GUIDELINES, POLICIES, LAW? HOW BEST TO ADDRESS THE ETHICS OF STEM CELL RESEARCH IN MALAYSIA.

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ABSTRACT

Regenerative medicine and the discovery of stem cell technology have paved new directions in the practice of contemporary medicine. More researches are however required to ensure risk-free therapies may be offered to patients. According to the Ministry of Health (MOH) Malaysia, existing legislation such as Human Tissue Act 1974 and the Sales of Drugs Act 1952 do not sufficiently address including all issues related to the ethical, social and legal conundrums of stem cell and its applications. This complicates all oversight undertakings of stem cell research and therapies. The only available document that seems to represent any regulatory instrument at all is the National Stem Cell Research and Therapy Guidelines (2009). There is however concern that the guideline maybe insufficient in directing the necessary regulations required of stem cell research and its technologies. In addition, proper checks over unethical research activities and avoidance of the application of harmful therapies on patients are important matters to be given serious attention to. This study systematically reviews the development of stem cell research in Malaysia and how various attention over regulatory matters were directed or have escaped the attention of the responsible parties. It will include a narration of the many implications of unregulated stem cell research within both the public and private sector. In-depth interviews were employed to gather insight, awareness, knowledge and experience regarding the matter of stem cell research and therapy. Participants included policy makers from particular divisions of the Malaysian Ministry of Health (MOH) and representatives of the National Stem Cell Research and Ethics Sub-Committee. We hope to offer readers an overview of the challenges and intricacies of policy making in multicultural Malaysia on the subject of the ethics of stem cell research and therapy. This study may reform efforts to raise public awareness on the ethics of stem cell technology and may influence the autonomy of patients and enhance their ability to make informed decisions regarding the use of stem cell therapies regardless of whether they seek the services from public or private medical practitioners.

Field of Research: Regenerative medicine, stem cell, policy, regulation, lawmaking
1. Introduction

Regenerative medicine is an interdisciplinary field of medicine that combines molecular biology, genetics, and tissue engineering. It is greatly improved by stem cells with its ability to rapidly multiply creating more cells, tissues and organs with desired function, to restore or replace damaged or diseased cells, tissues and organs to enable normal function of human body (Polak & Mantalaris, 2008). Stem cell is potential to treat or heal many incurable and chronic diseases ranging from neurodegenerative disorders like Alzheimer’s Parkinson’s to cancers and common diabetes (Mason & Dunnill, 2008). Doctors believe that regenerative medicine to be more effective as a treatment option compared to modern medicine. Although it is significant and valuable, but to offer stem cell therapy to all patients without risks or side-effects, extensive research is required. Currently most of the research is in its pre-clinical stages using animal models to understand the stem cell biology and its scientific mechanism prior to human administration (Harding, Roberts, & Mirochnitchenko, 2013). The experiments with clear evidence and potential often translates into clinical stage with real-life patients but the success rates of these clinical trials are inconsistent leaving room for failure.

Stem cell research is well-recognized for its potential in the medical field. Is it claimed revolutionary by doctors for its efficacy in treating diseases and illnesses that were impossible to cure. Although it has all these promises, it is necessary to regulate the research and development of stem cell to ensure that the rights of subjects, donors, patients, including doctors are guaranteed while preventing any unethical misconducts, violations or fraudulent activities involving stem cells research and therapy. Recognizing its large potential Malaysia begun its stem cell research as early as 1987 with the first documentation of bone marrow transplantation done by University of Malaya Hospital (UMH)(Gan et al., 2008). It has been growing ever since judging from the rising research and transplantations. Due to the many unknown (unidentified) elements of stem cells and its research it is quite normal not to mention fair that there is clearly opportunity for manipulation, which necessitate the need for regulations. In fact, the continuous request for individual clinical trial’s approvals led to the urgent development of the Guideline on Stem Cell Research in 2006. Although the formulation of the stem cell guideline is timely, but it is hard to distinguish if the stem cell research and therapy in Malaysia is regulated or not. Unfortunately, with a standard protocol aided with the recommended practice of the Guideline for Stem Cell Research and Therapy (2009), the stem cell research in Malaysia is largely unregulated allowing exploitation. There are several concerns identified beginning with the marketing of unapproved stem cell products to the unlicensed entity conducting stem cell research, while Malaysia is left with a guideline as oversight.

This study aims to review and discuss the progress of stem cell regulation in Malaysia beginning from the guideline to the intricate challenges of policy making involving stem cell research and technologies. It is important to study the origins of the regulative protocols practiced by the pioneering countries such as UK, US and Australia, as it will help other developing countries like Malaysia and South Africa to learn the intricate details in policy or law making. The experiences and challenges faced by these pioneers could prove valuable in helping Malaysia to equip itself with what is necessary and as deterrent to the many implications brought over by loose oversight.
2. Stem Cell in Malaysia

Stem cell research in Malaysia, is greatly improving. A search through Web of Science (WoS) Core Collection or the MEDLINE database indicates that there no stem cell research articles published in the 1980s by authors affiliated with Malaysian institutions. The earliest article as reported by MEDLINE database was written by Chan, Lin, Ariffin, Ariffin, and Saw (1999) titled, ‘Treating high risk childhood solid tumours with autologous peripheral blood stem cell transplantation – early experience in University Hospital Kuala Lumpur’. This is clearly not the only evidence of when stem cell research begun in Malaysia, in fact the resulting transplantation in the form of clinical trial in 1987 well qualifies.

The clinical trial was first documented in the form of bone marrow transplantation (BMT) in 1987 to a child with acute leukemia by University of Malaya Medical Center (UMMC) formerly known as University of Malaya Hospital (UMH). In 1993 the bone marrow transplantation (BMT) was performed to the first adult patient. Ten years after the world’s first cord blood transplantation, UMH performed its first cord blood transplantation to a child with beta-thalassemia (Gan et al., 2008). The National Transplant Registry (NTR) reported that in 2013 there were a total of 312 new cases of transplantations with a total of 12 transplantation centers (National Transplant Registry, 2013). Many of these transplantations are still conducted as clinical trials and have yet to establish as a common therapy across hospitals. Apart from the clinical trials and transplantations, the stem cell research development can be reviewed in the number of publication done in Malaysia. According to the Web of Science Core Collection, as of 6th Oct 2016, Malaysia authored 195 stem cell journal articles which do not include Malaysian authors living or studying abroad and affiliated with foreign institution. Out of this, only 18 was human embryonic stem cell research.

Academy Sciences Malaysia (ASM) published that in 2012, a total of 100 articles were published on stem cells for a span of ten years (Academy of Sciences Malaysia (ASM), 2013). Although the publication numbers are significantly low, it is evident that there is growth. This growth includes the initiation of the private sector of stem cell research and development which begun as the first cord blood and tissue bank established in 2001. The Medical Practise Division (also known as Bahagian Amalan Perubatan) of the Ministry of Health (MOH) Malaysia, declared that there are five stem cell commercial entities that are licensed. According to the Academy of Sciences Malaysia (ASM), there are eight private stem cell companies in Malaysia. Strangely three entities listed in the Academy of Sciences Malaysia (ASM) are not even captured in the licensed entity of the Medical Practise Division’s list. These stem cell companies are made of cord blood and tissue banks and stem cell research companies which are licensed to carry out clinical trials, who also have contributed to the number of publication on stem cell research here in Malaysia such as CryoCord Sdn Bhd and Stempeutic Research Malaysia Sdn Bhd.

3. Stem Cell Regulation

As pioneers US, UK and Australia, embarked on the stem cell research journey in the early 1980s using animal models. A series of legal frameworks were derived and these include, the UK Human Fertilization and Embryology Act (HFEA) in 1990 which covers all research involving embryos and those that have therapeutic potential of human research. In the US, the Dickey-Wicker Amendment (Fischbach & Fischbach, 2004) which was formulated in 1995 during President Clinton’s administration, was meant to restrict the use of federal funds to create, destroy or knowingly harm human embryos.
Prior to the Dickey-Wicker Amendment, there was the President’s Commission for the Protection of Human Subjects of Biomedical and Behavioral Research Act enacted in 1977 with clear provisions on the many matters of human subject in research which remained unchanged. According to the policy, 45 CFR § 46.204 (d) which states, “No application or proposal involving human in vitro fertilization may be funded by the Department or any component thereof until the application or proposal has been reviewed by the Ethical Advisory Board and the Board has rendered advice as to its acceptability from an ethical standpoint” (“President’s Commission for the Protection of Human Subjects of Biomedical and Behavioral Research Act,” 1977). In 1993, the former President Clinton introduced the National Institute of Health (NIH) Revitalizing Act (Public Law No. 103-43) which removed several provisions such as, “(1) biomedical ethics; (2) waiver of a risk standard; and (3) the construction of title IV (National Research Institutes) of the Public Health Service Act. Declares ineffective an Executive Order relating to a fetal tissue bank and a Federal regulation relating to ethical advisory boards”, which allows federal funding of grant to study human fertilization without the need for review by the Ethical Advisory Board (“S.1 - National Institutes of Health Revitalization Act of 1993,” 1993). The concerned Representative Jay Dicker and Roger Wicker authored an amendment for the budget of the National Institute of Health (NIH): Balanced Budget Downpayment Act I, Public Law No. 104-99 (“Balanced Budget Downpayment Act, I,” 1996), known as the Dickey-Wicker Amendment.

When President Obama took office, he retained the Dickey-Wicker Amendment and introduced the Guidelines for Human Stem Cell Research in 2009 apart from the Executive Order 13505: Removing Barriers to Responsible Scientific Research Involving Human Stem Cells signed on 9th March 2009, which displays support allowing all forms of stem cell permitted by law including funding revoking the many restriction imposed by the former President Bush. (National Institute of Health (NIH), 2016) and Australia introduced the Research Involving Human Embryos Act in 2002 which has undergone regular amendment, the most recent being 2016 and the Prohibition of Human Cloning Act 2002 within the Prohibition of Human Cloning for Reproduction and the Regulation of Human Embryo Research Amendment Bill published in 2006 (Parliamentary Counsel, 2016).

In Malaysia, all stem cell related research endeavors/organizations are required to register with the National Medical Research Register (NMRR) and seek the ethical approval of the National Medical Research and Ethics Committee (MREC). The institutions of higher learning (universities) have to gain approval from their institutional review board (IRB) and their institutional ethics committee (IEC). Figure 2 illustrates the review and approval process of the National Medical Research and Ethics Committee (MREC), the institutional review board (IRB) and the institutional ethics committee (IEC) comprises of the assessment of research proposal based on the National Stem Cell Research and Ethics Sub-Committee (NSCERT) checklist (Ministry of Health (MOH), 2009).
Figure 1: The Review and Approval Procedure of the National Medical Research and Ethics Committee (MREC) of any research involving human subject & stem cell. 

[Retrieved from the National Medical Research Ethics Committee (MREC) official website http://nih.gov.my/web/mrec/]

Malaysia does not have any form of regulatory policy or an act concerning stem cell research. The policy makers within the Ministry of Health (MOH) Malaysia found it challenging to incorporate stem cell research and technologies within the existing legislations such as Human Tissue Act 1974 or the Sales of Drugs Act (1952) due to the many unknown features of stem cells.

The Medical Development Division of the Ministry of Health (MOH) Malaysia formulated a guideline on stem cell known as the Guidelines on Stem Cell Research published in 2006 (Ministry of Health (MOH), 2006). Three years later in 2009 the guideline underwent a revision to add several aspects that were overlooked in the original version of 2006, such as the issue of using animal stem cells (xenotransplantation, to incorporate considerations of other religious beliefs apart from the Islamic Fatwa, regarding the use of human embryos and finally to include the resulting deliberation of the many unforeseen consequences of stem cell research and technologies.
Therefore, based on the revision, the Guideline for Stem Cell Research and Therapy (2009) included first, the feedbacks retrieved from the Department of Islamic Advancement of Malaysia/ Jabatan Kemajuan Islam Malaysia (JAKIM), Persatuan Perubatan Islam Malaysia, the Malaysian Consultative Council of Buddhism, Christianity, Hinduism, Sikhism and Taoism (MCCBCHST) and some non-governmental organizations (NGOs), second the resulting response of the ‘Brain Storming Workshop’ in Kota Bharu between 4th – 6th May 2008 involving many experts and finally the feedback ‘Public Forum on Stem Cell Research’ conducted in Ampang Hospital on 18th October 2008 (Ministry of Health (MOH), 2009).

4. Conceptual Framework
The conceptual framework of this study is displayed in Figure 2. Regardless of the many forms of conceptual frameworks, Miles and Huberman (1994) stated that a conceptual framework explains graphically the key points that need study and the supposed relationship between them. It is not just made of a set of concepts but it is a construct that each plays a significant role (Jabareen, 2009). It is the preliminary idea of what one plans to study, how much is known of it and why (Maxwell, 2013). It outlines the research while attempting to connect the many aspects of inquiry including the research problem, the purpose and methodology.

This study begins by looking into stem cell research in Malaysia from a research and developmental perspective while giving attention to the presence of all regulatory instruments including guidelines so as to assess or gauge the weakness or the implications of the lack of regulations pertaining to all stem cell research practices and applications. Policy makers therefore remain the most important group of target respondents in this study.

5. Methodology
This is a qualitative study that aims to explore the many implications of the ‘unregulated’ nature of stem cell research and the challenges of stem cell policy making. Qualitative methodology is often appropriate in answering the “whys” and the “hows” of the human behavior including opinions, attitudes and experiences which is not possible using a quantitative methodology (Guest, Namey, & Mitchell, 2012).
The major focus is within the regulative aspects of stem cell which is largely gathered from the many literatures written internationally and locally, and from the available annual reports and publications of the Ministry of Health (MOH) within their official portals (including its subsidiaries such as Medical Practice Division, Medical Development Division, the National Pharmaceutical Regulatory Agency (NPRA)). There is much too little known and documented regarding the origin and the ramification of the stem cell guideline. The best method to understand and study the unknown is through the most common qualitative data collection method, which is interviews of relevant experts or individuals.

Among the many types of interviews, we chose to combined the in-depth interviews and the semi-structured interview as it proved to be more useful in our pursuit of data collection. Semi-structured interviews contain a few major questions that can assist in outlining and describing the field to explore while permits the interviewers and interviewee to deviate and track a response or understanding in detail, which is exactly how we intended to engage with our chosen experts. In-depth interviews are less structured than semi-structured but it suitable to explore the aspects of respondents’ personal perception and experiences (Bricki & Green, 2007). This is most commonly used type of interview and its flexibility allows extended explanation in pursuit of a particular theory (Gill, Stewart, Treasure, & Chadwick, 2008).

The recorded audio of the interview sessions is then transcribed meticulously to ensure it matches the original recording to minimize data loss. The transcript is studied and analyzed carefully to gain the valuable insights.

5.1 Sample and data collection method

Purposive sampling allow us to select individuals or groups of individuals that is considered as knowledgeable and experienced regarding the topic in study (Creswell & Clark, 2010).

As the study is focused mainly on stem cell research regulation of Malaysia, the stem cell regulators and policy makers are identified as the chosen experts. The identified respondents are attached within the various divisions and subsidiaries of the Ministry of Health (MOH) Malaysia. Semi-structured interviews were employed to gather relevant data based on their perspectives, position and experience to learn the intricate details and challenges involved in the many policy related deliberations.

The respondents include (1) the Senior Chief Director of the Obstetrics and Gynecology (O&G) Pediatrics Services Unit of the Medical Development Division, (2) the Head of Department, Senior Consultant Pediatrics Haematologist of the Kuala Lumpur Hospital (HKL) and (3) the Deputy Director of the Private Medical Practicing Control Section of the Medical Practice Division. The first two respondents are also members of the National Stem Cell Research and Ethics Sub-Committee (NSCERT).

5.2 Validity & Reliability of Study

Qualitative study is accustomed to criticism for its lack of consensus in evaluating their research quality and soundness. However, due to the diverse genre and forms of qualitative study it is well acknowledged that it is impossible to have consensus in assessing any qualitative research project universally (Leung, 2015). The methods in qualitative research are more subjective, personal and often viewed comprehensively within their social framework unlike quantitative study which uses empirical and statistical analysis (Brink, 1993). It is only fair to assess them individually based on their methodology, sampling, result analysis and interpretations.
With that we used the elements of validity, reliability and triangulation to assess the quality of our study. Validity, in research often describes the ‘soundness’ and the ‘trustworthiness’ of the tools, processes and data in a study, which is the ability to measure what supposed to while reliability signifies the consistency of the tool and process used and data measured (Adams & Cox, 2008).

The in-depth, semi-structured interview of stem cell research and technologies regulatory experts in Malaysia as a method of data collection, displays simplicity but definitely valid and reliable as it is focused towards our research goal. It clearly demonstrates trustworthiness and confidence of the data and knowledge gathered, as it is acquired directly from the experts involved in the process of policy making firsthand. Their experience over the course of ten years, in the formulation of the stem cell guideline to the many deliberations for a more permanent solution speaks volume as little is known and would not be able to gather any other way. This method is reliable (any attempt to replicate) to a certain degree depending on several factors such as the individuals chosen, the position level and their years of experience. The irrelevant respondent chosen could lead to diverse data and would be inconsistent. The interviewer also need to be skilled and well trained (acquire the ability & aptitude by practicing and rehearsing) before conducting the session to maximize validity and reliability. Finally apply triangulation by seeking proof and d from a range of source and comparing them to

Triangulation is one method for increasing validity of the findings, through deliberately seeking evidence from a wide range of sources (official portals, annual reports, formal circulars and across respondents) and comparing findings from those different sources, even comparing the finalized respondents’ answers to ensure they were all witnessing the same progress. Although, some data may be difficult to triangulate, as experiences and personal challenges would not be readily available anywhere else and hard to capture (Bricki & Green, 2007).

6 Finding & Discussion
The semi-structured, in-depth interviews of Malaysian stem cell research regulators attached to the Ministry of Health (MOH) Malaysia also known as stem cell policy makers, led to the identification of the many challenges and implications of current stem cell regulation and oversight. These identified facts were not revealed previously and was not captured through the interviews alone, but also through the details gathered from the Ministry of Health (MOH) sources. Figure 3 summaries the findings as whole.
6.1 The Status of Stem Cell Regulations in Malaysia
All three policy makers verified that stem cell research and therapy in Malaysia is unregulated\(^1\). They also confirmed that the Guideline on Stem Cell Research was formulated as a standard in 2006 by the Medical Development Division, of the Ministry of Health (MOH) Malaysia in order to authorize the many clinical trials that were emerging since stem cell was recognized for its potentials. The guideline is acknowledged being only a recommended practice without any legal mandate\(^2\) and meant to act as an interim measure\(^3\) while a more permanent solution was achieved.

A particular case in 2003\(^4\), may be the push factor towards some form of regulatory control? A meeting was held, as quoted by the policymakers ‘haphazardly’ after receiving the call from the Deputy Director General of Ministry of Health (MOH) Malaysia who was approached by the National University of Malaysia (UKM) and the National Heart Institute (NHI) to review the need for the first cardiovascular stem cell transplantation as a clinical trial in Malaysia. The review brought forward the continuous deliberations on the guideline formulation.

The case may have been the reason for the guideline formulation but it received wide publicity as being the first of its kind in Malaysia reported by all major newspapers in Malaysia. Cardiac patient, Allagara Arumugam, 60-year-old had visited the National Heart Institute (NHI) a total of 31 times for chest pains, since his coronary bypass surgery in 1997. As all other surgeries were no longer compatible, he was suitable for the first cardiovascular stem cell transplantation. Ministry of Health (MOH) Malaysia decided in order to authorize the transplantation, it is vital that they design, formulate and publish the stem cell guideline to acknowledge such procedure is a clinical trial that may or may not succeed protecting the welfare of all parties. On 16th September 2003, 20 medical experts from National Heart Institute (NHI), the Kansai Medical University of Osaka and Hospital Kuala Lumpur (HKL) collaborated by successfully performing the country’s first cardiovascular stem cell transplantation, which was one of the few of its kind in the world treating severe heart disease. The procedure involved collecting bone marrow from Mr. Allagara’s hipbone which after process inserted into his heart, and expected to promote the growth of new blood vessel (Lee, 2003).

6.2 The Implication & Challenges of Policy Making
Policy formulation and implementation is a part of being responsible modern government, but it is no easy task (Patton, Sawicki, & Clark, 2012). There are many challenges and bureaucracies surrounding the entire ordeal. In Malaysia, the process of stem cell research and technologies policy making and regulation have had its share of adversity. Often times, it is not the drafting of the policy or the analysis. In fact, it is mostly challenging because of the unexpected consequences and exploitations of stem cell research and technologies.

6.2.1 BCRO, An Illicit Entity?
In 2008, a commercial entity known as Bio-Cellular Research Organization (BCRO) founded by Michael E. Molnar came to Malaysia to set up the largest rabbit breeding farm in Janda Baik, Pahang. BCRO was established in Czechoslovakia but the business took Molnar to UK and US before reaching Malaysia. Self-proclaimed professor\(^5\), Molnar was expected to sign the memorandum of understanding (MoU) with the Pahang states government officials who also owned the Pahang Technology Resources Sdn Bhd (PTR) to lease 81 hectare of land to established the world’s largest stem cell manufacturing facility in which they will breed rabbits from which stem cells will be extracted from to treat human disease (Mohamad, 2008).
Although the so-called historical event made the news involving government officials, however the Ministry of Health (MOH) Malaysia were not consulted until the very end and even then, it was to seek endorsement for the legitimacy of the Bio-Cellular Research Organization’s (BCRO) stem cell therapy. According to the Ministry of Health (MOH) Malaysia there is a lot of requirement before anyone could publicize their stem cell therapies. First, they need to demonstrate several stages of pre-clinical beginning with small animal, big animals and finally primates, second the toxicological testing before they can sort approval or even register them as potential therapies for clinical stage. Luckily, the Ministry of Health (MOH) Malaysia did not share the enthusiasm of the Pahang state officials as their continuous request to test the stem cell products were not entertained by BCRO conforming their doubts.

They were also displeased with the Bio-Cellular Research Organization’s (BCRO) for publicizing rabbit (animal) stem cells in treating down syndrome patients in Malaysia. The procedure that uses transplantation of non-human animal cells, tissues or organs into a human recipient is known as xenotransplantation which has high risk with unknown cross-species effect. Eventually, the project did not see through with the many scrutiny and Bio-Cellular Research Organization (BCRO) was seen making its business elsewhere in Indonesia (Hasballah, 2015).

6.2.2 The Aesthetic Medicine
Another implication due to the unregulated state of stem cell research and therapy is the establishments of many aesthetic clinics in Malaysia that is seen advertising stem cell therapy as a form of aesthetic medicine for treating anti-aging symptoms like skin pigmentation, wrinkles, and even hair-loss. These clinics are licensed under the Medical Practicing Division, of the Ministry of Health (MOH) Malaysia, but unfortunately being a fairly new field of medicine, the only protocol available for aesthetic medicine is clearly written in the Guidelines on Aesthetic Medical Practice (2013) beginning with (1) the registration of any medical practitioners who wishes to practice aesthetic medicine with the Malaysian Medical Council and have acquired valid Annual Practicing Certificate, (2) the registration of the establishments that the medical practitioners will be working in within the Private Healthcare Facilities and Services Act (1998) and Private Healthcare Facilities and Services (Private Hospitals and Other Private Healthcare Facilities, Private Medical Clinics or Private Dental Clinics) Regulations 2006 and (3) they are also required to obtain a Letter of Credentialing and Privileging (LCP), which is issued by the Medical Practicing Division, Ministry of Health (MOH) Malaysia once received recommendation from the Cosmetic Dermatology and Laser Medicine (CDLM) Board under the Dermatological Society of Malaysia for the aesthetic procedures they intended to offer (Ministry of Health (MOH), 2013).

Surprisingly, the guideline in its stipulations did not at any given time mention about the presence or use of stem cells in aesthetic medical procedures, creating doubts. Perhaps, each of these clinics have gotten their Letter of Credentialing and Privileging (LCP) but it is almost impossible to determine if they did as they are no record or relevant documentations to proof. This complicates our intention as well as of the general public, to verify the legitimacy and validity of the products and the services offered by such aesthetic clinics.

Somehow only certain clinics are identified incorporating stem cells in aesthetic medicine while the others have not, but the stem cell guideline failed to capture it as well, corroborating the fact that there are more unknown as far as stem cells research is concerned and hence easily exploited.

6.2.3 Other Unproven Commercial Entities
Apart from the Bio-Cellular Research Organization (BCRO) and the aesthetic medicine, there are other private entities including some private medical healthcare facilities and stem cell marketing entities known or identified offering unproven services defying the stem cell guideline. These entities are
either marketing stem cell beauty products ranging from stem cell drinks, facial masks to unproven therapies for many conditions which are publicized widely in their websites and even in newspapers. Sadly, it is almost impossible to distinguish the compliance of this entities towards standard protocol mentioned in the stem cell guideline due to the sensitivity of the matter.

The license and accreditations of these entities are not declared in their webpages, or registered in the Medical Practise Division, of the Ministry of Health (MOH) Malaysia lists of licensed entities. This raises doubts and suspicion of the legality of the entity and their services, but it is hard to rule out the possibility of these entities operating concurrently while requesting for license. Approaching these entities could only result in them concealing the truth and not forthcoming fearing legal suits.

6.2.4 The Deliberative Democracy

The regulation of stem cell research and therapy was challenging according to the policy makers, as they could not figure out the complexities of stem cell and if it was necessary to deal with the research and transplantations separately. It was first set as an ad hoc measure under the National Committee on Human cloning as Technical Committee on Stem Cell Research as presented by Figure 3 (Ministry of Health (MOH), 2006).

While the stem cell issue still at large, the Ministry of Health (MOH) Malaysia deliberated on the stem cell transplantation matters initiated by the first lady Deputy Director General of Health (Medical), Datuk Dr. Noorimi Morad. There were three Deputy Director General which are Deputy Director General of Health (Public Health), Deputy Director General of Health (Medical) and Deputy Director General of Health (Research & Technical Support). In 2007, Datuk Dr. Noorimi Morad was acknowledged for her initiative and guidance for the development of the National Organ, Tissue and Cell Transplantation Policy. She was also a part of the National Standards for Stem Cell Transplantation: Collection, Processing, Storage and Infusion of Hematopoietic Stem Cells and Therapeutic Cells that was published in 2009.

Figure 3: The Various Sub-Committees within the National Committee on Human Cloning [Retrieved from the Guidelines on Stem Cell Research 2006]

The transplantation matters were initially addressed due to the emerging bone marrow and cord blood transplantations in Malaysia. The embryonic stem cell, adult stem cell and the other hematopoietic stem cell were reviewed and dealt with directly by the Medical Development Division as clinical trials. Some aspects of the embryonic stem cell research and the advancing technologies was brought within the oversight of the former Deputy Director General of Research & Technical Support, Tan Sri Datuk Dr Haji Mohd Ismail Merican as Research Division, which was soon formalized as the National Stem Cell Research and Ethics Sub-Committee (NSCERT) in 2010. Prior to the establishment of the committee, stem cell research projects are reviewed by the National Medical
The main concern was the issue of transplantation and the need for an act that would help regulate not only the standard solid organ transplant but also the latest stem cell therapies and transplantation altogether. Unfortunately, there is no governing act or a policy which would incorporate all of them under one. The policy makers verified that the Guideline on Stem Cell 2006 was formulated as an interim measure. While the guideline was being executed, the National Stem Cell Research and Ethics Sub-Committee (NSCERT) deliberated to fit stem cell within the existing legislation such as Human Tissue Act 1974.

The only existing legislation that have some coverage on the matters of human cells is Human Tissue Act 1974 but it is insufficient to incorporate stem cell or its state-of-the-art therapies. Ultimately this created the gap or deficiency which is impossible to undo overnight as the process of law making would take close to ten years to accomplish. Despite the matters of stem cell, the Ministry of Health (MOH) Malaysia initiated a committee in 2010 to amend the already inadequate Human Tissue Act 1974, to incorporate the overlooked matters such as the illegal practices of the standard solid organ transplantation which were left out originally. The progress led to the drafting of a few revised act, which one of it was presented to the Director General of Health only to be rejected stating that the stem cell transplantation and the solid organ transplantation should be combined under one act.

The suggestion, prompted the committee to concede in combining the two transplantation into one act, instead of devising two separate acts or amending the already existing Human Tissue Act 1974. However, the committee were not completely agreeable and deliberated a great deal about separating the solid organ transplantation and stem cell transplantation. The two-year discussion expressed the supporters of solid organ transplantation’s refusal to combine stem cell in the act stating that the act had a higher possibility of passing without the hemo-therapy and cell therapy. The Director General was not pleased and questioned the fate of stem cell, its regulation and the act that none wanted to work on. As a result, they devised the act that combined both elements, but when presented to the Attorney General at the time Tan Sri Datuk Seri Panglima Abdul Gani Patail, offered different opinion which led the committee to deliberate even more. In 2013, a new Director General of Health was appointed complicating the ongoing discussion and law making, dealing with new opinions and suggestions.

This is clearly evident how the initiation of the overdue, well-needed act which may have begun as it should in 2010, but due to the existing bureaucracy this have yet to materialize. There have been countless deliberations with many proposals for a transplantation act (to combine or not to combine) but it is not ready for the past ten years. The regulators believe that the progression of the proposed policy (or act) is still ongoing and waiting for its statute, which aims to cover all sorts of transplantations including that of stem cell.

Until then there are regulative circulars that was released by the Ministry of Health (MOH) Malaysia which by law are legally binding unlike the stem cell guidelines. They are dated 14th November 2011 (Ref: KKM87/P1/26/10 Jld/ 13(39)) by the former Director General of Health and 2nd April 2015 (Ref: KKM87/P1/26/10Jld 18(41)) by the current Director General of Health (Ministry of Health (MOH), 2011, 2015). These circulars are issued by the Director General of Ministry of Health (MOH) therefore is considered as a regulation that needs to be complied, although Malaysia do not have any statute or law in particular. Sadly, although the circulars hold legal mandate, but it is not publicized enough. In fact, without speaking to a Ministry of Health (MOH) official regarding this, no lay person would ever know this to be true. Despite its statute, the circulars similar to the guidelines lacked to display or stipulate the issue of non-compliance and accountability. They also verified that
without any formal complaints or whistleblowers bringing matters into light, it is almost impossible for them to act accordingly. The public sector which includes the Clinical Research Centers (CRC) within hospitals, research laboratories of the institutions of higher learnings (universities) and other National Institute of Health (NIH) laboratories (such as Institute of Medical Research (IMR), National Cancer Institute (NCI) and National Heart Institute (NHI)) are well regulated as they have an inclination to adhere strictly to the guideline and even the circulars being public servants. However, the private sector has the most amount of concerns with unregulated and exploitation issues.

6.3 The Future Policy
The technicalities of the stem cell research, transplantations and therapies including the existing complexities of solid organ transplantation policy making, have brought enormous amount of deliberations and discussion over the last ten years involving various experts within the Ministry of Health (MOH) Malaysia. It is an ongoing procedure although claimed to be at its final drafting stage securing approval of their legal experts but will only take into effect once passed in the parliament. However, in order to reach the parliament, it is necessary for the draft to be presented to the current Attorney General the Honorable Tan Sri Dato’ Sri Haji Mohamed Apandi Ali for his approval. If passed the new transplant act would not only replace the Human Tissue Act 1974 but it will include what is disregarded in the Private Healthcare Facilities and Services (PHFS) Act 1998 as well.

Although at its final stage, due to the red-tape bureaucracy it could take longer than anticipated before the act is passed and legislated into law, as it not taken a decade already. Until then, the stem cell research and therapy will be managed by the stem cell guideline, the National Stem Cell Research and Ethics Sub-Committee (NSCERT), the Private Healthcare Facilities and Services (PHFS) Act 1998 and the formal circulars.
The guideline as mentioned is only a general statement without any mandatory control. It sets the parameters within a policy, standard or procedure. It is only a support document which is optional and not rigid (Howard, 2003). Some authors define guideline as a systematically obtained statements which help practitioners to decide about the care in certain clinical circumstances (Manchikanti et al., 2009; Woolf, Grol, Hutchinson, Eccles, & Grimshaw, 1999). This gives an impression that the existence of a guideline would be more authoritative and influential combined with a formal decree set out to achieve goals. Figure 4 shows the ranking order of policy and guideline.

![Figure 4: Policies, Standard, Procedure and Guideline](Retrieved from Harold Tipton's The Information Security Management Handbook, 5th Edition)

The Oxford (2012) dictionary defines policy as “a course or principle of action adopted or proposed by an organization or individual”. It also defined by Hare (2009) as a board document that states how the organization is to perform. It is a formal high-level statement that is mandatory. It describes the desired results, outcome and goals of the organization which is further supported by standards and guidelines. In another word, a policy defines the achievement goals of government ministries and the system or principle it may use to attain them. There could be variation in the definition of policy and that is because it is difficult to define or describe. Each organization can re-define them to fit their vision and mission in attaining their goals. Figure 5 presents the policy hierarchy within any organization, beginning with the basic guidelines all the way to the policy and legislations, such as acts and laws.

![Figure 5: The Policy Management Hierarchy](Retrieved from Harold Tipton's The Information Security Management Handbook, 5th Edition)

There are three major classification of policies, which are regulatory, advisory and informative. In a large organization, such as a ministry, policies can be designed to fit (1) either the entire corporation or within their many departments and divisions or (2) specifically a particular area or technology. In the aspect of regulating stem cell research and technologies, a regulatory policy
could prove valuable. It is something the government ministry require to work with efficiently and professionally. Since the Ministry of Health (MOH) Malaysia operates in the interest of public, maintaining their safety, managing their assets while holding perpetrators accountable for their actions, a regulatory policy would definitely prove worthwhile not to mention imperative. A broad formal research and development policy, one that includes all research and clinical trials involving human participation, newly emerging scientific technologies such as stem cell technology and those that is yet to reach the mainframe need to be devised. This policy should be comprehensive, sustainable and focused. It should incorporate the many unforeseeable but details within expectations and ultimately enable the regulators to see clearly the vision and direction of any specific issue concerning medical and healthcare. Eventually, while this policy has mandate and in place, the regulators can discuss and deliberate freely on other legislation or matters needed within the borders of the policy without worry of exploitation or manipulation. Even the existing guideline will receive the authority it deserves combined with that regulatory policy or an act which may material soon.

7. Conclusion
It is time to realize that stem cell research can be effectively regulated in Malaysia. The development of the Guideline on Stem Cell Research 2006 due to the rising clinical trials is a course that deserves congratulations but it has its shares of shortcomings unable to hold wrongdoers accountable, especially in the private sector. Despite the inadequacies, the guideline remained as the only form of standard concerning stem cell. The revision it underwent was mainly to add in several aspects which was overlooked compared to the original version due to the lack of exposure on the intricate matters of stem cell.

The formulation of the guideline is a preliminary regulative approach dealing with stem cell research and technologies. It triggered the Ministry of Health (MOH) Malaysia to re-assess the need for a better legislation to overlook and manage the solid organ transplantations. It even brought forward the establishment of the National Stem Cell Research and Ethics Sub-Committee (NSCERT) to help review all the stem cell related research projects.

The absence of a regulatory policy or formal legislation affected both the public and private stem cell research and technologies. The implication and consequences especially in the private sector of stem cell are greater than that of the public. The private sector of stem cell research and technologies involves mainly stem cell products and therapies for profit making allowing exploitations that could prove catastrophic without restrictions.

As far as stem cell research is concerned, the Ministry of Health (MOH) Malaysia is the key player to mobilize the central goal and vision then address the other concerns within that goal. This could possibly minimize resources and time spent deliberating on how to better tackle the situation. The challenges of regulative deliberations are dreadful but a necessary commitment in attaining order and creating governance. The matter of unknown consequences and exploitation of the stem cell research and technologies, often creates room for more deliberation but unfortunately to deal with the rising concerns but not as preventive measure. This is a challenging concern for the authority dealing with such novel technology. Hence, the establishment of a policy or an act, would definitely prove useful and efficient in fulfilling the ministry’s vision in regulating and managing stem cell research and its many emerging technologies.
Notes:
1,2,4 The data was retrieved & verified from the interview with the Senior Chief Director of the Obstetrics and Gynecology (O&G) Pediatrics Unit within the Medical Development Division, Ministry of Health (MOH) Malaysia & a member of the National Stem Cell Research and Ethics Sub-Committee (NSCERT)

1,2,3,4,5,6,8 The data was retrieved & verified from the interview with the Head of Department, Senior Consultant Pediatrics Haemato-oncologist of the Kuala Lumpur Hospital (HKL) & a member of the National Stem Cell Research and Ethics Sub-Committee (NSCERT)

7 The data was retrieved & verified from the interview with the Deputy Director of the Private Medical Practicing Control Section within the Medical Practise Division, Ministry of Health (MOH) Malaysia

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