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Forensic use of Genetic Information under Criminal Investigation and Prosecution in Rwanda: Is there any Ethical and Genetic Privacy Violation?

Thierry MB*

Forensic Law Expert, Kigali Independent University (ULK), Rwanda

***Corresponding author:** Murangira B Thierry, Forensic Law Expert at Rwanda National Police/ Criminal Investigation Department (CID) and a Senior Lecturer at Kigali Independent University (ULK), Rwanda, E-mail: thierrybm_murangira@yahoo.com

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Abstract

The advancement of science and technology mainly genetic engineering is extensively remarkable in the justice system. The development of forensic science particularly genetic based evidence (DNA) brought great contribution in various field of justice chain. The use of genetic information known as (DNA) information in justice has a great impact on investigation and prosecution of criminals. However, its use has created two major conflicts between public and private interests. The former deals with safeguarding justice by defending the interest of the public through ensuring security and public order and the latter intends to protect fundamental human rights such as right to genetic privacy, right against self-incrimination, autonomy of the body, human dignity to name a few. Although, forensic use of genetic data has a remarkable positive impact on justice system, it has also created a threat to some of human rights such as genetic privacy. The paper therefore explores the impact of the use of genetic information on fundamental human rights in administration of justice examining whether the use of genetic information is or not an antithesis to the fundamental rights of genetic privacy, human dignity and integrity of the body and ethical principles.

Keywords: DNA Data; Genetic Information; Right to Genetic Privacy; Integrity of the Human Body; Human Dignity; Respect for Persons; Informed Consent

Abbreviations: DNA: Deoxyribonucleic Acid; AAAS: American Association for the Advancement of Science; UDHR: Universal Declaration of Human Rights; EAC: East African Community

Introduction

The safety of the society from criminal activities is the State's main obligation and responsibility. Nevertheless, these obligation and responsibility has to be implemented

with due respect of various fundamental ethical values, existing legislations and established human rights principles. Today DNA data is an essential tool in many criminal investigations and prosecutions. Despite that, some concerns have voiced in regard to the use of DNA information, are related to the collection, retention and release or share of genetic information, its potential conflict with some basic legal aspects, human rights (respect of dignity of human and genetic privacy right, respect of human dignity) and ethical principles (consent, autonomy, integrity of the body, etc.).

There is in depth inquiry therefore to ascertain whether the use of genetic information/data is or not an antithesis to the human rights and ethical principles. The author explores how information generated from DNA test can be applied in the legal system of Rwanda without interfering with human rights and basic ethical principles of the individuals. It is against this background that the researcher has delved in the aforementioned challenges brought about by use of genetic information in the administration of criminal justice.

Arguments in the analysis are based on results of non-doctrinal PhD research carried out in the Republic of Rwanda in the year 2013. Since the scope of present paper is restricted on the use of DNA information in relation to the respect of fundamental principles of ethics and human rights; the author finds it appropriate to bring together the findings of only two questions which were designed and administered to test whether the use of DNA information violates genetic privacy.

Research Methodology Used

It is said that selection of a suitable research techniques and methodology is an important stage in legal research. In the aim of achieving the objectives of this paper and providing scientific responses to the framed questions, the author has selected to use empirical and doctrinal methods. Doctrinal method (Secondary data) and Non-doctrinal (primary data). The author also used qualitative research technique to also test how the usage of genetic information has been understood and how it can be entrenched by actors of justice.

Doctrinal /Non-Empirical Method

Secondary data: The secondary data was drawn from various sources such as: books, law journals, law commission reports, periodicals, research articles, internet web sites, etc.

Non-Doctrinal/Empirical Methods

Primary data: The primary data have been collected from case laws, constitutions, international instruments, statutes, structured comprehensive questionnaires, interviews and observations. During empirical data collection, questionnaires were administered to Judges, Judicial Police Officers, Public Prosecutors, Lawyers, University Lecturers, Law students and others. Since the topic of research is a new addition in the books and the rareness/lack of information relating to the same in the legal system of Rwanda, the author has decided to carry out empirical research to collect primary data in order to acquire proper understanding of the impact of using DNA information on the right to genetic privacy and to establish the reality of situation on the ground. The distributed questionnaires and interviews intend to find out whether the use of genetic information in criminal justice system violates the right to privacy namely genetic privacy and to see whether its application does not violate ethical values and fundamental human rights.

Tools used to Collect Data

Tools such as questionnaire, interviews, discussion and observation were used in this research whenever it was required at the time of collecting data.

Brief Overview of Genetic Information

Genetic engineering offers great potential and public benefit. It is estimated to change considerably the ability of law enforcement agents and Prosecutors to detect, prevent, investigate and prosecute, hence reducing crimes. The accomplishment of these public benefits necessitates that police investigators and prosecutors have access and utilize genetic information. Meanwhile, the scientific use of genetic based evidence known as DNA evidence in the justice system requires cooperation between two twin disciplines namely law and science which are regulated by formal requirements, standard, principles, rules and limitations. On the other hand, a combination of these two subjects or disciplines is extensively boosted towards safeguarding and administering justice in criminal as well as civil matters without completely holding, surrendering or abandoning their independence [1].

Current development and progress of science and technology have a great impact on administration of justice and the promotion of law and order. Although introduction of genetic based evidence namely DNA evidence in criminal cases as well as civil matters was initially scrutinized and met with significant debate yet, it

has now become a significant tool in the administration of justice. The ever evolving advances in DNA technology and its impact on the right of an individual and its societal effect have generated imperative need for getting acquainted with an understanding of the basics of modern genetic science for playing an effective role in the justice delivery system. Apart from detecting, investigating and prosecuting offenders, the use of genetic information has extensively generated another assistance of exonerating individuals falsely accused to have committed crimes. This has revealed a remarkable instance of the development and new impact of genetic information in rendering justice.

The prosecution of offenders, safeguarding and exoneration of innocent individuals suspected of crimes are the prime purpose of any criminal justice system [2]. Genetic based evidence plays a crucial role in detection, investigation and prosecution of crime such as murder, rape, case of abortion etc. It also plays another important role in identification in case of mass murder, disasters where human bodies are many. In civil matters, it plays a role in solving issue of immigration, parent's identification through the methods of DNA test when family relationships are in question.

Currently, actors of justice, academicians and researchers, etc. have realized the importance of genetic information in justice delivery. At the same time legal, ethical and human rights issues as well as other challenges raised by introduction and use of genetic information in administration of justice cannot be overlooked. The use of information generated from DNA has provoked two main conflicting interests namely public as well as private interest. The former is related to the protection of public against crimes, ensuring public order and security, while the latter concerns protection of individual interests such as right to genetic privacy, bodily integrity, autonomy of the person, to name but few. For instance, genetic privacy right is an interest most cherished by human beings; it is rooted in the system of human moral values and ethics which gives more significance on human rights respect and protection of individuals' interest. It also assumes that respect of social norms would mean respect for individual [3].

Ethical Principles and the use of DNA Information

Respect for persons is amongst the most continuing and extensively established/recognized foundation for protecting individual rights in the search for public interest. The use of genetic information begins with acquiring DNA samples from an individual or crime scene. This process is expected to respect ethical principles expressed in the Belmont report involving declaration of principles of ethics to regulate research relating to human subject [4]. Forensic Law Experts and Forensic Scientists envisage that collection and usage of DNA information in justice delivery should also be governed by ethical principles since they are much connected with human rights and legal procedures. This would foster investigation, prevention and reduction of crimes through respect of ethical norms and human rights.

Common Bioethical Principles

The guiding ethical principles declared under Belmont Report of 1978titled "Ethical Principles and Guidelines for the Protection of Human Subjects of Research "envisaged the protection and respect of individual involved in research. This report brought great changes in terms of providing definition of bioethics. It came to answer problems engendered by Tuskegee study conducted from 1932 to 1972 [5]. The Belmont Report established and defined three ethical principles namely respect for persons (human dignity, autonomy), beneficence and justice. Later on, Childress and Beauchamp in 1983 released a book on principles regulating respect of biomedical ethics; wherein a fourth principle namely non-malfeasance was added [6]. A good number of these biomedical principles and value scan also be found in the practice of Hippocrates, which has been based on various worldwide deontological codes. These principles have been also replicated and comprehensively used as basic structures for bioethical issues in the various documents including Convention on Human Rights and Biomedicine of European Council and American Association for the Advancement of Science (AAAS 1999).

In this view, the author advocates that these principles should also be engrained in the justice system and be adopted as guiding principles for all actors of justice whenever the use of genetic based evidences are involved to minimise any ethical or human rights interference.

Principle of Respect for Persons

The principle of respect for persons sets two main obligations. The first obligation requires that individual should be treated as autonomous person and second obligation is that individual with lessened autonomy be given a special protection. This principle creates also moral requirements to the concerned individual requiring to admit and recognise autonomy and provide protection to the people with lessened autonomy.

Applying the principle of respect for persons in the use of genetic information; the first elementary principle that shall guide gathering and use of genetic based evidence is autonomy. Respect for autonomy strengthens and supports the law of consent, which is hypothetically intended to protect the right of individuals to take decisions based on their own values and motives [7]. Whether an individual deserves to be given autonomy, the mere fact is that any human being should be free from coercion or external influences. This has raised a debate over informed consent since the20th century, because principally it is based on medical ethics which form biomedical ethics [8].

For instance, the prerequisite of informed consent to medical treatments is always justified with request to patient's autonomy. In this case, the patient is well informed on the effects of medication or procedures on his/her body. Informed consent entails that information be shared with a potential subject; so that the information provided to him/her should be done without duress or coercion and that the patient should agree to participate. The information provided to the individual subject should specify the purpose of informed consent, procedure individual subject will undergo, risks, expected advantage and alternative formalities in case the side effect or first proposed procedure fails.

Certainly, it is generally assumed that there is a theoretical connection between the respect for autonomy principle and the consent [6]. This connotes that the respect for autonomy of the individual is prerequisite to obtain consent meaning that a person to be autonomous is to consent on what has to be done on his/her body.Recapitulating this reasoning in the use of genetic information in justice system, it implies that non-extensive consent would never be admitted as just informed consent due to the fact that DNA sample provider lacks enough information necessary to provide valid decision in terms of providing permission to use his/her DNA sample in investigation. This reasoning also implies that informed consent is not an end in itself but a means to achieve the end. It requires that one be informed of all information relating to the use of his/her DNA sample. As DNA may reveal more information about a person and their family. The main aim of informed consent is to legitimize and safeguard investigating agencies and ensure their legitimacy. Thus, the DNA sample should only be used for the purpose for which it has been collected [9].

The use of genetic information in criminal matters involves suspect as subject of investigation. This principle requires that, for the fact of being a suspect, he/she should not be dispossessed or denied the chance to volunteer and provide DNA samples. Under criminal cases and suspect circumstances, there is risk that they may be forced to provide DNA sample. Whether letting a suspect to volunteer or forcing them to provide DNA sample for testing in the interest of investigation, engenders challenges. Respecting the autonomy of the suspect in criminal cases is challenging as the suspect may refuse to cooperate and to provide DNA sample. It is sometimes a question of balancing conflicting interests created and forced by the principle of respect itself [9].

With respect to other approaches such as, DNA samples collection, for instance, samples of human tissue, blood, saliva, etc. police investigator(s) must often take responsibility that; those who provide DNA samples are entitled to receive genetic privacy protection and be given the chance to exercise such right. For instance, in criminal investigations, there is a time when a particular set of data do not permit to ascertain who is a suspect. However; a collaboration of various information from databases provides the chance to identify the suspect. For collection and use of DNA evidence in investigations, consent of DNA sample provider is needed.

Convergence between Autonomy, Integrity of the Body, Informed Consent and Collection of DNA Samples

Autonomy of the body is another significant aspect supporting the respect for genetic privacy right which derives from principle of self-determination. It entails that respect for persons and dignity which is also much connected with the informed consent. To achieve respect for autonomy, the police investigator needs to respect the principle of informed consent and vice versa. As stated earlier, a person to be autonomous is to consent on what has to be done on his/her body.

Besides, the principle of respect for bodily integrity which is considerably connected to the dignity of human being and respect for autonomy of the body which are at the fore front. Thus, this explains that every individual must respect autonomy of the individual, hence, respecting his/her integrity. Additionally, respect for autonomy of the person entails respecting his/her consent which in return means respecting the integrity of the body. These three ethical principles namely; autonomy, consent and integrity of the body together form a triangle of biomedical ethics [10].

Applying this biomedical triangle in criminal investigation, the principle of respect for autonomy, informed consent and integrity of the body while collecting DNA sample from a suspect should be an ultimate goal of any investigating officer, prosecutor and any kind of forensic practice. Moreover, these principles require that the source or originator of genetic data whether victims or suspects be asked for their approval before any other procedure be taken and be informed on the purpose of collection of data. This should be firmly respected to avoid human right infringement and would diminish the likelihood of the misuse of genetic data.

Analysis of Ethical Point of View of informed Consent vis-a-vis Collection and use of Genetic information

The scrutiny of ethical point of view of informed consent, intends to provide clarifications of ethical behaviours while collecting genetic based evidence from an individual suspected to have committed an offence. This action of collecting and using genetic based evidence poses ethical challenges. It has a direct impact on legal and human rights principles such as right to genetic privacy, bodily autonomy and generally human dignity. Various ethical principles and documents of code of conducts have been scrutinized to assess whether if they can provide solution on the existing issues or whether it can support and provide standard and principles to regulate research done on human subject [10].

Ethical principles are significant in any research or act (withdrawal of blood for DNA test) involving human body. In certain circumstances, it is difficult to deliver complete justice based only on legal principles whilst ethical principles are ignored. It is not always the case but in certain situations respect of ethical principles help to administer complete justice. For instance, when a suspect is required to give blood sample for DNA test, it will be absurd if the police investigator only relies on legal principles without putting into consideration ethical principles.These principles are mental conceptions that guide human on which reasonable action to be taken in a particular situation. As an alternative, it is significant to adopt the general ethical principles enshrined in Belmont report and aligned them with investigation techniques to form guiding principles to govern procedures of collection and use of genetic information in justice system. The latter involves right to privacy protected under various international and national legal instruments. This protection aims at protecting and preserving human dignity. The aforesaid Belmont report provides also some ancillary/additional guidelines of right to privacy of the individual and consent.

The difficulties associated with the requirement for consent during investigation leads to the question of whether the police investigator in certain circumstances should overlook to request for consent. It is not always possible to get consent before using genetic information for instance in criminal cases where there is recognised exceptions to the requirement that informed consent must always be sought; for instance, when the suspect is caught red handed or when there is likelihood that the suspect will escape, destroy, hide, taint, falsify evidence of criminal offence or when DNA evidences have been left at crime scene. For instance, in the US investigation system when one is jailed, compulsorily his/her DNA must be taken.Additionally, in case of special need doctrine for example when there is high level of state interest. In these circumstances, several issues such as autonomy of the person, consent, genetic privacy right and right against self-incrimination are raised whenever an individual is forced to give DNA sample for testing.

However, to escape from this legal trap, police investigator should be allowed by law in special or exceptional circumstances to apply special need doctrine or use an alternative way of getting DNA sample either to prevent, investigate or prosecute perpetrator; otherwise, police investigators will always be blamed for failing to prevent and investigate crimes. It will be absurd to every time expect that suspected individual will always volunteer to give biological sample for DNA test when he/she knows well that such action could incriminate him or her. Police investigator(s) should also not be given blanket power nor be denied all powers because at the end all complaints go back to them. In certain exceptional circumstances, police investigator should be given the possibility to request the court to compel a suspect to deliver DNA sample so that justice can be rendered. However, this compelling power should be exercised as a last resort when other means to acquire DNA samples, have been truly exhausted. The law should specify and establish the procedure to be used and modality to be followed to compel recalcitrant suspect.Despite relying on different legal principles, so far the Courts in Rwanda are silent regarding whether taking DNA sample compulsorily is constitutional or not.

Principle of Beneficence

Broadly speaking, beneficence as a moral right which connotes that any human action should aim at promoting the good of others, upsurge their benefits and not the

opposite [11]. This principle forbids anyone to do harm to others but work for their betterment. It requires benefits maximization and risk minimization. Beneficence taken as a principle to guide human behaviour, entails that all human beings should take into consideration and bear repercussion or consequences resulting from their actions. Thus, it is required to try to predict or oversee the possible consequences which may result from any action of present and forthcoming decisions. Apparently, such kind of prediction is sometimes not easy and may even be impossible. Nevertheless, the primary challenge caused by beneficence is based on the fact that there is time when it conflicts with autonomy principle [10]. The experiences show that, it is not always possible to satisfy all people. This means that what is a benefit to one person may be detrimental to another or vice versa. Reiterating this argument in the use of genetic information in criminal investigation, there is a conflict of interest between individual and collective interest. For instance, a suspect subjected to provide DNA for investigation as individual interest and to curb proliferation of crimes as collective interest. Even if it is not easy describing or quantifying a particular impact of a good or harmful action that is adequate for every individual, it is clear that certain effects of an action of human being are definitely unbearable.

It is very imperative to take the principle of beneficence into consideration while collecting and using genetic information for the purpose of administration of justice. With respect to, for example, the gathering of biological evidences is required to assess the benefits, identify and likely danger which might occur in that particular action. The benefits should be balanced against the harmful effects, then take action. Mainly; if the assessment of risk is challenging and higher than the benefits or does not allow practical suggestion, scholars argue that the principle of beneficence suggests that there should be an interruption of that collection and use of DNA information [10].

Principle of Non-Malfeasance

In bioethics, the principle of non-malfeasance entails that an individual should not deliberately generate an unnecessary damage to the person seeking medical care, either by omission or commission. This reflects the idea of avoiding negligence or carelessness while exercising medical duty. It also reflects the idea that none should be a source of harm to another person. Giving an appropriate and required standard of care that diminishes and circumvents the danger, likelihood of damage or injury is required not only by ethics or morality but also by ultimate conviction of human being and laws that regulate the society in general. Thus, an individual can be held ethically and legally responsible for failure to fulfill the standard of care required by his/her profession [6].

Furthermore, there is another complicated circumstance; wherein a single set of action may be double standardized wherein; one apparently having a good effect and another having bad effect. The principle which regulates this kind of cases is normally known as "double effect standard". This standard of double effect can be illustrated by the following example. For instance, the issue of giving best treatment to a woman who is pregnant whose unborn baby has presented serious complication in the womb. The normal treatment is to terminate the pregnancy to save the mother. However, this practice will result in the death of the fetus.

The author argues that the action that is ethically and legally acceptable is to save woman's life which is the duty of a medical doctor in this particular case. But the woman's consent has to be sought and make decision on what should be done on her body. This means that the action of removing the fetus would be intended to save her life. The unexpected results are the loss of the fetus [6]. The author presents how the principle of non-malfeasance should guide the police investigator and forensic scientist visa a versa their daily work. Reiterating this theory in regard of collection and use of scientific genetic based evidence such as DNA which in certain circumstances some sort of injury or damage appear unavoidable. The sample collector is generally required by morality to select the lesser act among the two harmful acts such as, whether inflicting needle to withdraw blood or buckle swab. This is again challenged by what is considered the lesser evil among two harmful actions may be qualified based on the surrounding situations and facts.

In the case of Goutam Kundu V [12] State of West Bengal, the Supreme Court of India held that, the Court has power to direct blood examination; however, it should not be done as a matter of course or to have roving inquiry. This connotes that the collection or use of genetic information should not be done for the purpose of adventure because this brings unnecessary intrusion of human's rights. There should be a strong prima facie case and there should be a prudent assessment to see what would be the effect of collecting and using genetic data and there should be considerable a public benefit.

Principle of Justice

Justice is an ethical principle that should lead the collection and use of genetic information. The principle requires just and fair distribution of risks and benefits consequential from human acts. It entails that, every individual should obtain his/her share equally and that distribution of share should be based on necessity, merits and person's effort or work. As elucidated by the American Association for the Advancement of Science (AAAS 1999) that: "Since the fruits of knowledge can come at a cost to those participating in research… justice seeks a fair distribution of the burdens and benefits associated with research, so that certain individuals or groups do not bear disproportionate risks while others reap the benefits."

This connotes that "justice" should be understood as neutral benefit. It is most important to understand that a rational and reasonable sharing of benefits and burden does not indicate equality rather it indicates equity and impartiality in distribution of public benefits.

As mentioned above, it is not easy to precisely define the standard of good, benefit and harm. However, if the word "justice" can be interpreted as neutral benefit, the ambiguity is still persistent on the way benefits and burdens can be shared or distributed amongst concerned subjects. This implies that the only existing conception of justice is that which respects human subjects. The principle of justice, for instance, does not support and permit the idea of using a human being in research or any other project when it will not benefit them [13]. The principle of justice is a significant aspect which is an obligation to make certain that the inevitable benefits and burdens brought by the advancement of technology such as DNA technology do not get distributed unfairly among the group of people or institution. Its advantages and disadvantage are extensively and equally shared [14].

Applying this reasoning in the use of genetic information, justice is understood as possibly the complex principle in relation to the collection and use of genetic information. To illustrate this argument in the lens of using genetic information in administration of justice; genetic information should not be used as a tool in the hand of law enforcement agencies or prosecution to suppress individual's rights or to falsely accusing innocent people; rather, it should be used as a tool to administer fair justice to victims while convicting wrongdoers. Moreover, the principle of justice includes the idea of fair distribution. It requires society to guarantee that dangers or benefits should not only be applied to a particular person or group; rather should be equally shared and struggle for the widest sharing of technological benefits [6]. In that context, the principle of justice and fairness involves safeguarding and preserving the identity of those who relinquished their genetic information to minimise risk of injury or harm caused by unlawful release or disclosure of their identity.

Development of the Concept of Right to Privacy

The basis of recognition of right to privacy can be traced back to the year 1890 when Warren Samuel and Louis Brandeis issued a paper titled "the right to privacy" [15]. The authors were advocating for a new right known as right to privacy. They pointed out that this right was nurtured by common law which acquired legal respect in justice arena. The creativity of their argument was driven by the spirit that privacy is the right to be let alone. It is an interest that every individual should automatically acquire not through the struggle targeting to secure other interests. They believed that the right to privacy is the idea of possessing private space, free from interference wherein human being enjoys his/her free space [16].

Various scholars have struggled to define the right to privacy with some precision such as Paul A Freund [17] and Carl J Friedrich [18]. Some of them have a common understanding on the point that privacy is a basic right that should be cherished and legally protected. They added that it is: "the right to control who knows the things regarded as private". According to Jonathan Herring, the rights to privacy means that the right to have autonomy and control to decide what should be seen or let known by others, which gives people the control and possibility to live their lives as they wants[19].

International Instruments Relating to Right to Privacy

Various international instruments provide protection of privacy in theirs provisions. The Universal Declaration of Human Rights (UDHR, 1948) under Article 12states that: "No one shall be subject to arbitrary interference with his privacy, family, home or correspondence, nor to attack upon his honor and reputation. Everyone has the right to the protection of the law against such interference or attacks".

While Article 17 of the International Covenant on Civil and Political Rights, (ICCPR, 1966) provides that no person should be interfered with his/her privacy, correspondence, family or home expect when it is provided by the law.

The Human Right Convention of Europe under its Article 8, it is stated that everyone is entitled with right to respect for his private and family life, his home and his correspondence. There shall be no interference by a public authority with the exercise of this right except when it is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or for the protection of health, morals, right and freedom of others. The ICCPR and Human Right Convention of Europe both recognize that right to privacy is not absolute; they have provided circumstances from which this right to privacy can be challenged or abrogated.

Right to Genetic Privacy and Constitution of Rwanda

Right to genetic privacy and practices of law enforcement have reached at higher level in criminal justice chain. The Constitution of the Republic of Rwanda recognizes right to privacy under its article 23 [20]. It states that: "The privacy of a person, his or her family, home or correspondence shall not be subjected to interference in a manner inconsistent with the law; the person's honor and dignity shall be respected. A person's home is inviolable. No search or entry into a home shall be carried out without the consent of the owner, except in circumstances and in accordance with procedures determined by the law. Confidentiality of correspondence and communication shall not be waived except in circumstances and in accordance with procedures determined by the law."

Based on wordings of article 23 of the Constitution, it seems that genetic privacy was not taken into consideration. This connotes that genetic privacy cannot be protected under the same provision protecting ordinary right to privacy. This lacuna may be due to the fact that the notion of "genetic privacy" is a new concept under Rwandan laws and there were apparently no such ideas of privacy of genetic information before the naissance of modern scientific and technological developments. The development of DNA technology provides the ability to collect and manipulate genetic data which has triggered the evolvement of right to genetic privacy protection. Consequently, issues associated particularly with right to genetic privacy, are challenges brought by the advancement of forensic science. So far, privacy and other related issues concerning the use of genetic information in administration of justice have not been seriously addressed by Rwandan law-makers.

In the US, for instance when one is under investigation and the government collects DNA sample it retains genetic information without providing the possibility of expunging these delicate and complex genetic data. This practice provides a blanket power to the law enforcement agencies in the sense that it gives the possibility to store and share genetic information among security organs which may create the likelihood of misuse of genetic information of an individual.

The best practices suggest that there should be law which provides guidelines to govern the collection and use of genetic information. The law should reinforce and enforce strict respect of the chain of custody of genetic information. It should also provide the possibility of expungement whenever the situation requires. As stated earlier, before the collection of genetic information, consent of the donor should be sought for the purpose of diminishing and likelihood of interfering in human rights of individual. Due to the nature of genetic information, there should be a specific, complete and rigorous protective framework to safeguard its integrity and legitimacy of scientific evidence under Rwandan legal system [21].

The Concept of Genetic Privacy Right

The right to genetic privacy is an interest that prevents third party or any other person from accessing someone's genetic information without consent. The development of science and technology particularly in the field of genetic engineering and the use of DNA sample in administration of justice has created a new concept of genetic privacy. This concept of genetic privacy right was brought by such advancement and is a new concept in many countries including Rwanda.

The improvement of DNA technology has provided opportunities to investigate institutions on how to collect handle and manipulate genetic information. The use of advanced DNA techniques at multiple levels has enhanced and augmented techniques of collection, analysis, understanding and retaining/storage of DNA samples. Genetic engineering and technologies have also brought new questions and need of protection of right to genetic privacy. The innovation of science and technology has made genetic information easily available. The genetic information can intervene and be used when identity of an individual suspect needs to be established. Protection of genetic privacy thus, entails regulating its acquisition, use and revealing someone's genetic information. Due to the sensitive nature of genetic information and its

capability of exposing family genetic information, its protection is highly necessitated [22,23].

Every individual has the right to keep their genetic information private from outside intrusion. Moreover, the term privacy is much connected with many terms such as anonymity, secrecy, confidentiality and data protection. These terms have something in common regarding themeaning of privacy and they diverge in exact descriptions of the terms. The terms presented in this paper are meant to give the meaning of the term "privacy "to reflect their common understanding. The subsequent meanings are also intended to establish the manner from which the US Presidential Commission for the Study of Bioethical Issues approached the terms and utilized them to assist imminent debates concerning genetics and ethics.

Privacy of information means; to restrict everyone from accessing information which is not meant to be accessed by the public. Thus, confidentiality, anonymity and data protection simply are explicit means aiming to safeguard privacy of information in the comprehensive manner, particularly applicable in health and clinical research related. Legally speaking, the term privacy is a multi-dimensional aspect; it is comprised of confidentiality, secrecy and anonymity [24]. As per the author's point of view, the term privacy is also related to protection and security of data, fair information practices, autonomous decision and freedom from undesirable invasion.

Confidentiality and Secrecy

The term confidentiality is used to mean restrictive admission/access to information or data (genetic information) to groups of precisely unauthorized receivers. Confidentiality or secrecy is closely connected with trusting relationships. One can share private information with another person on the understanding that he or she can be trusted to keep that information secretly (i.e, will not divulge it to others). In the context of genetic information, data have to be kept confidential or in secret manner without exposing them to people who are not authorized to know the information. This entails that databases of genetic information must be protected against unauthorised access and information must kept secretly and must not be revealed to unauthorized end users.

Anonymity

Anonymity is applied to imply limitations of access to individually recognizable information relating to an individuals or groups, achieved through intentionally hiding or removing identifiers. Genetic information can be made more anonymous, for example, by removing a suspect's name, address, phone number, social security number or anything which can facilitate identification of the originator of genetic related information by an outsider. In case of genetic data, the information can be kept anonymous by labelling the genetic data with number associated to DNA samples provider.

Autonomy

The word "privacy" has a second separate use in ethics and law. Privacy is an implicit synonym of autonomy with respect to self-regarding conduct and close relations. At this juncture, privacy signifies the absence of outside interference with individuals' decisions and choices. Privacy in relation to genetic information includes; the ability to make autonomous decisions on who should or should not access genetic information. As it was pointed out by Enderlin and Rothstein that right to genetic privacy holds inherent significance since it is characterized by autonomy, wherein respect for autonomy denotes duty to respect individual's right to genetic privacy [25].

Within the legal framework, right to genetic privacy must be considered as human right and individuals should be able to exercise that right through blocking or seeking redress for invasions on their genetic privacy by other people and by the government. Rules and regulations protecting the right to privacy of genetic information should be intended to prevent, lessen or eliminate unauthorized access to genetic privacy.

Genetic Data Protection

Genetic data protection refers to measures designed to prevent unauthorised access, deliberate or unintentional leaks/release of private or anonymous genetic information. Genetic information/data that are electronically stored or transmitted can be protected with computer passwords and encryption. Law enforcement technologies or persons in charge of custody of such information should use technology to protect stored data. In case of genetic information, law enforcement agencies are also entitled to protect data contained in the database with security measures provided to prevent unauthorized access. This would also protect the integrity of the results of DNA testing. In regards of admissibility in court, without strong data protection measures, evidence derived from these data are likely to be challenged against its integrity due to the lack of mechanism of securing integrity of information or protection against contamination.

Reconciling Ethical Principle and the Right to Genetic Privacy

The purpose of establishment of above mentioned common ethical principles is to embrace the norms to reduce the genetic privacy threats that could occur to individuals suspected for a crime and his/her relatives. It also intends to foster criminal investigation to respect fundamental human rights in the name of public benefit. The respect of human being requires that every concerned individual put much consideration to respect the autonomy of a person and respecting someone's opinion and choice while abstaining from hindering their action, except when they are benefiting the society. Enforcement of the principle of autonomy comprises the exercise of the right of self-determination, which necessitates that individual be permitted to take important decisions about one's life or for oneself and according to one's own values or conception of a good life [26].

Respect for a person, entails respect for an individuals' autonomy. It recognizes that respect of individuals' ability should be respected to make decision for his or her own interest in accordance with their own values. In case of medical procedure, for instance, a person to be said to be autonomous he/she must be able to make free choice on what has to be done on his/her body. He/she must decide whether to undergo medical procedure based on what he/she considers best to him or her, taking into consideration of all risks, benefits, beliefs and cost. Reiterating this concept in criminal matters, compelling a person to undertake a procedure such as DNA test, even for the benefits of concerned subject would infringe individual's autonomy which in return indicates lack of respect of human dignity. Every police investigator should understand that respect for person means respect for his or her choice which leads to the respect of right to privacy. The unauthorized collection or disclosure of genetic information undermines the principle of autonomy, which determines the lack of respect of human dignity or respect for person.

The principle of public beneficence, for example, such as crime reduction, prevention and prosecution, support continued research on DNA technology to improve administration of justice. This principle of public benefit advocates that this kind of research should be regulated. The positive argument supporting the control of genetic privacy right is generally based on the rule of respect for person, beneficence, non-malfeasance and justice which together involve the respect for privacy for the purpose of diminishing risk of danger to that person [14].

With the use of genetic information in criminal investigation and prosecution, respect for a person denotes telling or notifying the source of genetic information about the probable risks or effect of his/her choice to provide his/her DNA sample to generate genetic information. The source of genetic information should also be informed about who should have access to his/her genetic information and how this information delivered from DNA sample might be used in the future. Again, respect for person also suggests that law-makers should determine who is authorized to collect genetic information for the purpose of justice. Providing sufficient explanations to an individual who opted to provide DNA samples for testing in criminal matter, for instance, helps them to take a completely informed decision about the probable consequences.

The best practices suggest that the biological sample provider should be informed about who is authorized to access his/her genetic information and how that information will be handled to allow him or her to make an autonomous or sovereign choice. The principle of respect for person should govern all genetic information irrespective of the manner in which they have been obtained such as surreptitious search or familial search [27]. Protection of right to genetic privacy can be enforced through mechanism of informed consent. By means of informing a person about the possible advantages and disadvantages of providing biological sample and providing explanations about security measures of genetic information, an individual can without duress select whether to or not to provide a biological sample for the investigation.

Respect for an individual involves respect for the privacy and human dignity. Respect for privacy undertakes unusual position in debates regarding ethics of genetic information. The disclosure of genetic information relinquishes crucial related health information such as heredity and also affects private lives of others such as relatives who most often did not consent to provide biological sample for testing. If this process is not seriously regulated, the whole biological sample poses threat to the right to genetic privacy. Such threat is compounded by the fact that biological samples collected have possibility to disclose and expose completely unexpected and unintended vital information.

However, this implies respect for ethical principles while gathering and using genetic information in justice delivery. The collection of DNA evidence should be based upon universal respect for human rights and dignity of

human subject involved and any act which does not follow these principles should not be entertained and supported [28].

The author recognises that; with the emerging crimes and advancement of DNA technology, it is challenging to refrain from sharing relevant genetic information among security organs for the purpose of investigation. Even though there is more use of DNA information and DNA data-sharing, this does not mean that individuals are not entitled with privacy protection. It simply connotes more explicit call for protections of genetic privacy interests.It is imperative to bear in mind that all principles put together advocate that individuals are eligible to genetic privacy protections that averts unnecessary intrusion. The absolute prohibition of DNA sample collection, retention and sharing of its information would protect privacy absolutely, however at the same time would hamper crime detection, prevention and investigation, hence diminishing advancement of justice. It would also fail to benefit citizens and society from advances and utility of DNA technology. The author submits that although these ethical principles support respect of human dignity and respect of a person in terms of genetic privacy, however, they do not support the concept of absolutism of right to genetic privacy. Therefore, law needs to balance all above mentioned conflicting interests to allow justice to be rendered at the same time respecting human rights of concerned individuals.

The importance of Protection of Genetic Privacy

The uniqueness of genetic information is that it can link one individual to his/her relatives. It also distinguishes individuals from others. DNA is known to be unique; no two individuals can have same DNA except identical or monozygotic twins. But one should be aware that human genetic code is common among relatives. It is known to be a shared heritage, transferred from one generation to another. This connotes that genetic code or genetic information is exclusively unique to people who are hereditary connected.

The effect of development of genetic engineering on the right to genetic privacy has created the need to have mechanism to protect genetic privacy. Due to its availability, easy manipulation, contamination and accessibility of genetic information; its protection is needed now more than ever. This has resulted in creation of DNA database, where genetic information is retained and stored mostly when sources of that genetic information have not been consulted. The increase of awareness among people about the sensitivity of genetic information have made people to think that without genetic privacy protection an individual's right to protect his/her reputation, right to preserve his/her hereditary information and make autonomous decisions about what should or should not be disclosed or shared on his/her privacy is in jeopardy. This has created the need to have protective mechanisms and measures to govern genetic information. Genetic privacy protection thus entails; regulating the collection, storage, use and non-revealing someone's genetic information without his/her consent. In regards to its sensitive nature, capability of exposing family information [29] and having an influence to human life, employment, productivity choices, health, insurance and law enforcement; the protection of genetic information is highly necessitated. Every individual has the right to keep his/her genetic information private, free from outside intrusion, unless there is a court decision or overriding legal obligation derogating that right. At this point in time, it is of paramount importance to understand how significant right to genetic privacy protection is needed.

Moreover, in order to respect the right to genetic privacy, there should be responsiveness and much attention in terms of respecting above mentioned ethical principles. The complete and absolute prevention of use of genetic information indeed would give strong privacy protection, however, the public would not benefit from the advances of DNA technology in crime detection, reduction, investigation and prosecution; that is intended to be attained by using DNA samples or genetic information in advancing administration of justice. To acquire the benefit brought by the innovations of DNA technology, law enforcement agencies need to have enough DNA samples possibly collected from public by means of comprehensive public involvement to be stored in established DNA database [30]. Common participation will be accomplished only if individuals trust law enforcement agencies and if the society is comfortable that their genetic privacy is strictly protected. Protection of privacy interests of persons necessitates that a variety of measures be set, such as; awareness program, professionalism, reliable/honest law enforcement agent, qualified forensic scientists, adequate security and protective measures of genetic information, policies and laws that hold offenders liable. Comprehensive public involvement to volunteer and surrender their DNA samples to establish DNA databank can also be possible when all law enforcers have a sense of respect of genetic privacy and sound safeguard mechanisms; which is possible in Rwanda.

Another issue is that at present, various developing and developed countries have acknowledged the importance of genetic privacy protection. However, it becomes a challenge when it comes to genetic information sharing during international investigation; for example, in international and trans-border crimes where there is involvement of INTERPOL. Another serious challenge is when genetic information has to be released due to the interest of national security and public order. It creates the conflict between genetic privacy protection and the interest of national security. For instance, at present, Member States of EAC do not provide uniform protection of genetic related information. This impasse generates a conflict when it comes to inter-state forensic evidence sharing. This kind of challenge advocates the need of harmonization of criminal laws and law relating to evidences in the East African Community (EAC). The more genetic information are used, the more offenders are caught and brought to justice and the greater genetic privacy protection is needed due to possible risk of misuses in this domain [2].

Right to Genetic Privacy Protection versus Use of Genetic Information

The progress of human genetics and use of genetic information in various fields such as; medicine, biotechnology, research and administration of justice have brought concerns about genetic privacy protections. The innovation of DNA techniques has established various means of collection, handling and manipulating genetic information. These DNA techniques have made it easier for DNA collection, testing and easy storage [31].

Nowadays, the collection of DNA sample to extract genetic information evades the legal process in the sense that it can be collected surreptitiously, when the consent of DNA's owner was not sought [27]. Advances in science and technology have made genetic related evidence available and reliable when identity of an individual needs to be established. Nowadays; genetic testing has become easier and less expensive. Various agencies and institutions have made accessing the process of DNA analysis and the uses of genetic information publicly available. The threat and likelihood of misuse of genetic information posed by easy availability and access to genetic information should not be overlooked by the government agencies [22].

As per the argument of Makdisi [32]; it is stated that; due to the mere fact that human tissues are nowadays available without problems, the latest tests based on newly discovered information can be applied to invade the genetic privacy of unwitting and unwilling targets of the right to genetic privacy is among those multifaceted rights which necessitate protections due to the ethical and legal challenges it possesses [32]. Generally speaking, genetic privacy entails; the protection of genetic information about an individual, family or population group from unauthorized disclosure (Encyclopedia of Medical Concepts, "Genetic Privacy" Reference M.D). DNA can expose information one does want to reveal such as medical and non-medical information. Medical information include genetic disorder, familiar ailment patterns, environment and drug sensitivities, parental relations, offspring individuality, and sibling linkage, etc. [29].

The use of genetic information for instance in investigation; the best practice requires that the investigator first seeks the permission from the DNA provider (originator). Genetic privacy protection means protection against unauthorized access to individual's genetic data. It has been argued that the concept of "right to be left alone" can be interpreted in the lens of genetic privacy or protection of genetic information in three ways [33]. It was suggested that:

a) Before using genetic information, third party should seek for consent to avoid genetic privacy interference.
b) Third party should not be authorized to access and use individual's genetic information in way that disturbs usual way of living of individual [34].
c) Genetic privacy is a right that deters individuals accessing genetic information without authorization regardless of urgency and need.

The concept of right to be let alone, entails that, the use of genetic information should respect the concept of the autonomy. It suggests that, when the concerned individuals are unwilling to know about their own genetic makeup, nobody should be able to force a person to know about their own genetic information. Besides, individual autonomy is a central ethical principle which considers that individual has the right to determine what he/she wants or does not want others to know about his/her own genetic constitution. There is time when the concerned individual does not want to reveal his/her genetic makeup to anyone. [35].

In the case of, State of Washington v. John Nicholas Athan (160 Wn. 2d 354,158P.3d 27 (Wash. 2007) [36] the courts held that genetic analysis cannot be performed by law enforcement agencies unless the search is considered "reasonable" within the meaning of Fourth Amendment. The Court ruled that, there is a reasonable expectation of

privacy in individual's DNA and DNA analysis and without consent it infringes on the right to privacy. Furthermore, to emphasise the importance of genetic privacy protection, the US Congress has enacted a law protecting this right. The law is titled "Genetic Information Non-discrimination Act, 2008" (GINA) [37]. The enactment of this law has instigated majority of States in USA to enact law and declaring that genetic information belongs to the owner and shall be free from outside interference [38].

Law enforcement Agencies have to be modernised, updated and use scientific evidence. It should not lag behind scientific and technological advancements rather it should be proactive in the sense that they should use scientific evidences to investigate and detect future crimes. This advocates that Rwandan legislators are under professional obligation to enact law authorising the use and protection of genetic information for justice purposes. They should be inspired, for instance, from the model law enacted by USA Congress regarding the use of genetic information in administration of justice.

Findings of Empirical Research

The basis of present paper is the results of non-doctrinal PhD research carried out in Rwanda in 2013 [39]. Among various respondents including Judges, Prosecutors, Polices, Advocates/Lawyers, Law Teachers/Students and Others. The researcher framed questions for Judges, Prosecutors, Police, Advocates/Lawyers, Law Teachers/Students and Others. Although the said research was limited to the actors of justice, the researcher found it indispensable to collect the views of law teachers and students through distribution of questionnaires as they are considered future actors of justice. Since the scope of present paper is restricted to the use of genetic information in justice, the author finds it appropriate to introduce the findings of questions which were designed to test whether the use of genetic information through DNA testing in justice encroaches right to privacy namely genetic privacy. The total numbers of respondents were two hundred seventy six (276).

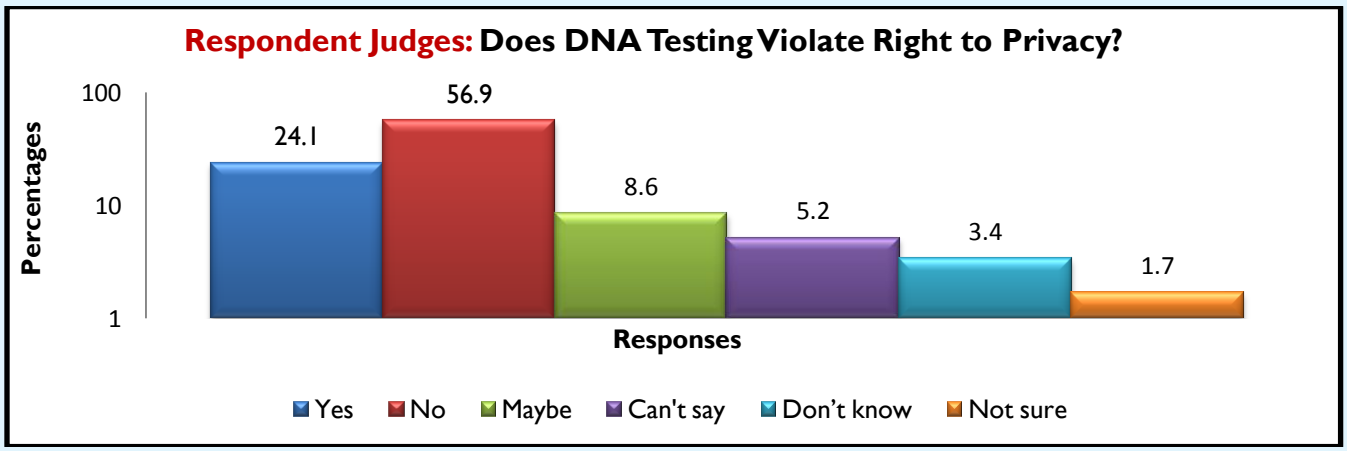
S. No	Respondents	Number
1	Judges	58
2	Prosecutors	62
3	Police	88
4	Advocates	20
5	Law teachers/Students	18
6	Others	30
	Total number of respondents	**276**

Table 1: Total number of respondents in each category.

Analysis, Interpretation of Data and Findings

The graphs below indicate responses of respondents. The researcher has placed the question which respondents were responding inside the graph on top, the percentage of the responses on left side to facilitate easy understanding and attract the attention of the reader.

Question: Does DNA Testing Violate Right to Privacy?

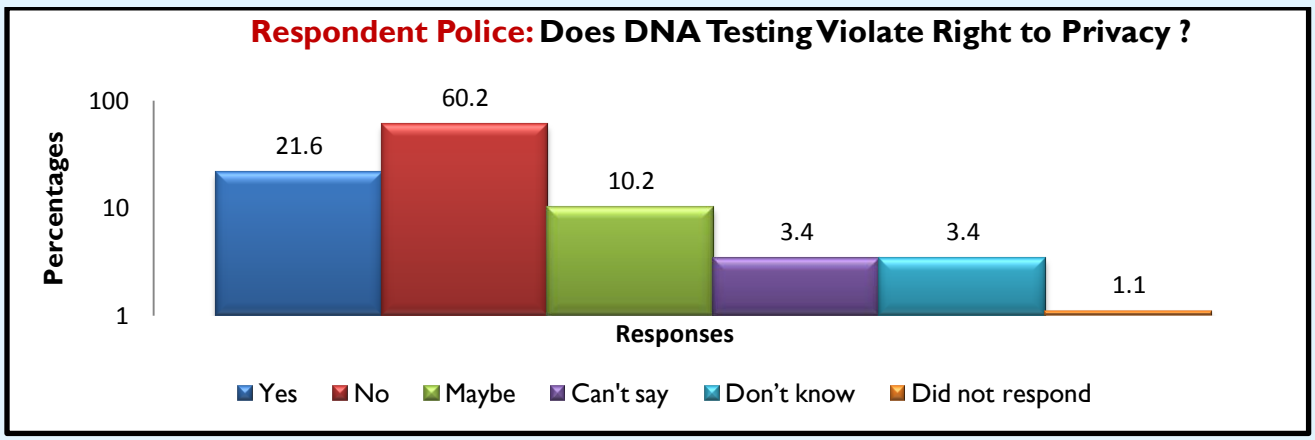


Graph 1: Respondent Judges.

As per the findings of the research represented in Graph 1 above, almost 24.1% of respondent Judges were of opinion that DNA testing violates right to privacy whilst 56.9% of respondent Judges thought that DNA testing does not violate right to privacy. Almost 8.6% of respondent Judges stated that maybe DNA testing violate right to privacy. Another 5.2% of respondent Judges stated they could not say whether DNA testing violate right to privacy, further almost 3.4% of respondent Judges stated that they did not know and 1.7% of respondent Judges were not sure if DNA testing violates right to privacy.

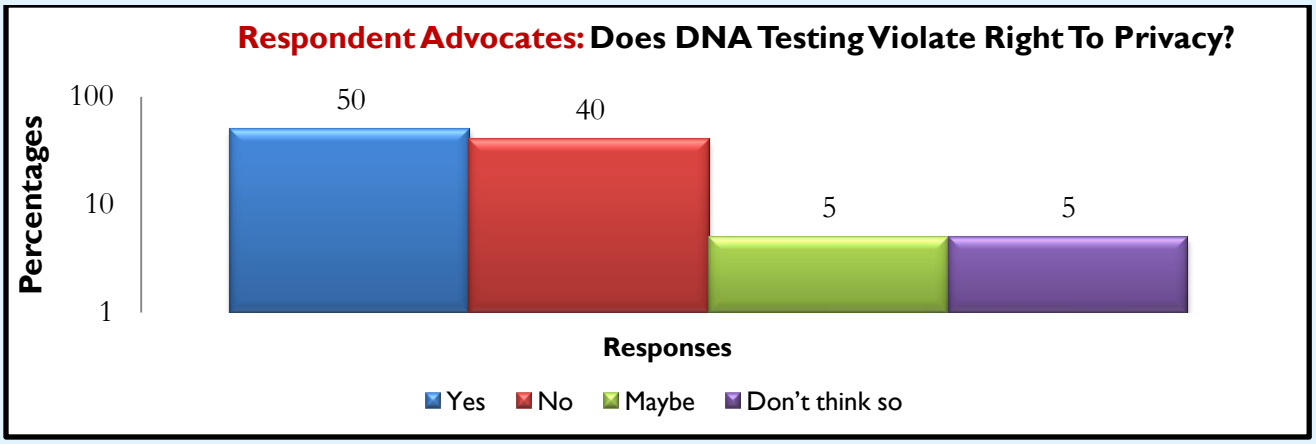
Therefore, from the responses above it can be noted that cumulatively almost, 32.7% (yes +maybe) of respondents Judges were of opinion that DNA testing violates right to privacy and 67.2% (no +can't say + don't know + not sure) of respondent Judges thought that DNA testing does not violate right to privacy. From the above, it is noted that majority of respondent Judges 67.2% state that DNA testing does not violate right to privacy.

As per the researcher, if a person provides DNA sample for testing under Court Order and if the same will not be misused and when it is for public interest then, there is no violation of privacy. DNA testing itself does not violate right to privacy, its misuse, however, does. For example, if someone's test results will be given to an insurance company without consent showing their health status then it is violation of genetic privacy. For detailed interpretation refer to graph no 6.



Graph 2: Respondent Police.

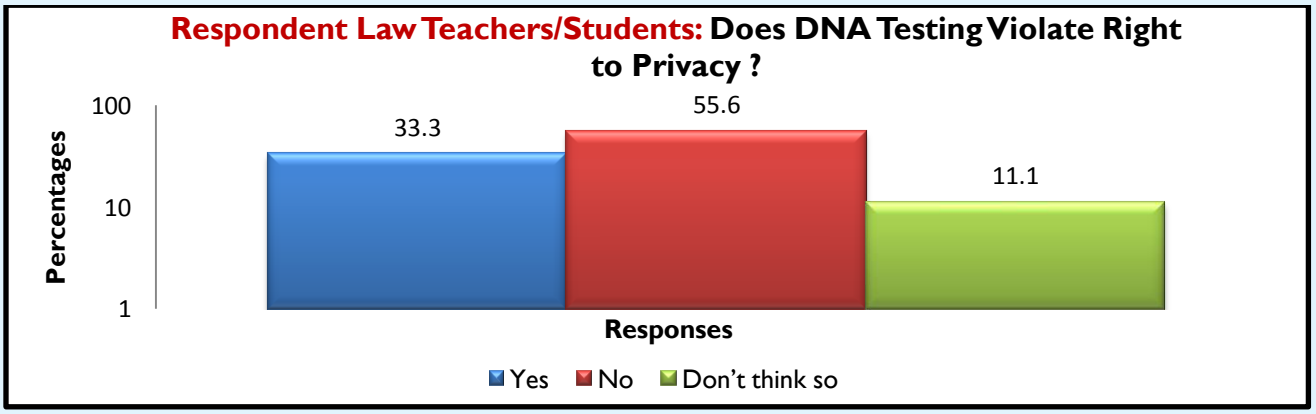
As per the findings of the research represented in Graph 2 above, almost 21.6% of respondent Police were of opinion that DNA testing violates right to privacy whereas 60.2% of respondent Police thought that DNA testing does not violate right to privacy. Almost 10.2% of Police respondents stated that maybe DNA testing violates right to privacy and another 3.4% of respondent Police mentioned that they could not say whether DNA testing violates right to privacy. Further, 3.4% of respondent Police stated that they did not know and 1.1% of respondent Police did not respond. Therefore, from the responses above it can be noted that cumulatively almost, 31.8% (yes +maybe) of respondent Police were of opinion that DNA testing violates right to privacy and 67% (no +can't say + don't know) of Police respondents thought that DNA testing does not violate right to privacy. From the above, the respondent Police are right in asserting that DNA testing does not violate right to privacy. The same is substantiated in graph no 6infra.



Graph 3: Respondents Advocates.

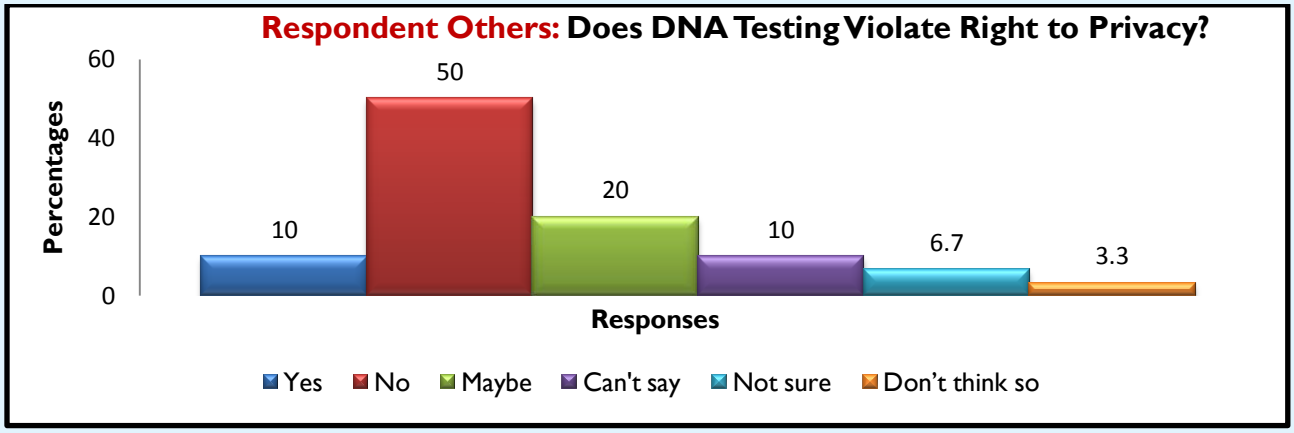
As per Graph 3, almost 50% of respondent Advocates were of opinion that DNA testing violates right to privacy whilst 40% of respondent Advocates thought that DNA testing does not violate right to privacy. Almost 5% of respondent Advocates stated that maybe DNA testing violate right to privacy and another 5% of respondent Advocates stated they could not think whether DNA testing violate right to privacy. Therefore, from the responses above it can be noted that cumulatively almost, 55% (yes +maybe) of respondents Advocates were of opinion that DNA testing violates right to privacy and 45% (no + don't think so) of advocate respondents thought that DNA testing does not violate right to privacy.

As per the findings, the respondent Advocates' views are opposite to the researcher's. This is mainly due to the fact that DNA samples used judiciously i.e. to help in investigations and if Court order for the same has been issued, then it does not violate right to privacy. If Court Order is issued and Judicial Police takes DNA samples and the same is used only for the case at hand then it is not violation of right to privacy. From the above, it can be observed that respondent Advocates' views are contrary to the researcher's views. Hence, need for educating on the same to Advocates in the interests of justice as justice should not only be done but seen to be done. If there is a perception that justice is not done then questions and doubt arise, hence, there is need to eliminate the same. Almost 45% of respondent advocates state that DNA testing does not violate right to privacy if samples used judiciously i.e. if Court Order is issued and Judicial Police takes DNA samples and the same is used only for the case at hand then it is not violation of right to privacy. As per the researcher, this is the correct view. The same is substantiated in graph no 6 infra.



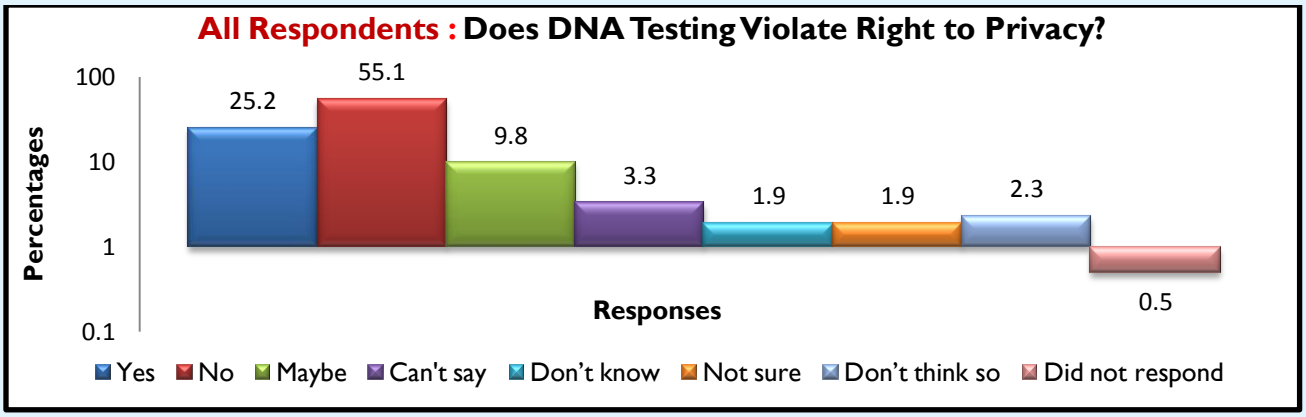
Graph 4: Respondents Law Teacher and Students.

As represented in the Graph 4 above, almost 33.3% of respondent Law Teachers/Students were of opinion that DNA testing violates right to privacy whilst 55.6% of respondent Law Teachers/Students thought that DNA testing does not violate right to privacy. Almost 11.1% of respondent Law Teachers/Students stated that maybe DNA testing violate right to privacy. Therefore, from the responses above it can be noted that cumulatively almost, 44.4% (yes +maybe) of respondent Law Teachers/Students were of opinion that DNA testing violates right to privacy and 55.6% of Law Teachers/Students thought that DNA testing does not violate right to privacy. Almost 44.4% of respondent Law Teachers/Students are of the view that DNA testing does violate right to privacy. As per the researcher, as stated in graph 3 the reasons are similar. This highlights the differing views of the same and the need for more education on the same. Almost 55.6% of respondent Law Teachers/Students state that DNA testing does not violate right to privacy. This is the correct view, the same is also justified in graph no 6. Due to the different viewpoints there is need for more education on DNA technology and the issues that are there to clarify the different standpoints.



Graph 5: Respondent others.

As per the findings represented in Graph 5 above, almost 10% of respondent others were of opinion that DNA testing violates right to privacy whilst 50% of respondent others thought that DNA testing does not violate right to privacy. Almost 20% of respondent others stated that maybe DNA testing violates right to privacy, and another 10% of respondent others stated they could not say whether DNA testing violates right to privacy, further almost 6.7% of respondent others stated that they were not sure and 3.3% of respondent others did not think that DNA testing violates right to privacy. Therefore, from the responses above it can be pointed out that cumulatively almost, 30% (yes +maybe) of respondent others were of opinion that DNA testing violates right to privacy and 70% (no +can't say + not sure + don't think so) of respondent others thought that DNA testing does not violate right to privacy. Almost 70% of respondents stated that DNA testing does not violate right to privacy. This is true as substantiated in Graph 6.



Graph 6: Cumulative Response of All Respondents.

Graph 6 illustrates the cumulative analysis of views of all respondents. Almost 35% (yes + maybe) of all respondents were of opinion that DNA testing violates right to privacy whilst 64.5% (no + can't say + don't know + not sure + don't think so) of all respondent thought that DNA testing does not violate right to privacy and 0.5% of all respondents did not respond.

As per the point of view of the Author, DNA testing is alleged to be invasive based on various grounds. Opponents of DNA testing argue that blood collection is principally intrusive for the reason that it implicates entering the body of someone. The mere entering in the body without the consent of the owner is not only an invasion of privacy but also an invasion into self-proprietorship of human body. Another reason, people have voiced against the use of genetic information from DNA testing; it is because, it is said to be intrusive and its spill over effect. It can easily disclose much more genetic information of people whose samples have been collected and relatives who most often did not consent to provide DNA sample for testing procedure. Compared with fingerprinting, DNA test reveals more information.

From the arguments above, the author is wondering at what extent the Government should be permitted to know and acquire information of its people for the purpose of knowing them. Genetic information is acquired through DNA tests. The latter is done when there has been a process of collection of biological samples found at scene of crime or victim's body. It is argued that there is no privacy violation when genetic information used was generated from biological samples collected from crime scene. There should be no claim for violation of genetic privacy when genetic information used were generated from biological samples left in the space where a rational man has no expectancy of privacy and people do not assume existence of privacy in such a place. For example, if an individual is or walks naked on the beach or down in the road he/she has no expectation of privacy if people see him/her naked. Because, there is no privacy expectation on public place.

It is common-sense and acceptable that there is no privacy expectation of a perpetrator who leaves behind his/her biological samples or his/her fingerprints. There is no harm when they are collected and utilised for identification and investigation purposes. However, there is no reason to believe that a Police Investigator will go against the purpose of investigation and use genetic information generated from DNA sample collected in the course of investigation just to discover hereditary diseases, illness, etc. when such information has no connection with the case under investigation. On the other hand, there is no privacy violation when DNA sample is collected and tested under court order for the purpose of rendering justice. The problem arises when the suspect categorically resists abiding by such order in terms of providing biological sample for testing. When an individual refuse to provide DNA samples various questions arise, such as:

a) Can the suspect be compelled to undergo DNA testing?
b) What procedure is to be followed and the means to be used to compel the suspect to undergo DNA testing?
c) Can the suspect be coerced and handcuffed so that he/she can provide DNA sample?
d) Whether such order is constitutionally valid within the meaning of Article 14 (right to physical and mental integrity), Article 29 (2) (presumption of

innocence) and Article 23 (right to privacy &dignity)of the Constitution of Rwanda?

Fortunately till today there has not been even a single reported case where a suspected individual has been physically coerced to provide his/her DNA sample for testing. Nor has there been a reported case where genetic privacy has been violated by way of DNA testing. The author submits that even though there is no single case reported for violation of genetic privacy, it may be due to the lack of awareness, which echoes how the society does understand and expect genetic privacy. However, to be on safe side there is silver lining that Rwandan Parliament will soon enact specific law to protect genetic privacy and hopefully answer all legal and human rights issues raised in this present paper.

Conclusion

The Author considers that the lack of specific law to govern and protect genetic privacy right provides slippery slope or an opportunity to the third parties to easily access genetic information of individuals without being afraid of consequences arising from such action. There is a legal principle which says that whatever is not forbidden by the law is impliedly accepted. Lack of genetic privacy protection mechanisms creates doubt and distrust among Rwandan society in terms of legitimacy of DNA evidence. The use of genetic information without law governing such use creates a risk of genetic privacy of individuals' subject. Thus, this creates a possibility of illegitimate share and transfer of genetic information among law enforcement institutions and illegal trade among insurance companies.

The author advocates that above mentioned common bioethical principles should also be engrained in the justice system and be adopted as guiding principles for all actors of justice whenever the use of genetic based evidences are involved to minimise any ethical or human rights interference in the name of justice delivery. Given the possible forthcoming misuse of the authority to gather anyone's DNA without consent, the author recommends that there should be legal framework for the protection of usage of genetic privacy. The author highlights that genetic information is of paramount importance in criminal investigation as well as prosecution. However, such use (DNA information) should not interfere with human dignity, rather, it should respect fundamental ethical and human rights principles. This can only happen with a sound and elaborate legal framework that safeguards genetic privacy enhances the integrity and legality of scientific evidence. At the same time, it should not hamper investigation and prosecution of offences relying on genetic information.

The standard of proof should be well elaborated regarding the use of genetic evidence which shall be different from habitual standard of proof in criminal process. To reduce the likelihood of human rights intrusion, there is need for the sound formulation of procedure(s) to safeguard the collection and use of genetic information, procedural safeguard and respect of chain of custody of DNA evidence, protection of genetic privacy.

The legal framework should also govern genetic information or DNA evidence sharing and obtain consent of individual before taking samples in order to reduce bias and likely human rights interference. The genetic information protection law should also establish the circumstances in which an individual's genetic information should be released or protected. This shall also include acceptable genetic information that may be revealed or used when and for what purpose by a protected institution. The author concludes that the use of genetic information in administration of justice through procedure established by law does not violate genetic privacy but its misuses do. We believe that the discussion and contribution in this research paper shed more light on current legal status in terms of enacting law regulating the usage of genetic related evidence in Rwanda.

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