Biomedicine and Innovation from OECD Web Site: http://www.oecd.org/health/biotech/46925602.pdf

Horner J, Minifie F.D. (2011). July 2 2017. Research Ethics I from US National Library of Medicine National Institutes of Health Web Site: https://www.ncbi.nlm.nih.gov/pubmed/21081677

n.a. (2000). June 27 2017. Patient Recruitment from Clinical Center Web Site: https://clinicalcenter.nih.gov/recruit/ethics.html

n.a.(2017). June 27 2017 from WHO Web Site: http://www.who.int/social_determinants/resources/action_sd.pdf

Silverman E. June 21 2017.The 5 Most Pressing Ethical Issues in Biotech Medicine from US National Library of Medicine National Institutes of Health Web Site: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3570985/

n.a. (2014). June 21 2017. Clinical Research from National Human Genome Research Institute Web Site: https://www.genome.gov/10000331/clinical-research/

n.a. (2004). June 14 2017. The Evolution of the Clinical Trials Process from International Psoriasis Council Web Site: http://www.psoriasiscouncil.org/docs/chapter_01.pdf

n.a. (2015). June 14 2017. Health at a Glance 2015 from OECD Web Site: http://www.keepeek.com/Digital-Asset-Management/oecd/social-issues-migration-health/health-at-a-glance-2015/summary/english_47801564-en#.WVKMbSuQzBU

n.a. (2012). June 11 2017.International Standards for Clinical Trial Registries from WHO Web Site: http://apps.who.int/iris/bitstream/10665/76705/1/9789241504294_eng.pdf

Prakash C.S. (2011). June 11 2017. Benefits of Biotechnology for Developing Countries from AgBioWorld Web Site: http://www.agbioworld.org/biotech-info/topics/dev-world/benefits.html

n.a. (2011). June 11 2017. Gene Therapy Successes from Genetic Science Learning Center Web Site: http://learn.genetics.utah.edu/content/genetherapy/success/

Merten O. (2014). June 11 2017. Gene Therapy from Animal Cell Technology Industrial Platform Web Site:http://www.actip.org/products/gene-therapy-as-of-january-2014/